
Big Help Langley Development CIC

Environmental Standards Statement

Proposed Development of 30 New Build Dwellings @ Land at Borrowdale Park,
Langley, Middleton, Rochdale, M24 5GQ.

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1 Executive Summary

This Environmental Standards Statement has been prepared by Watt Energy on behalf of Big Help Langley Development CIC to support a planning application for the development at the Land at Borrowdale Park, Langley. The statement specifically addresses the following Rochdale Borough Council (RBC) approved climate change planning policies, as stipulated in the Rochdale Core Strategy (October 2016):

- **Core Strategy Policy G1 – Tackling and Adapting to Climate Change**
- **Core Strategy Policy G2 – Energy and New Development**
- **Core Strategy G3 – Renewable and Low Carbon Developments**

The statement details how the development will incorporate sustainable design and resource efficiency in line with the Energy Hierarchy, so to meet the policy requirements and council targets whilst reducing its overall environmental impact. The methodology and calculations are consistent with the RBC Appendix A EN6 Energy Target Explanation and all figures used within this report have been based on the most recent issue of drawings and modelled using SAP 10.2 to accurately predict Energy Usage and CO₂ reductions.

In relation to the planning documents and policies outlined above, the development is required to be **Zero Carbon**.

In order to achieve compliance, the development has been designed with a holistic low energy design concept involving a fabric first approach. The U-values, design air permeability and ventilation targets all aspire to Passive House design standards along with the consideration and application of low zero carbon renewable technologies.

Following the LZC feasibility assessment, it is proposed that the development will also benefit from a **68kWp PV array** that will be implemented on the suitable roof space for each apartment block and house type.

As a result of the above the predicted site wide reduction in CO₂ over Part L 2013 of the Building Regulations can be summarised as:

- **101.9%** with SAP 10.2 carbon factors

This statement also examines how the design, specification and characteristics of the proposal will contribute to sustainability and meet the relevant objectives outlined within the National Planning Policy Framework (NPPF) 2021, in addition to the RBC approved core strategy planning policies outlined above. The sustainability measures assessed included:

- **Flood Risk Zone**
- **Green and Blue Infrastructure**
- **Sustainable Drainage Systems (SUDs)**



- Biodiversity / Ecology
- Internal Water Efficiency
- Waste Management
- Materials
- Pollution Control
- Health and Wellbeing
- Sustainable Transport

The development therefore complies with all RBC's current and future policy requirements relating to creating a sustainable development.

In relation to the planning target centred around carbon emissions reduction, the proposed development is achieving a **101.9%** reduction in these emissions, over the Part L1 2022 of the Building Regulations. This surpasses all of RBC's planning targets and therefore allows compliance to be reached.

2 Planning Statement

The following statement relates to the proposed Community Led residential development on a portion of Borrowdale Park on Borrowdale Road within the Langley Estate.

2.1 The Site and Proposed Development

The site is located northeast of the centre of Manchester, within Langley. The site occupies approximately 0.58 hectares of land. A plan, with the site's extents denoted by the red outline seen in Figure 1 (shown later in this subsection).

The site is bounded to the north by Borrowdale Street, Wood Street to the southwest and is adjacent to three existing residential dwellings. The current use of the site is open space. The quality of the space is poor, and it is under-utilised. It is a piece of land that is accessible to the public. The land is home to bats, birds, foxes and used by local dog walkers but it is also very dark at night and is a magnet for anti-social behaviour, drinking and drug use and a place for young people to congregate at night. There is a desire by the community to use the land for more community focused activities such as a space for children to be at one with nature and a generally safer space for all the community for enhanced health & wellbeing.

The proposal is for a residential-led mixed use development consisting of 30 new build apartments and houses. The houses will be including a mix of, two, three and four- bedroom units and the apartments will be one-bedroom (use class C3). Also provided will be associated ancillary facilities including a refuse/recycling store and bike store.



Figure 1: Site Plan

2.2 Relevant Policies and Guidance

2.2.1 Local Planning Policy

2.2.1.1 Rochdale Core Strategy

Rochdale's Core Strategy was adopted on 19 October 2016. It's the lead document in the Local Plan is the key Development Plan Document (DPD) guiding the measures assessed in this report.

G1 – Tackling and Adapting to Climate Change

G1 - Tackling and adapting to climate change

We will address climate change and ensure growth does not increase CO2 emissions by:

- Locating growth in areas which are likely to minimise the need for travel and which are well served by public transport, services and infrastructure;
- Expecting all development and regeneration schemes to be well connected to surrounding areas and facilities by sustainable means of transport (Policy T2);
- Encouraging and promoting renewable energy developments, including standalone and community developments, that do not, by virtue of their scale, siting, construction or operation, cause harm to the local area, its character and environmental assets and adjoining uses, which cannot be satisfactorily mitigated (Policy G3);
- Promoting the efficient re-use of buildings, especially those of heritage value, and the recycling of construction waste;
- Ensuring that development does not cause unacceptable harm to the borough's peatlands and woodlands, and encouraging their restoration and responsible management;
- Promoting sustainable waste management through the operation of policies in the Core Strategy and Greater Manchester Joint Waste Plan;
- Making the best use of open space to contribute to climate change mitigation and adaptation; and
- Securing planning obligations for energy infrastructure and climate change adaptation measures.

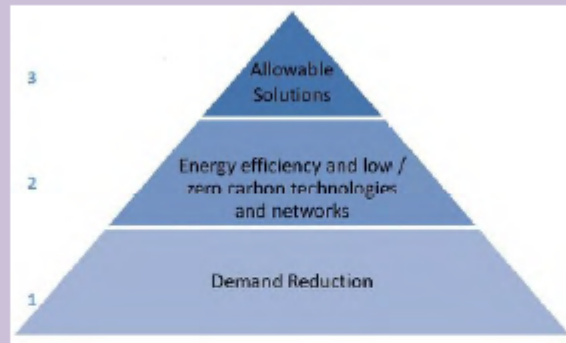
New developments will be expected to:

- a. Be zero carbon in line with national targets and definitions;
- b. Adhere to the 'energy hierarchy' as outlined in policy G2, being designed in such a way that ensures that buildings require the minimum amount of energy to function over their lifetime;
- c. Reduce CO2 emissions through the use of renewable and low carbon decentralised energy technologies and networks. This will be through both on-site provision in new developments and through connection to local networks;
- d. Address the impacts of climate change by incorporating comprehensive adaptation measures, including:
 - i. suitable measures, such as urban greening, for tackling the 'urban heat island' effect;
 - ii. where possible, the opening up of covered and culverted sections of waterways and provision of new water features, to help cooling and provide biodiversity, landscape and flood prevention benefits;
 - iii. the incorporation of appropriate water conservation and management measures, such as Sustainable Drainage Systems (SuDS), including ensuring that the rate of run-off on 'greenfield' sites is not increased and on 'brownfield' sites is significantly reduced, and avoiding the use of impermeable surfaces;
 - iv. the retention of existing trees wherever possible and the taking of all appropriate opportunities to plant trees and other suitable vegetation on site; and
 - v. the incorporation of 'green roofs' wherever possible, such as with flat roofs.

G2 – Energy and New Development

G2 - Energy and new development

All new development will be expected to adhere to the following energy hierarchy to the extent that policy G2 reflects national policy, targets and requirements for that type of development:



1. **Demand Reduction** – Achieve the maximum possible reduction in demand for energy through building design (i.e. the use of passive systems). At the design stage of new developments, every effort should be made to ensure that buildings use as little energy as possible throughout their lifetimes, using siting, orientation, layout, construction and landscaping to optimise use of natural passive systems such as solar gain and natural lighting, shading, ventilation and cooling to minimise heating, cooling and lighting demands. Green roofs and green walls should be incorporated into developments wherever feasible.
2. **Energy efficiency and low / zero carbon technologies and networks** – Design to maximize energy efficiency, and use on-site or linked low or zero carbon technologies or direct connection to a low or zero carbon heat source (not necessarily on-site).
3. **'Allowable solutions'** – use wider energy efficiency / CO2 reduction measures, which could include developer contributions, to compensate for 'residual emissions' not addressed by 1 or 2 above.

G3 – Renewable and Low Carbon Developments

G3 - Renewable and low carbon energy developments

The Council will promote renewable, low and zero carbon energy generating developments, including wind power, biomass, Combined Heat and Power (CHP), hydro and heat pumps in order to help meet CO2 reduction targets and contribute towards energy security for Greater Manchester and the North West.

Any proposal and associated infrastructure must avoid harm to the health and safety of the public, including through nuisance or adverse impact on highway safety by conflict with or undue distraction to road users. Any harm to the following must be minimised and appropriately mitigated:

- The visual character and quality of the landscape or townscape and the physical record of the historic and cultural evolution of the landscape;
- The setting of heritage assets including Scheduled Ancient Monuments, Conservation Areas and Listed Buildings;
- Local residents and their amenity;
- Biodiversity including protected species, statutory and locally designated sites and important habitats, and geodiversity;
- The value of the borough's peatlands as an ecological and hydrological resource and as a carbon sink;
- The value of the surrounding area for relaxation and recreation;
- Water quality;
- Land which is used for water catchment purposes and which is critical to the delivery of water supply; and
- Highway safety.

Any proposal must demonstrate the best use of location, topography, siting, design and colour to minimise its visual and other impacts, including any cumulative impacts. Any ancillary structures and access roads should employ sensitive design and the use of local materials to respect the character and appearance of the setting. The visual impact of infrastructure associated with renewable energy developments should be satisfactorily addressed, including by routing power lines underground wherever possible. All proposals should seek to minimise the length of cable connection in order to reduce the visual impact of such structures when sited above ground. It must be demonstrated that the proposal will not result in electro-magnetic interference with local television reception and specialist radio communication networks.

All the above issues, where relevant, will have to be addressed in a detailed statement of environmental effects submitted with the application.

Planning permission will be subject to a condition that if a wind turbine generator, or other redundant plant or infrastructure, is not producing electricity for six months or more, it shall be removed and the site fully restored to a use and condition appropriate to its surroundings in accordance with this plan.

In the case of wind power developments, in addition to the above criteria the following will also apply.

Planning permission will only be granted if:

- The development site is in an area identified as suitable for wind energy development in

2.2.2 National Planning Policy

The NPPF (Revised July 2021) sets out the Government’s planning policies for England and how these are expected to be applied. The overall emphasis of the NPPF is to reiterate the Government’s key objectives, including securing sustainable development.

The NPPF defines the purpose of the planning system as being to contribute to the achievement of sustainable development. It explains at Paragraph 8 that there are three dimensions to sustainable development. These are economic, social and environmental and should be pursued simultaneously through the planning system.

Paragraph 10 states that at the heart of the Framework is a presumption in favour of sustainable development.

2.3 Sustainable Design Strategy

2.3.1 Energy and Carbon Emissions

Building Services Strategy

In response to the policy requirements and climate change plan targets set out in section 2.2, developments should aim to assist and achieve the following carbon reduction targets:

1. Achieve a Zero Carbon Status for the development.

To achieve the most accurate calculations and estimates, the proposed units have been modelled using *SAP 10.2* the governments Standard Assessment Procedure for residential dwellings.

The proposed strategy for minimising energy use and carbon emissions is based on the energy hierarchy described in CIBSE Guide F 2012 (Energy efficiency in buildings). The energy hierarchy has been adopted for the development to ensure that the correct approach to design is taken to promote an energy-efficient low carbon solution (see figure 2). This has ensured that the benefits of effective methods of energy use reduction have been maximised first. The approach adopted is as follows:



Fig 2: Energy Hierarchy

Minimise energy demand – Implement passive design measures and optimise the building envelope in terms of orientation, air tightness, and insulation. For example, the proposal is targeting a low carbon classification through a holistic low energy design concept as it will be designed with a fabric first approach whereby standards designed to exceed Building Regulations compliancy are aspired to for all fabric U-values and air permeability targets.

Meet demands efficiently – Specification of energy efficient decentralised plant, heating, ventilation, lighting, and system controls to facilitate efficient operation. For example, each dwelling has been designed with an all-electric system in the form of a heat pump to contribute to the de-gasification of the housing stock.

Particular attention is being paid to the wellbeing of occupants. The ventilation strategy has been developed to minimise noise ingress from the proposed location as far as possible while minimising the risk of overheating.

Additional Renewable Energy Measures

Opportunities for incorporating low and zero carbon technologies (LZCT) have been considered for this development. The viability of several separate technologies was examined in a LZCT study (see section 3).

Efficient and Sustainable Design Measures

In line with the above Sustainable Design Strategy, the following Energy Efficient design measures are specified.

- High levels of insulation throughout with minimal thermal bridges
- Passive solar gains and internal heat sources
- Excellent level of airtightness
- Good indoor air quality by openable windows

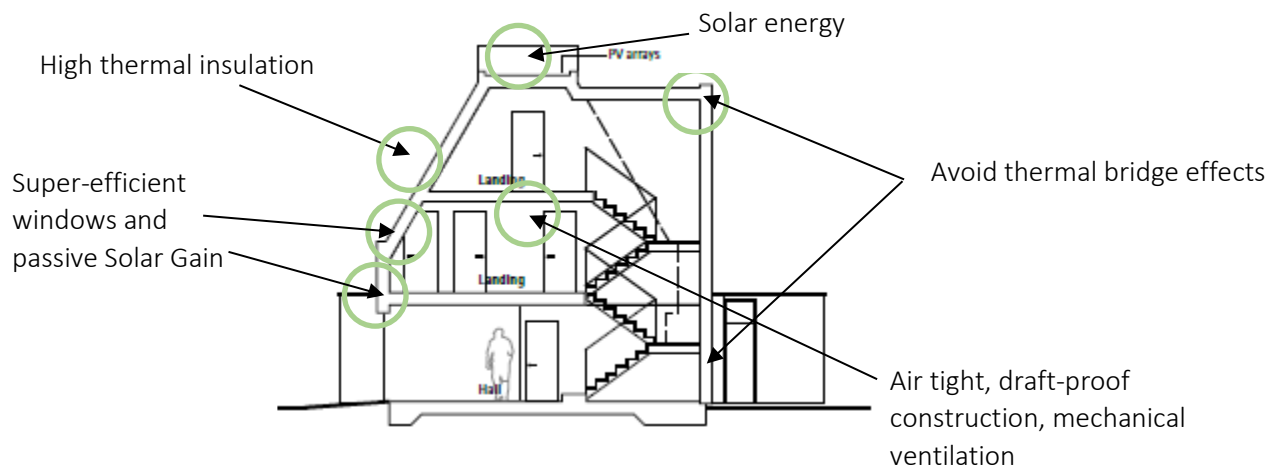


Fig 3. Efficient Design Measure examples

The Proposed specifications and key energy efficient design measures are as follows:

Residential Units:

- Ground floor U-values of 0.10 W/m²K
- External Wall U-values of 0.15 W/m²K
- Pitched Roof U-values of 0.11 W/m²K
- Low Triple Glazed Window U-values of 0.8 W/m²K
- 100% low energy lighting throughout
- Air Source Heat Pumps to two-storey houses to satisfy space heating and hot water
- 100% efficient electric panel heaters to each flat
- Dimplex Edel Air Source Heat Pump Hot Water units to each flat
- MVHR – Nuaire MRXBOX ECO 5 to each dwelling
- Air Permeability Rate of 1m³/hm² in all houses
- Air Permeability Rate of 3m³/hm² in all flats

2.3.2 Choice and Impact of Renewable Technology

All reasonable technologies were investigated for their suitability to the site and development; please refer to section 3 for details.

In addition to energy efficiency measures, it is proposed that the development will feature the following Low/Zero carbon Technologies:

- **68kWp Site Wide PV Array (Approx. 170no. 400W Panels) implemented onto the roof of the apartment block and houses**

The above LZC contribution has provided an **106.3%** reduction in CO₂ following Energy Efficiency Measures.

- Energy Saving from onsite LZC Technologies = **58103.0 kWh/Yr**
- CO₂ Saving from onsite LZC Technologies = **7902.0 kgCO₂/Yr**

2.3.3 Energy and CO₂ Reduction Summary

A summary of all stages of the energy demand assessment from baseline figures to final carbon reduction are shown in Figures 1 & 2 below:

	SAP 10.2
Summary of CO₂ Emission Reductions	Total CO₂ emissions (kgCO₂/year)
Carbon Factors (Gas / Electric)	0.210 / 0.136
Baseline emissions	25063.5
Improved emissions (after application of energy efficiency measures) - residual emissions	23675.1
Improved emissions (after incorporation of efficient energy supply)	7435.1
Improved emissions (after incorporation of renewable energy technology) % CO ₂ displaced in total	-466.9
% CO ₂ displaced in total	101.9%
% CO ₂ displaced by energy efficiency measures	5.5%
% CO ₂ displaced by efficient supply of energy	68.60%
% CO ₂ displaced by renewable energy	106.3%

Table 2: Summary of CO₂ Reductions



	Energy demand (kWh pa)	Energy saving achieved (%)	Regulated CO ₂ emissions (kg pa)	Saving achieved on residual CO ₂ emissions (%)
Building Regulations Part L compliance (“Baseline” energy demand & emissions)	115057.7		25063.5	
Proposed scheme after energy efficiency measures (“Residual” energy demand & emissions)	109577.9	4.8%	23675.1	5.5%
Proposed scheme after clean energy supply	54669.8	50.1%	7435.1	68.6%
Proposed scheme after on-site renewables	-3433.2	106.3%	-466.9	106.3%
Proposed scheme offset for financial contribution or other “allowable solution”			0	0
Total savings on residual emissions				68.6%

Table 3. Total Energy and Carbon Emissions Savings Based on SAP 9.0 Carbon Factors



For a full Breakdown of the figures and calculations please see Appendix A – Energy Demand Assessment Spreadsheet.

Baseline energy demand

‘Standard Assessment Procedure - SAP 2012’ was used to produce example SAP reports to generate the figures used within the calculations.

Baseline energy demand (kWh pa)	115057.7
Baseline carbon emissions (kg pa)	25063.5

Be Lean stage

The following table demonstrates how the development achieves the reduction in carbon dioxide emissions from energy efficiency measures.

Energy savings from energy efficiency measures (kWh pa)	5479.8
Emission savings from energy efficiency measures (kg pa)	1388.4
Total regulated emissions after CHP savings and energy efficiency measures (kg pa) (“residual emissions”)	23675.1

Be Clean stage

The heating and cooling hierarchy has been applied to the design process of the development. It has resulted in large focus on energy efficiency measures and as can be seen in Figure 1.

Energy savings from the use of CHP systems (kWh pa)	54908
Emission savings from the use of CHP systems (kg pa)	16240
Total regulated emissions after CHP savings (kg pa)	7435.1

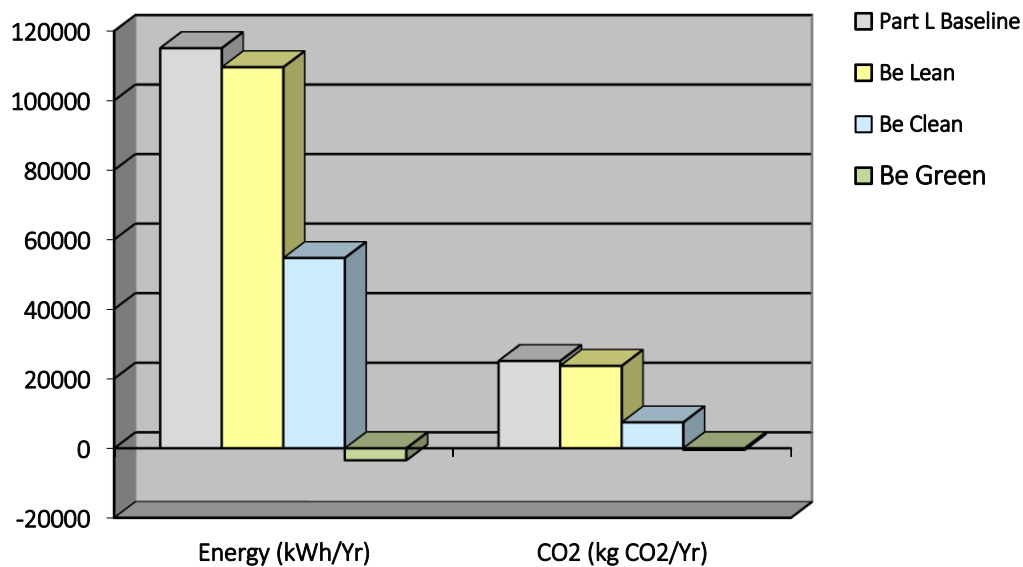


Be Green stage

The following table demonstrates how the development achieves the reduction in carbon dioxide emissions from LZC technologies.

Energy saving from the use of renewables (kWh)	58103
Saving on residual emissions from the use of renewables (kg)	7902
Saving on residual emissions from the use of renewables (%)	106.3%

The chart below illustrates the improvements over the Part L Compliant Baseline:



2.4 Adaptation to Climate Change

In addition to the primary building design and fabric, many other issues that will influence creating a Sustainable Development, including flood prevention, material use, waste minimisation and transport.

All the sections of creating a sustainable development should be taken into consideration from the start of the development and promoted throughout the building construction on site in order to maximise their benefits. Additionally, features which enable more efficient usage should also be specified to encourage the building users to maintain efficient use once construction has been completed.

2.4.1 Flood Risk Zone

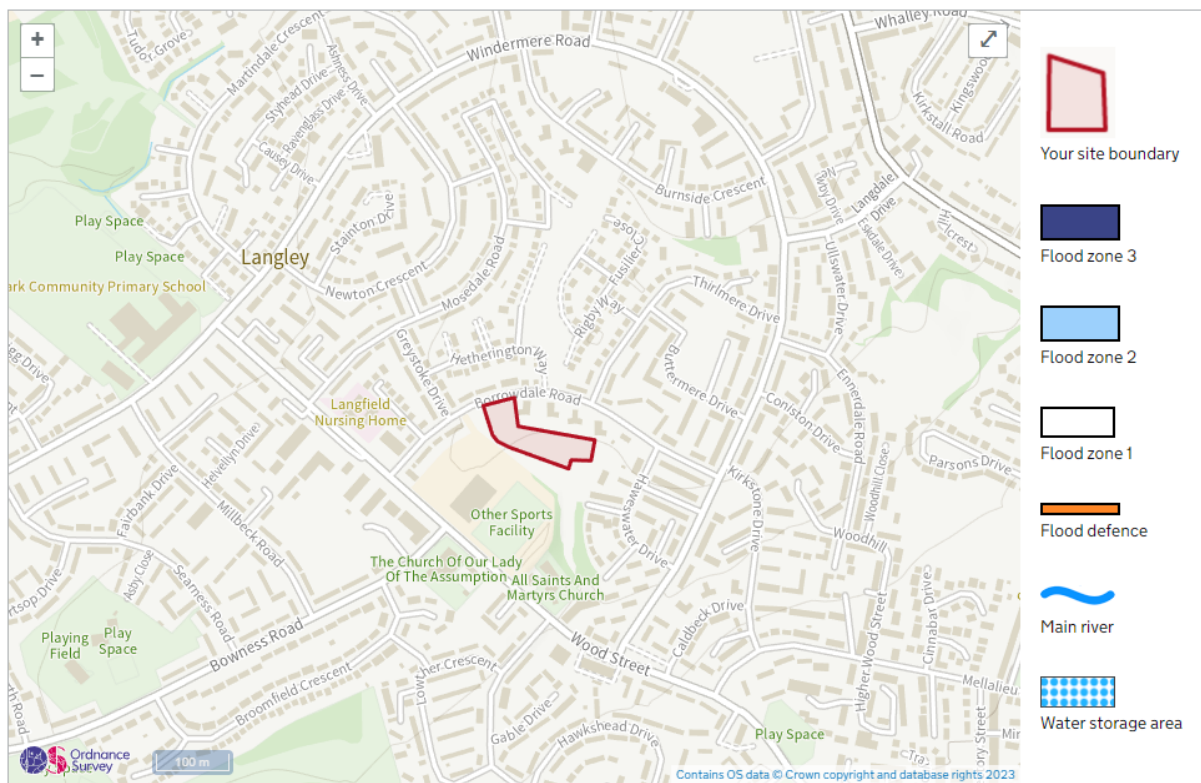


Fig 4: Flood Risk Map

The above map and snippet have been taken from a Government licenced flood risk map for the site. It can be seen that the site is located within flood risk zone 1 and therefore has minimal to no risk of flooding.

2.4.2 Green Blue Infrastructure

2.4.2.1 Sustainable Drainage Systems (SUDs)

Even though it has been shown that the proposed scheme is located on a site with a low to zero flood risk, it should still be ensured that the levels of surface water run-off do not increase from the existing development to the proposed, especially due to the new scheme having a different footprint and potentially resulting in new areas of impermeable surfacing. Therefore, a drainage strategy assessment should be undertaken, by a suitably qualified professional, to assess the feasibility of introducing on-site SUDs measures, that will reduce surface water run-off and any flood risks associated.

By incorporating SuDs, flood risk can be managed and mitigated. Section 1.1 of the SuDs Manual (Ciria C753) states the following:

“Sustainable drainage systems (SuDs) can deliver multiple benefits.

Surface water is a valuable resource, and this should be reflected in the way it is managed and used in the built environment. It can add to and enhance biodiversity, beauty, tranquillity and the natural

aesthetic of buildings, places and landscapes and it can help make them more resilient to the changing climate.”

The general concept of SUDs is to manage the flood and pollution risks in developed areas. This is done by efficiently managing surface water run-off by either slowing down the surface water run-off, or by reducing the quantity of surface water run-off. There are different methods to achieve this such as:

- Harvesting – capturing rainwater and facilitate its use within the development
- Infiltrating – rainwater infiltrates into the ground
- Storing – capturing rainwater and control the flow through the means of storing and releasing it slowly i.e. attenuation
- Conveying & treating – capturing rainwater and removing any contaminants, then convey the flow towards a downstream system

The SuDS Manual describes the four pillars of SuDS design as Water Quality, Water Quantity, Amenity and Biodiversity as illustrated in Figure 3 below:

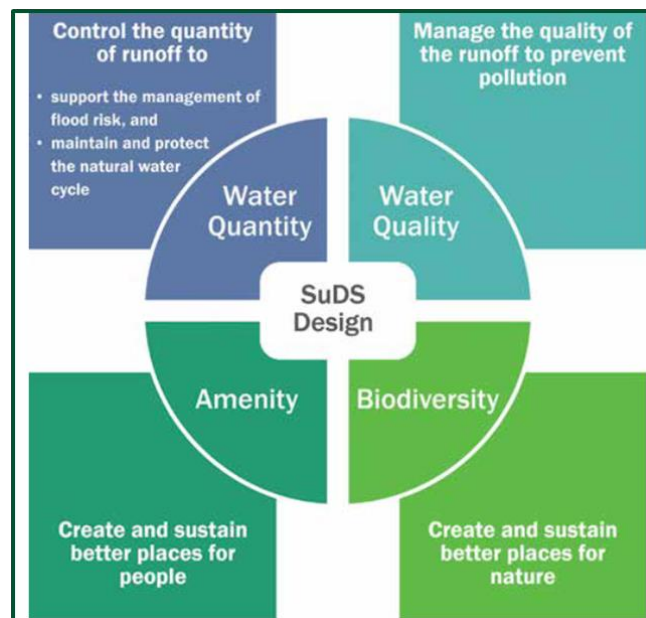


Fig 5. Representation of figure 2.1 of the SUDs Manual

SuDS are increasingly gaining popularity as a holistic solution to a wide range of pressing issues including flood risk, water pollution, groundwater depletion, biodiversity loss and urban decline.

Drainage Hierarchy

To alleviate pressure on existing sewer networks and to address issues of climate change the following hierarchy has been developed and implemented from a planning perspective.

The Planning Practice Guidance, states that:

“generally, the aim should be to discharge surface run-off as high up the following hierarchy of drainage options as reasonable practicably:

1. *Into the ground (infiltration)*
2. *To a surface water body*
3. *To a surface water sewer*
4. *To a combined sewer”*

The “Building Regulations Approved Document H” refer to this discharge hierarchy.

Description	Benefit
Flood risk management	SuDS aim to have an attenuating affect by slowing down and storing surface water run-off
Drainage resilience	Future proofing designed to be resilient against climate change
Natural flow regime protection	Mimic natural drainage arrangements to emulate natural flow
Water quality	Filter out pollutants and discharge cleaner water
Water reuse	Can be strategically placed to clean and capture water for reuse
Biodiversity and ecology	SuDS use vegetation and natural landscape to support biodiversity and ecology
Amenity	Improve visual integrity and desirability of the site by implementing green and blue features
Carbon reduction	SuDS can reduce carbon use throughout the life cycle including construction, maintenance, and demolition
Microclimate	Aim in reducing heat island effects
Education	Educate and engage the general public about surface water management

Table 5. Outline of types of green/blue infrastructure and associated benefit



2.4.2.2 Biodiversity

Similarly, to the previous section on SUDs, the nature of the proposal: potential change in area of impermeable surface, there could be adverse impacts on the surrounding ecology as well potential for the enhancement. Therefore, an ecology report should be produced, by a suitably qualified professional, in order to ensure that any existing ecology on or near the site is adequately protected and to determine the possibility of new habitat creation, planting schemes, green wall areas.

2.4.3 Internal Water Efficiency

Part G of the Building Regulations requires all new dwellings to have an internal water consumption of no greater than 110 litres / person / day, unless specified to be less. Therefore, fittings proposed should have low flow rates, capacities, effective flush volumes etc. Example targets for these to achieve the required internal consumption are as follows:

Appliance	Unit of measure	Amount (litres)
WC (Dual flush)	Full flush volume	4
WC (Dual flush)	Part flush volume	2.6
Taps (excluding kitchen)	Flow rate l/min	5
Kitchen taps	Flow rate l/min	6
Bath	Capacity to Overflow	170
Shower	Flow rate l/min	8
Washing Machine	Litres / kg dry load	8.17
Dishwasher	Litres / place setting	1.25

Table 6. Internal Water Efficiency Flow Rates

The above rates will achieve a total internal water consumption of 106.31 with a bath present and 98.25 with only a shower present.

The specifying of 'A' rated appliances should be prioritised where possible.



2.4.4 Waste Management

2.4.4.1 Occupational Waste

Manchester City Council's Waste Storage and Collection Guidance for New Developments 2017 encourages all new developments to incorporate a waste management strategy into the build at the earliest stage possible. RBC will follow this guidance.

2.4.4.2 Construction Waste

A target of at least 90% of waste generated on site, throughout the construction stage of the development, to be diverted from landfill' will be included as part of a Construction Environmental Management Plan (CEMP) to be agreed with RBC.

The proposal will also endeavour to maximise the use of recycled materials on site, whereby further promoting the minimising of waste production.

2.4.5 Materials

The construction of new buildings and building elements has a large environmental impact in terms of both, energy, and embodied carbon of new materials. Therefore, RBC promote the prioritising of environmentally friendly materials, where possible, and encourages the use of recycled building materials. This information should also be incorporated into the SWMP mentioned in the previous subsection (Waste Management) as a means of promoting the re-using and recycling of materials.

Where new materials are to be used, careful consideration of their environmental impact should be taken. This can be achieved by ensuring that only materials that score well under The Green Guide to Specification. This useful online tool can be used as a reference that provides guidance on the relative environmental impacts for a wide range of different building specifications. The BRE's Environmental Profile Methodology determines the Life Cycle Assessment (LCA) of materials, which is what the Guide's specifications are based on.

In order to take full advantage of low impact materials, elements key to the scheme should be specified to achieve ratings of between A+ and C under The Green Guide's ratings. Insulation materials that are specified will also have a global warming potential (GWP) of 5 or less, with an ODP of 0. Additionally, 100% of all timber used as part of the scheme will be responsibly sourced from suppliers that are either Forest Stewardship Council (FSC) accredited, Programme for the Endorsement of Forestry Certification accredited, or a similar recognised accreditation body.

To further promote embodied energy and carbon savings, the scheme will first prioritise the reusing of any demolished materials within the site, however if this is not possible secondary priority must be given to the redirecting from landfill, in line with the waste hierarchy.

Finally, in addition to the above policy points, the development is also recommended to register with the Considerate Constructors Scheme, or a similar approved scheme.

2.4.6 Pollution Control

To reduce emissions of gases with high global warming potential (GWP) and nitrogen oxide (NOx) into the atmosphere, new buildings will be specified with insulating materials that have a GWP of less than 5. This will follow throughout the development to reduce the impact that the construction phase has upon climate change.

Additionally, the following measures will be implemented:

- Pollution Prevention Guidance will be adhered to in respects of air (dust) and water (ground and surface) pollution during the demolition and construction phase.
- External light fittings will be controlled through a time switch, or daylight sensor, to prevent operation during daylight hours to limit the impact of artificial lighting for the development's residents and surrounding environment.

Sound insulation will be specified to achieve Building Regulation Part E compliance standard (this will be verified by pre-completion testing) in addition to meeting the requirements of the council. This will reduce the impact of sound pollution for the occupants within adjoining dwellings.

2.4.7 Sustainable Transport

A key message from all climate change adaptation plans is the need to increase the proportion of cycling, walking and public transport journeys. This is due to it providing both environmental and social benefits through the reducing of emissions, improving air quality, and promoting a more active lifestyle.

The proposed development acknowledges the benefits associated with these forms of sustainable transport and is therefore providing cycle storage, thereby encouraging all residents to commute in a sustainable manner.

Further to providing cycle provision, the site is located within Rochdale adjacent to Mosedale Road and Wood Street both, which both have multiple bus stops. This proximity to several transport nodes with such a range of travel possibilities further reduces the reliance on cars and the negative environmental impacts associated.

Transport Links

- **Train:** The closest train station to the site is Mills Hill Train Station, which is located approximately 1.73 miles southeast of the site. This station provides access to additional Manchester stations as well as regional and national destinations.
- **Bus:** The nearest bus stop is located on Mosedale Road and Wood Street Pollard Street and is less than 0.1 miles from the site. These will provide frequent services to Manchester City Centre, where further buses can be caught to more regional destinations.

Local Amenities

- Truffet Park Area is situated 500m from site; providing a recreational space for residents.
- Manchester Metropolitan and Manchester University are both less than 1 hour public transport from the proposed development providing good access to higher education via the transport nodes mentioned earlier in this subsection.
- Due to its proximity to Central Manchester, the site has good access to music, theatre and art venues, places of religion and Manchester's City Library.

3 Feasibility Assessment of Renewable Energy and Low Carbon Technologies

Solar Hot Water (Thermal)

Solar water heating systems are one of the more familiar renewable technologies used at the moment. They use the energy from the sun to heat water, most commonly for hot water needs. Solar heating systems use a heat collector that is usually mounted on a roof in which the sun heats a fluid. This fluid is used to heat water that is stored in either a separate hot water cylinder or in a twin-coil hot water cylinder (the second coil is used to provide additional heating from a boiler or other heat source).

Solar hot water panels could be used however, PV will provide slightly better savings and avoid the need for water storage cylinders when compared.

Renewable Technology Not Chosen.

Photovoltaic Panels (PV)

Photovoltaic modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases of silicon. Through a process called doping, very small amounts of impurities are added to the semiconductor, which creates two different layers called n-type and p-type layers.

Certain wavelengths of light are able to ionize the silicon atoms, which separates some of the positive charges (holes) from the negative charges (electrons). The holes move into the positive or p-layer and the electrons into the negative or n-layer. These opposite charges are attracted to each other, but most of them can only re-combine by the electrons passing through an external circuit, due to an internal potential energy barrier. This flow of electrons produces a DC current.

A PV array can be mounted on the suitable roof space. The amount proposed at this stage is **68kWp Site Wide PV Array (Approx. 170no. 400W Panels)** implemented onto the main roof areas.

Chosen Renewable Technology

Ground Source Heat pumps

A heat pump is a device that takes up heat at a certain temperature and releases it at a higher temperature. The essential components of a heat pump are heat exchangers (through which energy is extracted and emitted) and a means of pumping heat between the exchangers. The effectiveness of the heat pump is measured by the ratio of the heating capacity to the effective power input, usually known as the coefficient of performance (COP). Ground-source heat pumps (GSHP) extract heat from the ground. They are classified as either water-to-air or water-to-water units depending on whether the heat distribution system in the building uses air or water. Ground source heat pumps either use long shallow trenches or deep vertical boreholes to take low grade heat from the ground and then compress it to create higher temperatures.

Ground source heat pumps would not be suitable due to the lack of land space around the properties and the associated costs.

Renewable Technology Not Viable

Air Source Heat pumps

Air source heat pumps absorb heat from the outside air. This is usually used to heat radiators, underfloor heating systems, or warm air convectors and hot water in your home. An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside.

The system performs down to air temperatures of -20°C which means that they are more than suitable for installations within the UK. Hot water and Heating can be provided 365 days a year. The hot water is produced without the aid of electrical immersions and at 55°C is more than hot enough for baths and showers.

There are two main types of air source heat pump system:

- An air-to-water system distributes heat via your wet central heating system. Heat pumps work much more efficiently at a lower temperature than a standard boiler system would. So they are more suitable for under-floor heating systems or larger radiators, which give out heat at lower temperatures over longer periods of time.
- An air-to-air system produces warm air which is circulated by fans to heat your home. They are unlikely to provide you with hot water as well.

Air Source heat pumps are a good option to provide heating and cooling. A conventional ASHP will be proposed to the houses to satisfy the space heating and hot water demand whereas a Dimplex Edel ASHPHW unit is to be proposed to the apartments to satisfy the hot water demand due to space constraints.

Chosen Renewable Technology



Biomass Heating

Biomass is any plant-derived organic material that renews itself over a short period.

Biomass energy systems are based on either the direct or indirect combustion of fuels derived from those plant sources. The most common form of biomass is the direct combustion of wood in treated or untreated forms. The use of biomass is becoming increasingly common in some European countries.

The environmental benefits relate to the significantly lower amounts of energy used in biomass production and processing compared to the energy released when they are burnt. This can range from a four-fold return for biodiesel to an approximate 20-fold energy return for woody biomass. Biomass-fuels can be used to produce energy on a continuous basis (unlike renewables such as wind or solar energy) and it can be an economic alternative to fossil fuels as it is a potential source of both heat and electricity.

However, Biomass systems have particular design management and maintenance requirements associated with sourcing, transportation and storage and are therefore more commonly used in commercial developments rather than domestic installations. It can be less convenient to operate than mains-supplied fuels such as natural gas and are more management intensive and require expertise in facilities management. Sources of biomass can also fluctuate, so boilers should be specified to operate on a variety of fuels without risk of overheating or tripping out.

A communal biomass system would not be feasible for this development due to the expense associated with the necessary output to heat all dwellings on the site.

Renewable Technology Not Chosen

Wind

Wind turbines convert the kinetic energy in wind into mechanical energy that is then converted to electricity. Turbines are available in a range of sizes and designs and can either be free-standing, mounted on a building or integrated into a building structure.

The wind speed in the area is under the advised minimum and the built-up area means that a wind turbine wouldn't be feasible.

Renewable Technology Not Viable

4 Conclusion

This statement has assessed the proposed development at the Langley site against the relevant climate change and sustainability policies and targets, as outlined within: the Rochdale Core Strategy (October 2016), through the following of the energy hierarchy, the modelling of the dwellings in the FSAP 10.2 software and addressing all aspects of a sustainable development. In addition, the proposal has been assessed against national sustainable design definitions to determine how it can be classified.

As part of this process, the development was designed with a fabric first approach; with U-values, design air permeability and ventilation targets all aspiring to exceed Building Regulations Part L 2022 standards. Following on from this, efficient MVHR systems were proposed for each apartment and house, to further reduce the total energy demands whilst simultaneously providing each dwelling with healthy internal environments. This approach demonstrates a holistic low energy design concept, involving very low limiting values and thus led to high-energy performance targets and being defined as a low carbon development.

Furthermore, an LZC feasibility assessment was carried out, with all suitable technologies investigated for their suitability to the site and development. The assessment determined that a 68kWp system can be proposed at this stage, which would equate to 170No panels and would provide an additional 106.3% reduction in carbon emissions over the residual emissions: bringing the total carbon reduction to **101.9%** and defining the development as **Zero Carbon** as all residual emissions have been offset through the implementation of PV panels. In addition to this renewable technology provision, the development can also be defined as carbon neutral by obtaining all the energy used on site from a 100% renewable energy electricity supply provider.

The development will also be adapting to climate change by incorporating sustainable drainage measures into the design, protecting existing ecology, enhancing biodiversity where possible and providing cycle storage provision to residents.

In addition to the following of the energy hierarchy through the efficient design and renewable technology measures mentioned and meeting all relevant RBC carbon targets the proposal will include many sustainability measures throughout construction and once completed, which will contribute heavily to the development's sustainability performance and accord with the requirements of the NPPF. The key measures to be included and therefore can be taken from this report include:

- The proposal sits within Flood Risk Zone 1 and therefore has minimal to no risk of flooding.
- A SUDs strategy will be produced to outline all measures to be incorporated that will ensure any additional surface water is collected, treated and removed.
- The development will incorporate green infrastructure in the form of extensive planting involving hedges, trees, sedum and ornamental planting that will instil a sense of wellbeing whilst also assisting with offsetting carbon dioxide and balancing local temperatures through evapotranspiration.

- Internal water efficiency will be prioritised by ensuring that efficient water fixtures are proposed so that each dwelling achieves less than 110L per person per day and 'A' rated appliances will be specified where possible.
- Waste minimisation will be targeted from throughout construction and occupational phase. It is targeted that at least 90% of construction waste will be diverted from landfill. Whilst tri-separator refuse chutes will be installed on each floor to promote recycling.
- In addition to targeting Secure by Design accreditation through adoption crime prevention measures, the site layout promotes busy spaces and routes and facilitates natural surveillance. These will therefore reduce the fear of crime and subsequently improving mental health of residents, visitors and workers.
- Prioritising reusing existing materials and locally sourced materials for construction to reduce waste and transportation to landfill in addition and promote a low embodied carbon development.
- When new materials are specified that are not locally attainable then only those that score well on the BRE: The Green Guide to Specification are to be used; to further encourage the use of sustainable materials and reductions in embodied carbon.
- The buildings will have a daylight and sunlight analysis carried out and will aim to achieve high pass rates. Additionally, highly efficient MVHR systems are being proposed to each flat individually to provide a continuous source of fresh air and maintain healthy indoor environments. These will promote healthy housing and subsequently boost physical and mental wellbeing of residents.
- The proximity of the Manchester City Centre to the proposed site is highly sustainable in terms of transport and local amenities as it is near a number of public transport nodes including multiple bus stops as well as a multitude of shops and other local amenities.
- The development will also include significant cycle storage provision.

As a result of all the above, the proposed sustainable design and energy strategy allows the development to comply with RBC's planning policy requirement and is in line with all targets put forward in their planning documents.

House Type/Name	Flat 1	Flat 2	Flat 3	Flat 4	Flat 5	Flat 6	Flat 7	Flat 8	Flat 9	Flat 10	Flat 11
Frequency	2	2	4	1	1	1	1	1	1	1	2
BASLINE Dwelling Emission Rate (DER)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)
Main Heating Fuel Requirement (DER)	3167.722	3078.303	2156.821	1385.389	1487.581	1449.403	1428.306	1754.925	1326.309	1630.435	1157.431
Secondary Main Heating Fuel Requirement (DER)	0	0	0	0	0	0	0	0	0	0	0
Secondary Heating Fuel Requirement (DER)	0	0	0	0	0	0	0	0	0	0	0
Water Fuel Requirement (DER)	3045.006	3047.953	2934.507	2323.771	2562.346	2321.506	2563.487	2358.306	2371.545	2362.525	2374.991
Electricity Pumps Fans Requirement (DER)	86	86	86	86	86	86	86	86	86	86	86
Electricity Lighting Requirement (DER)	247.364	231.178	199.223	128.715	150.186	131.279	154.399	130.85	128.923	128.923	151.994
TOTAL PER DEVELOPMENT											
AFTER ENERGY SAVING MEASURES Dwelling Emission Rate (DER)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)
Main Heating Fuel Requirement (DER)	3254.219	3053.878	2228.726	836.706	947.366	976.877	968.507	1151.935	1006.605	1415.091	772.036
Secondary Main Heating Fuel Requirement (DER)	0	0	0	0	0	0	0	0	0	0	0
Secondary Heating Fuel Requirement (DER)	0	0	0	0	0	0	0	0	0	0	0
Water Fuel Requirement (DER)	3025.037	3030.999	2918.322	2307.978	2542.466	2301.717	2540.935	2339.784	2346.578	2332.368	2354.037
Electricity Pumps Fans Requirement (DER)	86	86	86	201.29	245.146	215.125	245.146	220.29	220.29	220.29	220.29
Electricity Lighting Requirement (DER)	237.117	222.03	177.501	142.309	172.766	144.499	175.566	146.752	146.543	146.543	168.058
TOTAL PER DEVELOPMENT											
FINAL Dwelling Emission Rate (DER)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)
Main Heating Fuel Requirement (DER)	562.793	676.09	445.629	597.581	689.107	729.283	728.919	864.581	732.035	1058.575	613.259
Secondary Main Heating Fuel Requirement (DER)	0	0	0	0	0	0	0	0	0	0	0
Secondary Heating Fuel Requirement (DER)	0	0	0	0	0	0	0	0	0	0	0
Water Fuel Requirement (DER)	1462.622	1462.622	1400.512	574.515	620.972	574.515	620.972	583.085	583.085	583.085	583.085
Electricity Pumps Fans Requirement (DER)	237.214	265.679	217.857	115.29	159.146	129.125	159.146	134.29	134.29	134.29	134.29
Electricity Lighting Requirement (DER)	244.148	228.172	182.105	145.367	174.756	148.262	179.659	148.734	146.543	146.543	172.767
TOTAL PER DEVELOPMENT											
PV Energy Produced (DER)	-5126.738	-5126.738	-10253.476	-1708.913	-1708.913	-1708.913	-1708.913	-1708.913	-1708.913	-1708.913	-3417.826
TOTAL PER DEVELOPMENT											



Flat 12	Flat 13	Flat 14	Flat 15	Flat 16	Flat 17	Flat 18	Flat 19	TOTAL (kWh/yr)		TOTAL (kgCO2/yr)	SAP 10.0	TOTAL (kgCO2/yr)	SAP 10.1	TOTAL (kgCO2/yr)
2	2	1	1	1	2	2	2	51						
Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)
663.577	1041.946	1544.165	1476.172	1915.177	1496.273	1468.913	1341.905	50857.3	0.216	17027.0	0.210	10680.0	0.210	10680.0
0	0	0	0	0	0	0	0	0.0	0.519	0.0	0.233	0.0	0.136	0.0
0	0	0	0	0	0	0	0	0.0	0.216	0.0	0.210	0.0	0.136	0.0
2396.63	2379.962	2362.981	2365.639	2353.975	2364.922	2367.492	2371.431	76380.9	0.216	25572.3	0.210	16040.0	0.210	16040.0
86	86	86	86	86	86	86	86	2580.0	0.519	1339.0	0.233	601.1	0.136	350.9
143.304	143.304	144.878	137.821	137.821	137.821	128.923	128.923	4796.3	0.519	2489.3	0.233	1117.5	0.136	652.3
								115057.7		46427.7		28438.7		25063.5
Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)
377.692	833.213	1089.996	1040.338	1728.498	1021.012	976.605	1076.557	42807.2	0.216	14331.9	0.210	8989.5	0.210	8989.5
0	0	0	0	0	0	0	0	0.0	0.519	0.0	0.233	0.0	0.136	0.0
0	0	0	0	0	0	0	0	0.0	0.519	0.0	0.233	0.0	0.136	0.0
2376.164	2351.893	2340.996	2343.686	2321.23	2344.357	2347.91	2344.035	75739.9	0.216	25357.7	0.210	15905.4	0.210	15905.4
220.29	220.29	220.29	220.29	220.29	220.29	220.29	220.29	5559.9	0.519	2885.6	0.233	1295.5	0.136	756.2
158.146	158.146	159.886	152.397	152.397	152.397	146.543	146.543	5027.6	0.519	2609.3	0.233	1171.4	0.136	683.8
								109577.9		45184.5		27361.8		23675.1
Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)
296.173	669.372	856.601	842.695	1420.516	770.796	722.859	785.108	20495.3	0.519	10637.1	0.233	4775.4	0.136	2787.4
0	0	0	0	0	0	0	0	0.0	0.519	0.0	0.233	0.0	0.136	0.0
0	0	0	0	0	0	0	0	0.0	0.519	0.0	0.233	0.0	0.136	0.0
583.085	583.085	583.085	583.085	583.085	583.085	583.085	583.085	24339.0	0.519	12632.0	0.233	5671.0	0.136	3310.1
134.29	134.29	134.29	134.29	134.29	134.29	134.29	134.29	4698.0	0.519	2438.3	0.233	1094.6	0.136	638.9
162.889	162.889	164.679	156.657	156.657	156.657	146.543	146.543	5137.5	0.519	2666.4	0.233	1197.0	0.136	698.7
								54669.8		28373.6		12738.1		7435.1
-3417.826	-3417.826	-1708.913	-1708.913	-1708.913	-3417.826	-3417.826	-3417.826	-58103.038	0.519	-30155.5	0.233	-13538.0	0.136	-7902.0
								-3433.2		-1781.8		-799.9		-466.9



