
McCarthy Stone

St Chad's Drive, Kirkby

Energy Statement

December 2023



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1.0 Introduction

1.1 Purpose of the Report

Instructions were received from McCarthy Stone to produce an Energy and Sustainability Statement for the proposed development at St Chad's Drive, Kirkby. 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 below listed documents:

Knowsley Local Plan: Core Strategy - Adopted 6 January 2016.

1.2 Site and Building Description

The development will be located at St Chad's Drive, Kirkby. The application seeks approval for the construction of a retirement living complex consisting of 53 apartments (a mix of 1 & 2 bedroom), circulation spaces, a homeowner's lounge, staff areas and reception area, as well as supplementary parking and landscaping. A proposed location plan 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 Kirkby, within the authority of Knowsley District Council.

Representative SAP calculations for all plots have been completed for an equivalent scheme to determine the approximate performance of the development. The development will be assessed against the 2021 Part L1A Regulations, so the Elmhurst Energy Design SAP 10.2 Software has been used to complete these calculations.

A representative SBEM calculation has also been undertaken for an equivalent scheme using software for the 2021 Part L2A Regulations, which has been used to provide data for this statement. The specifications and results for the buildings as proposed are compared to the target building baseline, which is the benchmark for Part L of Building Regulations compliance.

A proposed sanitaryware specification has been calculated using the Code for Sustainable Homes (CfSH) tool in order to demonstrate Part G Water Efficiency performance.

2.0 Planning Policy

2.1 Knowsley Local Plan: Core Strategy - Adopted 6 January 2016

Policy CS2: Development Principles

- 1) *New development in Knowsley and the preparation of subsequent stages of the Local Plan will be expected to support the following development principles:*

Principle 2: Reduce carbon emissions and adapt to the effects of climate change by:

- a) Contributing to reductions in carbon dioxide emissions from all sources, in line with national targets;*
- b) Ensuring an ability to adapt to future changes to national targets for carbon dioxide and other greenhouse gas emissions, including recognising the role of new technology;*
- c) Identifying and applying measures offering effective mitigation and adaptation to likely environmental, social and economic impacts of climate change; and*
- d) Meeting appropriate minimum standards for sustainability.*

Policy CS22: Sustainable and Low Carbon Development

Sustainable Construction Principles

- 1) *New development will be required to meet high standards of sustainable design and construction and minimise carbon emissions. This should be achieved by:*
- a) Designing new buildings for flexible uses throughout their lifetime;*
 - b) Avoiding the creation of adverse local climate conditions by using natural systems to avoid internal overheating and excessive heat generation;*
 - c) Ensuring developments are comfortable and safe for users;*
 - d) Making the most effective and sustainable use of water, aggregates and other resources;*
 - e) Limiting energy use by incorporating high standards of insulation, heat retention, natural ventilation and passive solar techniques;*
 - f) Landscaping (including measures such as green walls or roofs) to create shelter and reduce any heat island effect;*
 - g) Using sustainable materials from local suppliers where possible;*
 - h) Supplying energy efficiently and incorporating decentralised energy systems, using renewable and low carbon energy where feasible;*
 - i) Managing flood risk, including through the use of Sustainable Drainage Systems (SuDS) and flood resilient design for infrastructure and property; and*
 - j) Promoting sustainable waste practices in new and existing developments.*

3.0 Policy Response

3.1 Fabric Efficiency

In efforts to reduce the overall carbon emissions associated with the development and to maximise the energy efficiency, McCarthy Stone have developed a robust 'fabric first' approach to the build specification, which allows it to comfortably achieve the TER, TPER and TFE targets under ADL1 2021.

This has been achieved through building fabric improvements with an uplift on the minimum requirements of ADL1 2021, 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 Kirkby compares to the limiting values and minimum efficiencies allowed within Part L 2021:

Table 1: Proposed Specification		
Building Element	Limiting Part L 2021 Specification	Proposed Specification Part L
External Walls U-Value	0.26	0.17
Roof U-Value	0.16	0.11
Ground Floor U-Value	0.18	0.11
Window U-Value	1.60	1.30
Party Wall U-Value	0.20	0.00
Space Heating Efficiency	100%	100%
Pressure Test	8.00	4.00
Lighting Lumens	75 lm/w	80 lm/w

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 2022.

The proposed build-up for the external wall for the apartments is a Light Gauge Steel Frame (LGSF) system containing a total insulation thickness of 230mm, that generates a U-value of 0.17W/m²K. 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 in the apartments is 4.00 m³/(h.m²), providing a significant improvement over the Notional Building target.

It is proposed that the scheme will be constructed using Modern Methods of Construction (MMC). There are numerous benefits to the use of MMC, hence why the Government is keen to promote it to the construction industry going forward and why MMC has been endorsed by the Government's Construction Playbook.

The use of bespoke calculated thermal bridge details also ensures that thermal performance is enhanced by minimising heat and energy losses through thermal bridges and air gaps. The simple form of the site layout and the apartments means that heat loss wall area and complex thermal bridges are minimal to most plots on the scheme, which again will minimise space heating demand.

McCarthy Stone utilise electric panel heating to all apartments, which achieve efficiencies up to 100%. Due to the continuing decarbonisation of the UK energy supply, electricity is increasingly becoming the low carbon choice for heating strategy, and it is expected this will continue as more renewable electricity sources become operational and fossil fuel sources are phased out.

Water Heating demand for the apartments will be serviced by an Air Source Heat Pump Hot Water Cylinder, currently proposed to be the Dimplex EDEL product, which can be classified as a low carbon technology. This is a stainless steel cylinder with a hot water heat pump mounted on the top of it.

The system works by extracting heat from external air, supplied through insulated ductwork. As such, it is able to provide hot water with a COP efficiency of up to 336%, which is significantly higher than the efficiency of a standard immersion cylinder powered by direct electricity.

Another key element to the specification of the proposed development is the utilisation of mechanical ventilation with heat recovery (MVHR) in the apartments. 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 to warm the 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 therefore save 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.

Optimising Natural Light & Solar Gains

Passive solar design and providing a benign site microclimate both enhances the energy and environmental performance of a building. The development at St Chad's Drive, Kirkby will have good access to solar radiation and daylight.

The orientation of the building lends well to a Southerly direction, in order for the dwellings to gain maximum benefit from the sun. It will not be shaded by surrounding buildings and there is sufficient space around the building so that overshadowing will not be an issue and maximum solar benefits will be felt. This provides natural heating and daylighting to the respective rooms. The necessary steps to mitigate any risks associated with summertime overheating will need to be resolved during the next stage of the design.

Overheating / Comfort

The proposed scheme will be assessed against the new Part O Overheating Building Regulations, using the Dynamic Thermal Modelling method, which follows the CIBSE TM59 methodology. It is currently expected that compliance will be achieved through a combination of passive measures and mechanical ventilation. Where further measures are required to ensure Part O Compliance, these will be installed in full by McCarthy Stone.

Potential Adaptation

While the intention is that the proposed scheme remains as a retirement facility for the over 60s for the foreseeable future, the relatively simple form of the building does allow future repurposing. The obvious future options would be as a similar usage, for example as more standard apartment accommodation. In addition, the MMC construction does allow for elements of the scheme to be removed and re-used elsewhere if this was ever required, or for layouts within the building to be easily amended without affecting the building footprint.

While the fabric is already high performing, there could be further opportunities to reduce the carbon footprint through M&E strategy. To an extent, as the building is electrically heated, this will occur by default as the grid is decarbonised. However, the use of further rooftop PV could be explored, as could battery technology and the use of smart technology within apartments to allow for more detailed monitoring and control of energy use.

McCarthy Stone will also install sufficient Electric Vehicle (EV) Charging points to comply with Part S of the Building Regulations at a minimum. While this is not directly connected to the energy performance of the building, it does demonstrate their commitment to emphasising low carbon technologies throughout the site and adaptability to future needs, as this will provide the easily accessible facility for the end user to operate an electric vehicle rather than a petrol fuelled vehicle.

3.2 Carbon Emissions

Representative SAP and SBEM calculations have been utilised for the development to understand the proposed performance in relation to carbon emissions. In order to accurately estimate the quantity, a scheme of equal build specification and service strategy has been used as a base.

The below tables detail the performance of the proposed scheme against all relevant assessment metrics of Part L 2021. The full representative outputs for the SAP and SBEM calculations used to derive these figures are available on request.

Table 2: Part L 2021 Carbon Emissions	
Domestic	Units (kg/CO ₂ /year)
Target Emission Rate (Block Compliance)	33,064.94
Dwelling Emission Rate (Block Compliance)	9,619.01
Non-Domestic	Units (kg/CO ₂ /year)
Target Emission Rate	5,063.40
Building Emission Rate	5,072.10
Percentage Reduction	61.50%

Table 3: Part L 2021 Primary Energy	
Domestic	Units (kwh/m ² /year)
Target Primary Energy Rate (Block Compliance)	73.17
Dwelling Primary Energy Rate (Block Compliance)	41.68
Percentage Reduction	43.03%
Non-Domestic	Units (kwh/m ² /year)
Target Primary Energy Rate	59.89
Building Primary Energy Rate	56.97
Percentage Reduction	4.88%

Table 4: Part L 2021 Fabric Efficiency	
Domestic	Units (kwh/m ² /year)
Target Fabric Energy Efficiency (Block Compliance)	26.32
Dwelling Fabric Energy Efficiency (Block Compliance)	23.66
Percentage Reduction	10.12%

Based on the Design Stage representative SAP's and SBEM calculations utilised, this scheme will demonstrate an improvement over in carbon emissions over the target value of approximately 61.50%, which is a significant improvement over the minimum standards and goes beyond the expected target for the 2025 Future Homes Standard.

District Heating

An exercise has been completed reviewing the potential for the proposed development at Kirkby 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.

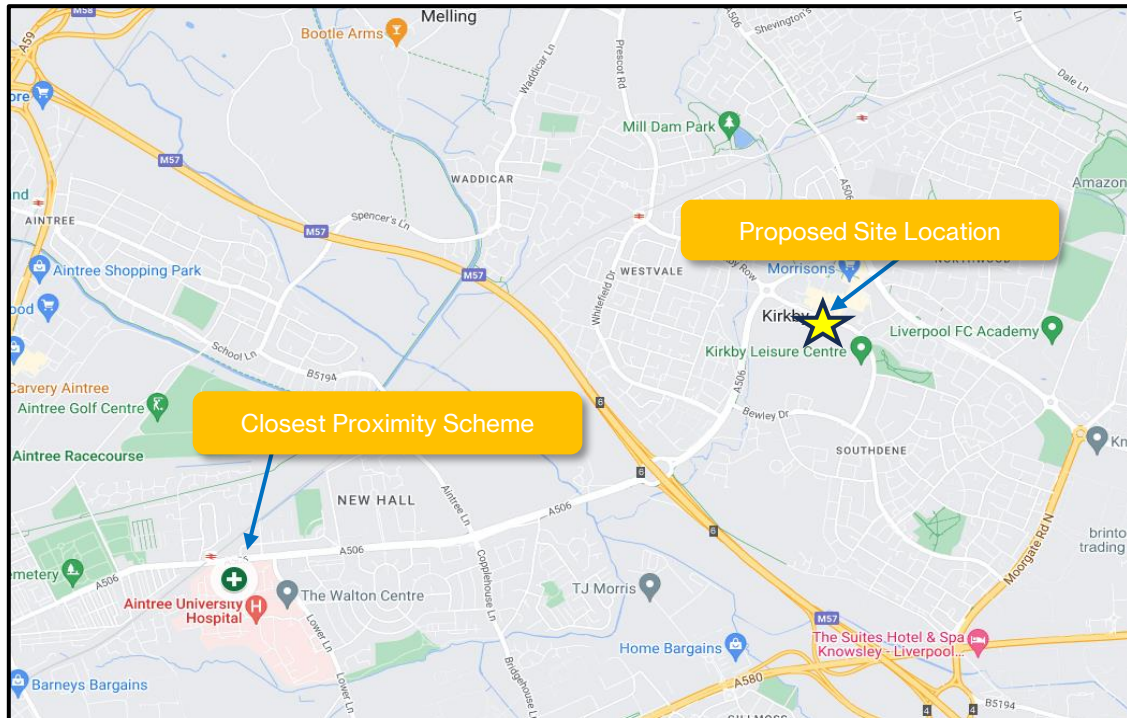


Figure 1 – Association of Decentralised Energy - www.theade.co.uk

The closest connection point is the Media City district heating connection, which is approximately 46 kilometres 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.

Solar 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.

In addition to the fabric first approach that has been applied on the scheme, there is also provision to include for a Solar PV array to support the energy use of the building in operation. Based on the proposed energy use, an output of 26,508.90 kWh / year is required to ensure that Part L2A Compliance is achieved for the communal elements of the proposed scheme. 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, and the PV figure will be updated where required as the scheme design develops.

McCarthy Stone put their customers at the heart of product choice, it is the attributes of Solar 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.

3.3 Sustainable Construction and Waste Management

Recycling & Waste Management

It is a statutory requirement for local authorities and private sector organisations to meet higher recycling targets. The aim is to recycle, reuse and reprocess more waste into useful products and materials.

It is therefore important to provide sufficient storage areas within the building to reflect the recyclable waste streams that are generated and then collected by the local waste authority. This makes it as clear and convenient as possible for the building users to separate waste at source and encourage the reduction of waste to landfill.

McCarthy Stone will provide a dedicated space for the segregation and storage of operational recyclable waste generated by the development at St Chad's Drive, Kirkby. The space will be clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams. It will also be accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors and of a capacity appropriate for the development type, size and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates.

Additionally, each apartment will be provided with internal storage containers for recycling in addition to non-recyclable waste storage. Home composting facilities and a home composting information leaflet within the kitchen area or communal space for each self-contained dwelling or bedsit will also be provided to residents.

Sustainable Construction

The development at Kirkby will strive to incorporate sustainable design into the building. The use of MMC is a vital component of this.

MMC utilises offsite construction far more than conventional construction. This allows for a much more controlled environment and therefore a significantly greater degree of control throughout the process, which leads to fewer quality issues, lower levels of defects and provides greater certainty in design programming and build costs.

MMC can also provide for a more sustainable construction process, as the greater degree of quality control eliminates wastage and the factory based setting means less work and materials storage is required on site, reducing air pollution in the vicinity of the construction site. The use of MMC can also deliver significant time savings across the construction process, through better co-ordination of factory and on-site processes, and then better on-site methodologies.

Apart from the specific elements to be delivered using MMC, material selection will endeavour to show preference to suppliers who operate responsible sourcing practices and have current environmental management certificates. Examples including FSC/ PEFC certified timber products will be utilised, this ensures all products have been obtained from sustainable and legal sources.

Where possible, local suppliers of required building materials will be given preferred selection over those who operate at further distance from the development site. Through this approach, delivery materials will be transported lesser distance, reducing the associated CO₂ emissions and fuel use of delivery loads. The procurement of these materials closer to the site, will support local businesses & operations within the region. Where allowing, suppliers who possess environmental certifications such as BES 6001/ISO 14001 will be sourced from to further encourage the use of materials ascertained from responsible accredited supply chains.

Similarly, where contractors and site personnel are required to aid the construction efforts, they too will also be given preferential consideration where they are local to the site. This again will reduce the associated CO₂ emissions of travel, in addition to supporting the local economy.

In efforts to reduce waste throughout the construction process, as part of the design development, the design team have implemented a number of measures to eliminate potential waste, which are augmented by the use of regimented and tested factory procedures for the MMC elements.

McCarthy Stone have an effective site waste management system adopting waste hierarchy principles of reduce, reuse, or recycle. All waste will be handled by a licensed waste contractor who will segregate and process waste produced. Such waste will be separated into key waste groups and recycled at a waste processing plant to be refined into new products, or reused in other projects where they cannot be reformed.

Site hoarding or materials where safe and appropriate are transported from other sites for reuse. The design of the apartments looks to incorporate recycling facilities for residents further encouraging the principles of recycling.

The development design is to standard material dimensions to avoid waste generation. This contributes towards the standardisation of the dwellings which reduces waste not only at the manufacturing stage, but also during construction as it reduces the need to re-size materials on site. In addition, the use of standardised materials increases the likelihood that the materials will be reused in the eventuality that the site is redeveloped in the future. The use of MMC is key to this aim.

3.4 Water Usage

The relevant policy stipulates efficiency in relation to water use. The Client will provide a sanitaryware specification that shows an improvement over the Building Regulations requirements of 125 litres/person/day. The development at St Chad's Drive, Kirkby will incorporate efficient, water saving sanitaryware to meet this goal. Where this is not possible, flow restrictors will be installed to limit water use of sanitaryware items.

A representative specification is listed below, whilst the final flow rates of individual sanitaryware items may change as detailed design progresses, the 125 Litre limit will be maintained. A full breakdown of calculations is available in Appendix 2.

The specification outlined in Table 5 below achieves 118.8 litres/person/day, this therefore is comfortably below the 125 litres/per person/per day target.

Table 5: Proposed Sanitaryware Specification Flow Rates	
Component	Water Usage
WC's	6 Litres (Full Flush Volume), 3 Litres (Part Flush Volume)
Showers	10 Litres/Minute
Baths	180 Litres
Wash-hand basin taps	5 Litres/Minute
Kitchen taps	5 Litres/Minute
Washing Machine	8.29 Litres/kg
Dishwasher	1.25 Litres/Place Setting

4.0 Conclusion

This statement has reviewed the proposed development at St Chad's Drive, Kirkby a retirement living complex consisting of 53no apartments (mix of 1 & 2 bedroom) and associated communal areas, with supplementary parking and landscaping, and has provided an assessment of the proposed scheme against the relevant policies:

Knowsley Local Plan: Core Strategy - Adopted 6 January 2016

- Policy CS2: Development Principles
- Policy CS22: Sustainable and Low Carbon Development.

Details have also been given of commitments and procedures to be complied with by the developer, in order to comply with the Sustainable Construction and Waste Management element. It is expected that the use of MMC will be key to the successful implementation of these strategies. A review of potential future climate change mitigations and uses has been provided, including an overview of the overheating prevention measures that are proposed to be in place at the scheme.

The statement has highlighted that the scheme currently proposes to utilise a high performing thermal envelope to minimise heat loss, as well as efficient heating and lighting systems, which will drive energy efficiency in the building. This is augmented by the use of an Dimplex EDEL ASHP system to provide hot water, and an MVHR system for ventilation, both of which are high performing products that drive low carbon, efficient energy usage.

As such, supplemented by a photovoltaic array for the communal areas, the proposed specification allows the scheme to comfortably comply with all metrics under the new Part L 2022 Building Regulations, and demonstrate a level of predicted carbon emission performance for the apartments that is more in line with the expected 2025 Future Homes Standard requirements. A PV array with a minimum output of 26,508.90 kWh / year will also be installed at the scheme, to ensure that Part L2A Compliance is achieved for the communal element.

The calculations completed on the building fabric and the use of Dimplex EDEL ASHP confirm that the specification meets the required performance in relation to carbon emissions. The proposed carbon emissions of 14,682.41 kg/CO₂/yr, against the target carbon emissions of 38,137.06 kg/CO₂/yr confirm an approximate 61.50% improvement, exceeding Building Regulations Part L 2022 requirements.

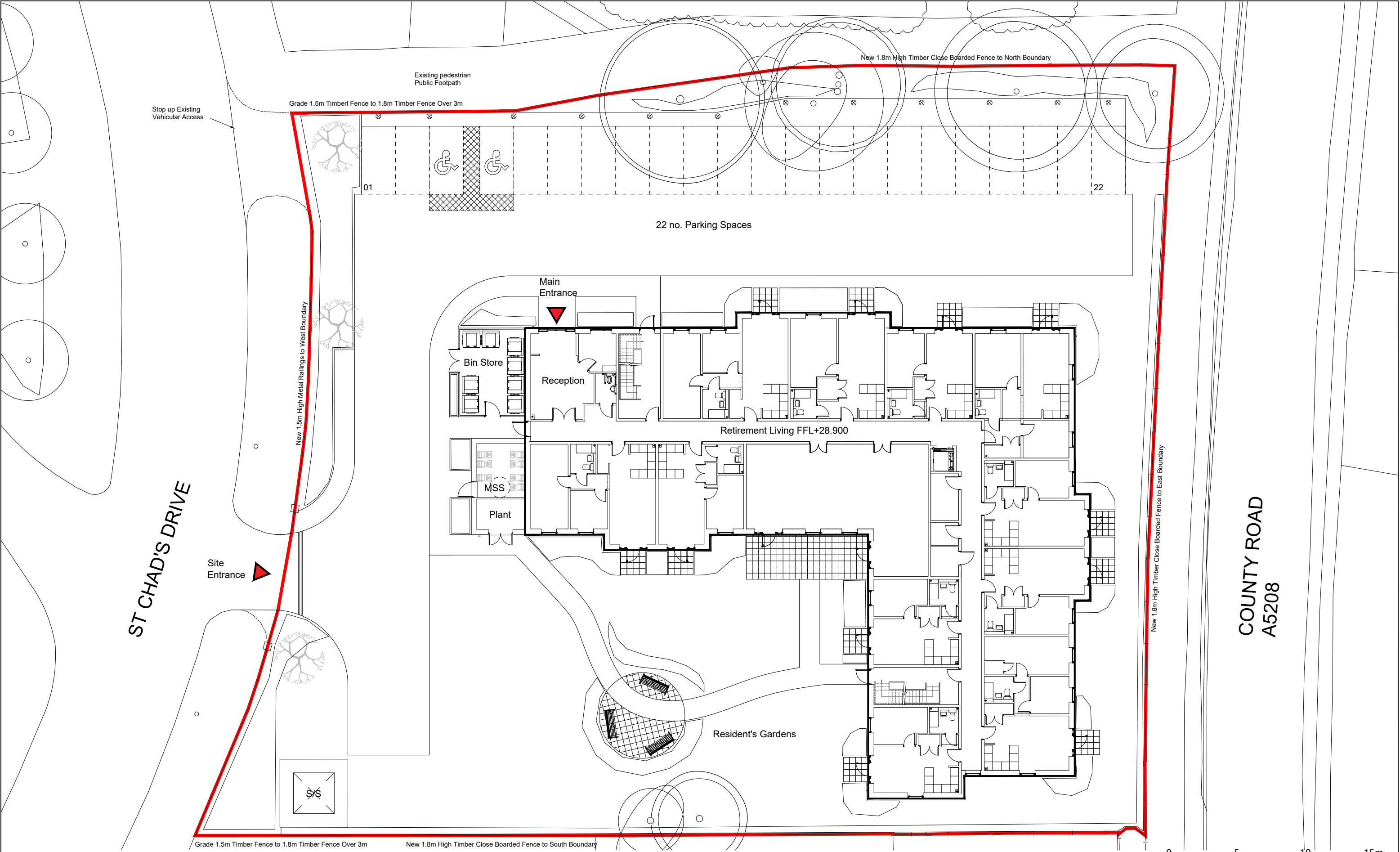
A proposed sanitaryware specification of less than 125 litres/use/person/day has been detailed, in order to demonstrate the client commitment to conserve water.

Whilst the proposed water sanitaryware flow rates and the use of PV & Dimplex EDEL ASHP are the preferred specification 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 Location Plan



1002
01

Proposed Site Plan
Scale 1:250

- Notes:
- All drawings are subject to Planning and Building Control consent.
 - The details shown are for design intent purposes only and are subject to further design development with suppliers and sub-contractors
 - Proposals subject to consultation and approval from Local Authority Building Control or an Approved Inspector
 - All setting out dimensions should be checked on-site prior to construction and any discrepancies and/or omissions should be reported to the Architect immediately



Rev. Date Details

Drawn Chkd

Rev. Date Details

Drawn Chkd

Drawn By: MP
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Rev: P1

Issued for: **PLANNING ISSUE**
Project/Client: Project Evolve RL Scheme, St Chad's Drive
Drawing: Proposed Site Plan
Kirkby, McCarthy Stone

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Appendix 2

Part G Water Calculations



Job no:	R3766
Date:	November 2023
Assessor name:	Adam Revill
Registration no:	
Development name:	St Chad's Drive, Kirkby

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PRINTING: before printing please make sure that in "Page Setup" you have selected the page to be as "Landscape" and that the Scale has been set up to 70% (maximum)

WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS - (BASIC CALCULATOR)

	House Type:	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7		Type 8		Type 9		Type 10	
	Description:	Specification 1																			
Installation Type	Unit of measure	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day	Capacity/flow rate	Litres/person/day
Is a dual or single flush WC specified?		Dual		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Click to Select		Click to Select		Click to Select	
WC	Full flush volume	6	8.76		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
	Part flush volume	3	8.88		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Taps (excluding kitchen and external taps)	Flow rate (litres / minute)	5	9.48		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Are both a Bath & Shower Present?		Bath & Shower		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Bath	Capacity to overflow	180	19.80		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Shower	Flow rate (litres / minute)	10	43.70		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Kitchen sink taps	Flow rate (litres / minute)	5	12.56		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a washing machine been specified?		Yes		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Washing Machine	Litres / kg	8.29	17.41		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a dishwasher been specified?		Yes		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Dishwasher	Litres / place setting	1.25	4.50		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a waste disposal unit been specified?		No		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Water Softener	Litres / person / day		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Calculated Use		125.1			0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
Normalisation factor		0.91			0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91
Code for Sustainable Homes	Total Consumption	113.8			0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
	Mandatory level	Level 1/2			-		-		-		-		-		-		-		-		-
Building Regulations 17.K	External use	5.0			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0
	Total Consumption	118.8			0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
	17.K Compliance?	Yes			-		-		-		-		-		-		-		-		-



Appendix 3

SAP/SBEM Calculations (Available on request)