McCarthy Stone

Oakfield, Sale

Energy Statement

November 2022

focus-consultants.com
Focus Consultants, Focus House, Millennium Way West, Phoenix Business Park, Nottingham NG8 6AS T. 0115 976 5050

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Contact Information

Client:	McCarthy Stone Unit 3 Edward Court Altrincham Business Park Altrincham WA14 5GL
Client Lead:	Martin Aston
Tel:	01619263340
Email:	Martin.Aston@mccarthyandstone.co.uk
Prepared By:	Focus Consultants 2010 LLP Focus House Millennium Way West Phoenix Business Park Nottingham NG8 6AS
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Focus Contact Details:	Kate Pumphrey, Sustainability Consultant Kate.Pumphrey@focus-consultants.com
Authorised By:	Ben Matthews, Senior Sustainability Consultant
Signature:	[redacted]

Focus Offices

NOTTINGHAM
Focus House
Millennium Way West
Phoenix Business Park
Nottingham
NG8 6AS
T: 0115 976 5050
E: enquiries@focus-consultants.com

LONDON
45-46 Lower Marsh
London
SE1 7RG
T: 0203 096 9717
E: londonenquiries@focus-consultants.com

LEICESTER
Olympus House
Unit 3, Main Street
Kirby Muxloe
Leicestershire
LE9 2AL
T: 0116 275 8315
E: leicesterenquiries@focus-consultants.com

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1.0 Introduction

1.1 Purpose of the Report

Instructions were received from McCarthy Stone to produce an Energy Statement for the proposed development at Oakfield, Sale. This report has been produced to support the planning application to be submitted for the development.

This statement provides a response to the relevant planning policy objectives within the Trafford Local Plan: Core Strategy document.

1.2 Site and Building Description

The development will be located at Oakfield, Sale. The application seeks approval for the construction of a retirement living complex comprising of 25 apartments (mix of 1 and 2-bedrooms), communal areas (including Reception Area, Lounge, Refuse, Scooter Store, Stairs, Lifts, Stores, Corridors and Guest Suite and Ensuite) and associated landscaping. A proposed site layout has been included in Appendix 1.

1.3 Methodology

The proposed drawings, elevations and site plans were reviewed to gain a good understanding of the development; following this the relevant policies were identified. This development is located in Sale, therefore the Trafford Council Local Plan: Core Strategy (particularly policy L5), and Supplementary Planning Document 1: Planning Obligations, have been recognised as relevant.

Sample Design Stage SAP & SBEM calculations have been completed to determine the expected performance of the development at Oakfield. The specifications and results for the buildings as proposed are compared to the target building baseline, which is the benchmark for 2013 Part L of Building Regulations compliance.

In reference to local renewable energy, this report determines the feasibility of connection to district heating networks.

2.0 Planning Policy

2.1 Trafford Council Local Plan: Core Strategy

The Trafford Council Local Plan: Core Strategy, adopted January 2012, outlines the requirements for new developments regarding sustainability. Policy L5 has been identified as relevant.

2.2 L5: Climate Change

L5.1: New development should mitigate and reduce its impact on climate change factors, such as pollution and flooding and maximise its sustainability through improved environmental performance of buildings, lower carbon emissions and renewable or decentralised energy generation.

CO2 Emissions Reduction

L5.2: Major built development proposals will be required to demonstrate how they will seek to minimise their contribution towards and/or mitigate their effects on climate change, in line with both national standards and local opportunities and programmes. For the purposes of this policy, "major development" is defined as comprising:

- *Residential development equal to or greater than 10 units; and*
- *Non-Residential development above a threshold of 1,000m2 floor area.*

L5.3: Developments below the thresholds, but involving the erection of a building or substantial improvement to an existing building (such as extensions or change of use), will be encouraged to adopt the principles of energy efficiency and incorporate appropriate micro-generation technologies, to help contribute towards reducing CO2 emissions within Trafford. Those developments within Conservation Areas or which include Listed Buildings will also be encouraged to adopt these principles.

CO2 Emissions Reduction Target

L5.4: Development will need to demonstrate how it contributes towards reducing CO2 emissions within the Borough. This should include incorporating measures such as applying sustainable design and construction techniques prior to utilising renewable energy generation technologies, examples of which can be found in the supporting Technical Note.

L5.5: The Council recognises that the achievable levels of reduction in CO2 emissions in new developments are strongly influenced by, and are dependent upon the scale and location of the proposed development. Therefore, the following spatial areas have been identified which have distinct opportunities for major development to deliver different CO2 reduction targets:

- *Low Carbon Growth Areas (LCGAs) - where there is potential to deliver CO2 reduction target of up to 15% above current Building Regulations; and*
- *Outside LCGAs - where there is potential to deliver CO2 reduction target of up to 5% above current Building Regulations.*

L5.6: The main focus for high levels of both residential and economic growth have been tested to determine a CO2 reduction target(s) for the Borough. This has resulted in three LCGAs being identified in which the Council considers major development to have the potential to deliver a higher local CO2 emissions reduction target, than the rest of the Borough. This is subject to the new energy generation infrastructure and programmes in these locations being delivered within the plan period. Location plans outlining the LCGAs (Altrincham Town Centre, Carrington and Trafford Park) are provided within the supporting SPD.

L5.7: These higher CO2 reduction targets will only be applicable where the required infrastructure, as detailed in L5.6 above, exists at the time that the relevant planning application is determined. The higher reduction targets will only be applied until the national standards (Building Regulations) require developments to achieve zero carbon.

How to Calculate and Reduce CO2 Emissions

L5.8: All new built development meeting the thresholds set within Policy L5.2 should detail how they will meet the requirements of this policy alongside their planning application. A template Carbon Budget Statement is included within the associated SPD to help applicants calculate the baseline level of CO2 emissions to be emitted from the proposed development and to provide guidance on measures to reduce emissions.

L5.9: CO2 emissions should be reduced by applying the following hierarchy:

1. Design and construction techniques to reduce the demand for energy (for example: through the orientation of building; internal layout; and superior energy efficiency measures such as extra insulation);

2. Technology (for example through sourcing low carbon or renewable energy generation, including any district energy network which may be accessible).

L5.10: The Council will encourage applicants to consider and incorporate CO2 reduction design techniques within the building prior to investigating technology solutions. Guidance on both these options are detailed in the associated SPD and the supporting Technical Note.

L5.11: The Council expects that all new major development will deliver the required CO2 emission reductions, however in those circumstances where it can be demonstrated that these cannot be feasibly delivered without having a significant adverse impact on the viability of the development, a lower level will be accepted by the Council.

Energy Generating Infrastructure Opportunities – Commercial or Community

L5.12: The Council recognises the role that commercial and community low carbon, renewable and decentralised energy generation and distribution facilities can play in reducing CO2 emissions and providing viable energy supply options to serve new and existing developments. The impact of such infrastructure and any suitable mitigation measures will be assessed in line with the policies within this Plan, in particular Policy L7 – Design Quality and Protecting Amenity.

2.3 Supplementary Planning Document 1: Planning Obligations

G: CARBON BUDGET STATEMENTS

G.1. To assist the applicant and the Council in determining how the carbon emissions reduction target for the development will be met, the developer will be required to provide a Carbon Budget Statement (CBS) for the proposed development. A template CBS is set out below to help applicants.

G.2. The submitted CBS will detail which design measures and or technologies will be employed to reduce the energy consumption of the development in line with the carbon reduction target. Some examples of the types of technologies that can be used to reduce carbon emissions from a range of developments can be found in Section F. To help applicants submit an appropriate level of detail for the CBS, a template CBS has been produced. ***An equivalent document will be accepted as part of a Design & Access Statement or Planning Statement, if it meets the required content of the CBS.***

G.3. The CBS will also contain an element of viability testing, to help the developer and Council to ensure that the technologies and or design measures used to meet the carbon reduction target are technologically feasible and financially appropriate for the development.

G.4. An applicant should first consult with the Council at the pre-planning application stage to establish the actual carbon reduction target before preparing a CBS.

G.5. The CBS submitted with the planning application should be regarded as a draft statement which may be subject to change during the application process if this is deemed to be necessary. Delivery of the development in line with the final agreed CBS will form a condition of the planning approval. Once the Council is satisfied that all planning conditions have been met, the planning conditions will be discharged.

2.4 Policy Response

This statement will respond to Policy L5 of the Trafford Council Local Plan: Core Strategy and will aim to provide the required content of the CBS outlined in the Supplementary Planning Document 1: Planning Obligations, which will be addressed in Section 3.0 - Energy Assessment.

This scheme at Oakfield, Sale, is a residential development comprising of 25 dwellings, therefore BREEAM is not applicable to this scheme. The Code for Sustainable Homes environmental assessment methodology has been discontinued; therefore, this is not applicable.

3.0 Energy Assessment

3.1 Maximising Energy Efficiency and Reducing Carbon Emissions

In efforts to reduce the overall carbon emissions associated with the development and to maximise the energy efficiency, as outlined in Policy L5.3 and 4, the developer has a robust 'fabric first' approach to the build specification.

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

The table below demonstrates how the specification of the development at Oakfield, Sale compares to the limiting values and minimum efficiencies allowed within Part L 2013:

Table 1: Limiting Value and Minimum Efficiencies Comparison

Building Element	Limiting Part L 2013 Specification	Proposed Specification Apartments
External Walls U-Value	0.30	0.19
Roof U-Value	0.20	0.11 – 0.16
Ground Floor U-Value	0.25	0.11
Window U-Value	2.00	1.40
Party Wall U-Value	0.20	0.00
Half Glazed Door U-Value	2.00	1.40
Heating Efficiency	88%	100%
Pressure Test	10.00	4.00 – 5.00
Low Energy Lighting	75%	100%

The development is proposed to adopt a 'fabric first' approach to the specification and as detailed above, the proposed U-Values are a significant uplift on the minimum requirements under Part L.

The build-up of external wall for the apartments is a fully filled 150mm cavity with Masonry block that achieves a u-value of 0.19 W/m^2K. Well insulated cavity walls, roof, floors and openings provide a comfortable environment within the development and reduce the buildings' reliance on the main heating system. The air permeability target is between $4.00m^3/(h.m^2)$ and $5.00m^3/(h.m^2)$, providing a significant improvement over the Notional Building target.

Intelligent construction methods are also utilised in the specification of this development. The use of bespoke calculated thermal bridge details ensure that thermal performance is enhanced by minimising heat and energy losses through thermal bridges and air gaps.

McCarthy Stone utilise panel heating within the apartments in conjunction with thermal mass to regulate internal temperature, which achieves efficiencies up to 100%. This is a further improvement on the minimum efficiency required by individual gas combination boilers in the Notional Building.

Another key element to the specification of the apartments is the utilisation of mechanical ventilation with heat recovery (MVHR).

This system allows warm stale air produced by occupancy and internal activities to be extracted from the building; however, the heat within this air is retained and transferred into cool fresh air being brought into the building from outside. The use of MVHR reduces the need to use the main heating system as it provides background heating through occupation (as well as improving comfort levels through the flow of fresh air).

In communal areas, lighting occupancy sensors will be utilised that switch off or dim the lighting when occupants are not present in areas such as circulation spaces, toilets or storage areas. This prevents lighting from being left on when it is not needed, therefore saving energy.

Metering and sub-metering equipment for the heating system will also be used that help identify areas where more energy than expected is being used, such as heaters being left on at times when they are not needed or where there are defective elements present. This helps improve the heating strategy and saves further energy.

To summarise, all of the main building elements outlined in Table 1 have been designed to provide a thermally efficient building envelope that achieves an improvement on the minimum requirements set out within Part L. These elements along with the incorporated heating and ventilation systems ensure enhanced energy efficiency and reduce CO_2 emissions, thus mitigating the impacts of climate change.

3.2 District Heating

To satisfy Policy L5.12, an exercise has been completed reviewing the potential for the proposed development at Oakfield, Sale to connect to an existing district heat network. The Association for Decentralised Energy's (ADE) District Heating connection map has been reviewed to confirm the closest possible connection point.

As demonstrated from the map overleaf, the closest connection point is Stretford House, approximately 1.46 miles from the proposed site location. Due to the extended distance between these two points, it is considered that this would not be a feasible application.

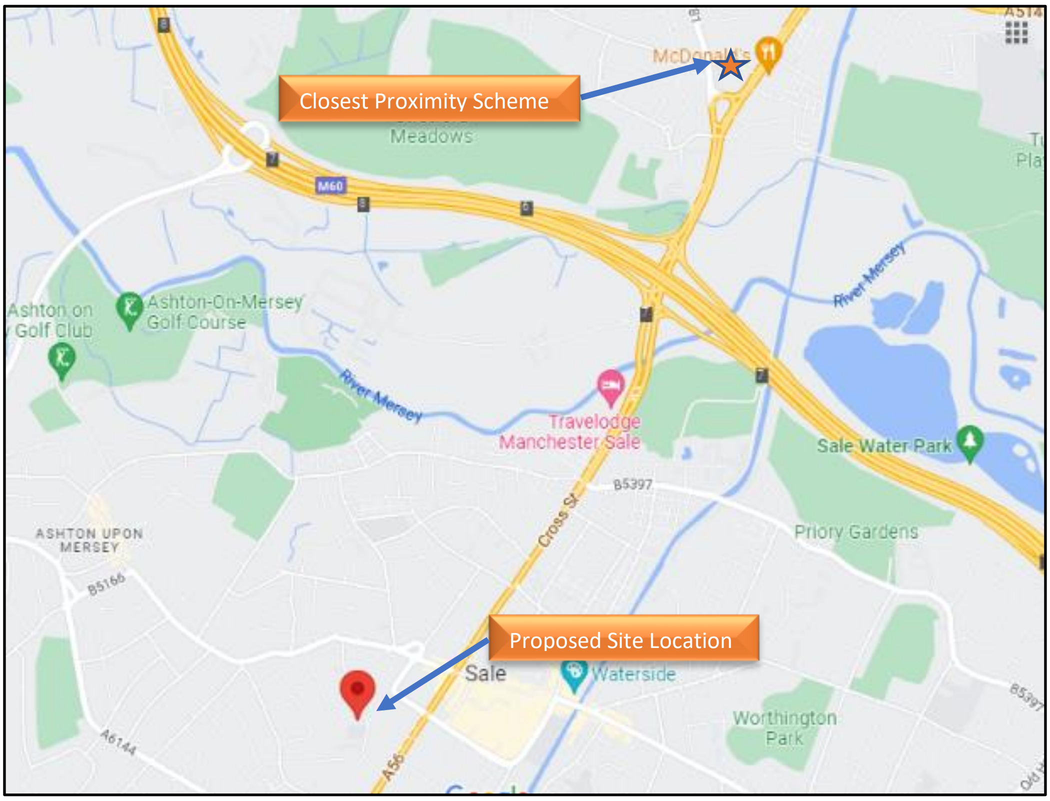

Figure 1 – Association of Decentralised Energy - www.theade.co.uk

3.3 Carbon Emissions

Policy L5 in the Trafford Council Local Plan: Core Strategy refers to a 15% carbon reduction target above current Building Regulations for Low Carbon Growth Areas (LCGAs), and a 5% carbon reduction target above current regulations for areas outside LCGAs. The site is not located within a LCGA and therefore the 5% carbon reduction target will apply. The development will fall under the 2013 Part L version of the Building Regulations.

To understand the overall proposed energy use of the development, and in line with the 5% carbon reduction target highlighted in Policy L5, sample SAP and SBEM calculations for the proposed development have been undertaken. Software outputs of the calculations completed can be found in Appendix 2.

Table 2 below demonstrates each dwelling's expected breakdown of carbon emissions, based on the dwellings modelled.

Table 2: Carbon Emissions Breakdown	
Target Carbon Emissions (TER)	**Units (kg/CO2/yr)**
Domestic	40,721.86
Non-Domestic	20,798.06
Sub-Total	**61,519.93**
Predicted Carbon Emissions (DER/BER)	**Units (kg/CO2/yr)**
Domestic	40,635.31
Non-Domestic	20,734.85
Sub-Total	**61,370.16**
CO2 Reduction	**149.77**

As a result of the sample SAP and SBEM modelling outputs for the development, Table 2 shows the Target CO2 Emissions (TER) of the development to be 61,519.93 kg/CO2/yr. The Predicted Carbon Emissions (DER/BER) are demonstrated to be below this amount, currently modelled to achieve 61,370.16 kg/CO2/yr. Overall, this is a 149.77 kg/CO_2/yr reduction in carbon emissions.

In order to meet Policy L5's 5% carbon reduction policy for the development, a total carbon reduction of 3,076 kg/CO_2/yr needs to be achieved through the use of further energy efficiency improvements or low carbon technologies, such as renewable energy. To achieve the 3,076 kg/CO_2/yr reduction, a minimum of 5,927 kWh/yr would need to be provided if PV was the chosen solution to meet the target.

3.4 Energy Consumption

To understand the overall proposed energy use of the development, as required for the CBS mentioned in the Supplementary Planning Document 1: Planning Obligations, sample SAP and SBEM calculations for the proposed development have been undertaken. Software outputs of the calculations completed can be found in Appendix 2.

Table 3 demonstrates the development's approximate breakdown of regulated energy use, based on the apartment block.

Table 3: Predicted Energy Consumption

Regulated	Units (kWh/yr)
Space Heating	53,376.45
Hot Water	43,013.24
Lighting	18,970.65
Auxiliary - Pumps, fans and electric keep-hot	2,904.14
Total Predicted Building Energy Consumption	**118,264.50**

The development has a total predicted energy consumption figure of 118,264.50 kWh/yr. In order to achieve the 5% carbon reduction target, approximately 5,927 kWh/yr would be provided if PV is the chosen solution. This would provide a significant proportion of the developments predicted energy consumption.

3.5 Renewable Technology Option Review

To address Policy L5, a brief overview of relevant renewable technologies has been undertaken to determine the most suitable solution to meet the 5% carbon reduction target.

3.5.1 Small-Scale Wind Turbines

Wind turbines convert the power in the wind into electrical energy using rotating wing-like blades to drive a generator. Similar to Photovoltaic panels (PV), they can either be grid connected or used to charge batteries or for on-site use.

Wind turbines can range from small domestic turbines producing hundreds of watts to large offshore turbines with capacities of 3MW and diameters of 100m. A detailed study for urban deployment should take into account wind speed and turbulence and potential noise pollution issues.

There are two main types of turbine available, horizontal or vertical axis. Horizontal axis turbines, (sometimes referred to a propeller type) range in scale from 0.5m to 100m diameter. Vertical-axis turbines rotate around a vertical axis, resulting in lower rotor tip speed and reduced noise and vibration issues.

In both cases, the output of the turbine will be dependent upon both the start-up speed of the blades and the specific gearing and generator design.

The most common cause of poor performance is poor siting of the turbine. The turbulent wind conditions often found in urban locations undermines the performance of horizontal scale turbines as they have to regularly rotate Yaw to face the oncoming wind.

This process reduces the proportion of energy that the turbine can capture. Vertical axis turbines are designed to avoid this issue by always having blades facing the wind.

These performance issues mean that as a general rule, horizontal turbines are better suited to less turbulent wind regimes, whilst vertical axis turbines offer potential for installation in urban environments. In either case, the turbine must be mounted at a reasonable height to ensure that it can 'see' the wind. For urban deployment, this means that roof mounted turbines still require a mast and the structural design of the building must be developed to incorporate the additional loads and stresses.

It may be possible for the scheme to secure a 5% reduction from Wind Turbines, however, due to the likely issues associated with permissions required for such installation and the potential for nuisance noise in a residential area, the use of wind turbines has not been considered appropriate for the scheme**.**

3.5.2 Solar Thermal Heating

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

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

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

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

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

While the use of Solar Thermal could possibly meet the requirement, it is highly unlikely that it would be the most efficient or cost-effective method to do so. As such, the use of solar thermal has not been considered for this scheme.

3.5.3 Heat Pumps

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

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

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

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

The constraints and nature of the proposed site do not lend well to the use of ground source heat pumps and as a result, this technology has not been considered to be feasible.

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

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

Given site constraints (both in terms of space required and potential noise and visual nuisance) as well as financial viability reasons, currently heat pumps are not considered appropriate for the apartment element of the proposed development.

3.5.4 Photovoltaics

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

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

For McCarthy Stone, following research and evaluation over several years, PV has been adopted as their preferred renewable technology. McCarthy Stone put their customers at the heart of product choice, it is the attributes of PV's high performance by delivering real energy generation benefits to running costs, added to the low maintenance costs, which is vital to reduce whole life costs of a scheme for all residents. It is this that makes it their preferred renewable approach for CO2 reduction and Energy reduction targets.

As above, the intended strategy to meet the relevant planning conditions is to apply Solar PV panels into the design. This equates to a required array generating a minimum of 5,927 kWh/yr in order to meet the 5% carbon reduction requirement. The client has requested their chosen PV supplier to propose a suitably sized PV array in order to meet the output requirement, which they are committed to applying to the scheme.

The application of PV is the client's current intention; however, designs are subject to change and the tools used are a guide limited by their design as regulation compliance measures against a notional performance, they are not guaranteed of 'As Built' performance nor should they be treated as such.

4.0 Conclusion

This statement has reviewed the proposed development at Oakfield, Sale, which consists of a retirement living complex comprising of 25 apartments, communal areas (including Reception Area, Lounge, Refuse, Scooter Store, Stairs, Lifts, Stores, Corridors and Guest Suite and Ensuite), as well as associated landscaping, and has provided an assessment of the proposed scheme against Policy L5 and Section G within the Supplementary Planning Document 1: Planning Obligations.

The statement has highlighted that the scheme currently proposes to utilise a good thermal envelope to minimise heat loss, as well as efficient heating and lighting systems, which will drive energy efficiency in the building. This is in line with Policy L5.9 and L5.10's objectives to incorporate sustainable construction and CO_2 reduction design techniques.

The calculations completed on the building fabric show that the predicted energy consumption will be around 118,264.50 kWh/yr. They have also shown that a total carbon reduction of 3,076 kg/CO2/yr needs to be achieved to meet L5's 5% carbon reduction target. Having undertaken a review of renewable technological options to meet Policy L5, the client is proposing to engage a suitably qualified PV supplier to provide a PV array with an approximate minimum output of 5,927 kWh/yr, which will provide a 5% reduction in carbon emissions, therefore meeting Policy L5's target.

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

Appendix 1

Proposed Site Plan

NOTES

The contractor must check all dimensions, levels and services prior to commencement of any works. Box Architects to be notified of any discrepancy. Do not scale from drawing.

The contractor is responsible for ensuring all works comply with all relevent statutory requirements and British standards, whether or not they are noted on this drawing.

Rev	Date	Details	Drawn by	Checked by
A	26/10/2022	Revised access to site and communal gardens	AEM	SMS
B	28/10/2022	Revised parking arrangement and removed tree31	AEM	KE
C	01/11/2022	Revised front boundary. Moved building to clients comment 01/11/2022	AEM	KE

- Outline of existing building
- Retained Existing Wall
- Demolished Existing Wall
- New Wall
- Tree category B 1, 2 or 3
- Tree category C 1, 2 or 3
- Root protection Area
- Tree Trucks
- Removed Trees
- Retained Hedge
- New Hedge
- Removed Hedge

25 Retirement Living Apartments
14 one bed
11 two beds

16 Parking space inc, 1 disabled

Key

- 1 Bedroom
- 2 Bedroom
- Amenities
- Circulation

North

0 2 4 6 8 10m

SCALE 1 : 200

McCARTHY STONE
Life, well lived

CLIENT NAME
McCarthy Stone

PROJECT
Retirement Living Apartments
35 Oakfield,
Sale,
M33 6NB

TITLE
Site Plan

STATUS
Stage 3

DATE	SCALE
October 2022	As indicated @ A1
DRAWN	**CHECKED**
AEM	SMS

DRAWING NUMBER
NO-2860-3-AC -0002 Site Plan

REVISION	JOB NUMBER
C	757.88

box architects
LEEDS: 1 Foundry Square, Leeds, LS11 5DL 0113 244 1133
LONDON: 2 Angel Square, London, EC1V 1NY 020 345 70835
www.boxarchitects.co.uk info@boxarchitects.co.uk

Appendix 2

Energy Calculations (SAP Worksheets – available on request due to size)