

ENERGY AND



SUSTAINABILITY STATEMENT

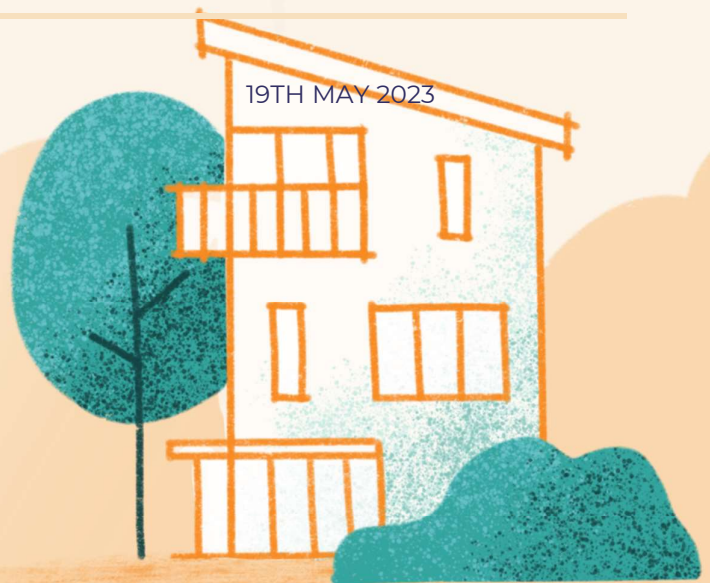
LAND AT TESCO EXTRA CAR PARK

PORTMAN ROAD, READING WEST

PREPARED FOR:

RIDGEPOINT HOMES
TERRIERS HOUSE,
AMERSHAM ROAD,
HIGH WYCOMBE,
HP13 5AJ

19TH MAY 2023



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EXECUTIVE SUMMARY

1. This Sustainability and Energy Statement has been prepared in support of a planning application for Land at Tesco Extra Car Park. The statement includes an energy demand assessment showing how selected energy efficiency, low carbon and renewable energy measures have been considered and those, which are deemed appropriate for the scheme.
2. SAP Calculations have been prepared for the development based upon the construction specification set out within the report and using the detailed planning drawings. This provides an accurate assessment of the carbon dioxide emissions arising from the site and has allowed a number of different systems and technologies to be tested.
3. Reading Borough Council require all new development to achieve a minimum of 35% improvement in regulated emissions over the target Emissions Rate in SAP 2012 with SAP 10 carbon emission factors.
4. The conclusion of the energy strategy is that the development significantly reduces the buildings CO2 emissions when compared to the baseline target, through a combination of passive measures, building fabric design improvements and the installation of high efficiency hot water services and the addition of 131,200 kWp of photovoltaic panels.
5. A saving in CO2 of 83% is estimated to be achieved annually compared to the building regulations compliant baseline assessment across the site.
6. Policies CC4 Decentralised Energy and H5 Standards for New Housing have also been addressed and satisfied in the document. The table below provides a summary of the regulated CO2 savings achieved by the development.

	Regulated CO2 emissions (Tonnes CO2 pa)	Saving achieved on CO2 emissions (%)
Building Regulations Part L compliance ("Baseline")	112	
Proposed scheme after energy efficiency measures and ASHP Hot water cylinder ("Residual")	46	59%
Proposed scheme after on-site Photo Voltaic	26	23%
Total savings on residual emissions	93	83%

Table 1: Summary table of proposed measures

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1. INTRODUCTION

1. This Statement has been prepared in support of a planning application submitted as part of the planning work for the proposed Land at Tesco Extra Car Park development.
2. It is proposed to redevelop the site at Land at Tesco Extra Car Park to comprise 80 Flat units.
3. The following addendum statement seeks to outline how this redevelopment will comply with the requirements and objectives of both the Reading Borough Council in terms of their respective sustainability policies. Policies adopted within the Reading Borough Council plan are, generally, more onerous. Reading Borough Policies CC4 and H5 have all been outlined and addressed in the original report. Reading Borough Council policies covered in this addendum are outlined below.
 - a. **CC4** – Decentralised Energy
 - b. **H5** – Standards for New Housing
4. Darren Evans Assessments have been commissioned to;
 - a. Investigate the technical viability and feasibility of incorporating low or zero carbon technologies into the development.
 - b. Identify additional solutions outside the scope of renewable energy technologies which will assist in improving the energy efficiency of the proposed development.
 - c. Reduce carbon emissions associated with the development.
 - d. Address how the development will meet wider sustainable development issues.

2. LOCAL PLANNING POLICY

2.1. CC4 Decentralised Energy

1. This policy requires developers to consider inclusion of decentralised energy infrastructure, increasing the amount of decentralised energy provision in the Borough. This will help to achieve a shift to sustainable energy consumption and production and covers a wide range of technologies that reduce dependence on a centralised network or grid.

2.2. H5 Standards for New Housing

1. This policy outlines standards for new-build housing, including those for sustainable design and construction. All new-build housing must be built to the higher water efficiency standard under the Building Regulations. All major new-build residential should achieve zero carbon homes and all other new-build housing must achieve a minimum 19% improvement over the 2013 Building Regulations target. This policy will help to deliver high-quality new homes and achieve Reading's emissions targets, as well as mitigate the effects of climate change.
2. In achieving Zero Carbon Homes for major residential developments, the preference is that new build residential of ten or more dwellings will achieve true carbon neutral development on-site. If this is not achievable, it must achieve a minimum of 35% improvement in regulated emissions over the Target Emissions Rate in the 2013 Building Regulations, plus a Section 106 contribution of £1,800 per remaining tonne towards carbon offsetting within the Borough (calculated as £60/tonne over a 30 year period). £60 per tonne of carbon is a nationally-recognised price of carbon and reflects the amount established by the Zero Carbon Hub. Based on a review of other Local Planning Authorities (LPA) carbon pricing, £60 is the amount used by a majority of LPAs and is lower than the £95/tonne proposed in the new draft London Plan.
3. Where a SAP assessment is required to demonstrate compliance with policy H5 for new-build residential, applicants are expected to use SAP 2012 carbon emission factors, as well as updated (SAP 10) carbon emission factors, to assess the expected carbon performance of a new development. Applicants should undertake this approach until such time as central government adopts the new Building Regulations, at which point only SAP 10 emission factors shall be used. Applicants should continue to use the current Building Regulations methodology for estimating energy performance against Part L 2013 requirements as set out in Policy H5 but with the outputs manually converted for the SAP 10 emission factors. This is for demonstrating performance against planning policy targets and is separate to Building Regulation compliance

3. THE ENERGY HIERARCHY

1. The Energy Hierarchy is a widely adopted and recognised set of principles to guide design, planning and development decisions to optimise energy provision. The Hierarchy prioritises minimising the need for energy consumption through firstly design and energy efficiency and then through generating the reduced energy demand via renewables. The Hierarchy can also help to balance the economic and environmental dimensions of sustainability, supporting choices which are both environmentally and economically sustainable.

Reduction at Source

- Sustainable design
- Passive solar design
- Avoidance of overshadowing

Increased Energy Efficiency

- Natural ventilation over mechanical ventilation
- Efficient building services

Renewable Energy

- Installation and operation of solar photovoltaics and heat pumps

2. It is considered that the above principles carbon reduction forms the most appropriate approach from both the practical and financial perspective. The industry is broadly in agreement that the energy efficiency and low carbon technologies have the greatest impact offsetting CO2 emissions. Therefore, it is logical to encourage enhanced mitigation through energy efficiency and low carbon technologies in the first instance, as opposed to applying renewables as the first option at a significantly greater cost.

4. THE PROPOSED DEVELOPMENT

1. This proposal seeks the erection of 80 dwellings in Reading West South of Portman Road. Below are pictorial representations to that effect.



Figure 1: Satellite view of existing area to be redeveloped sourced from google.

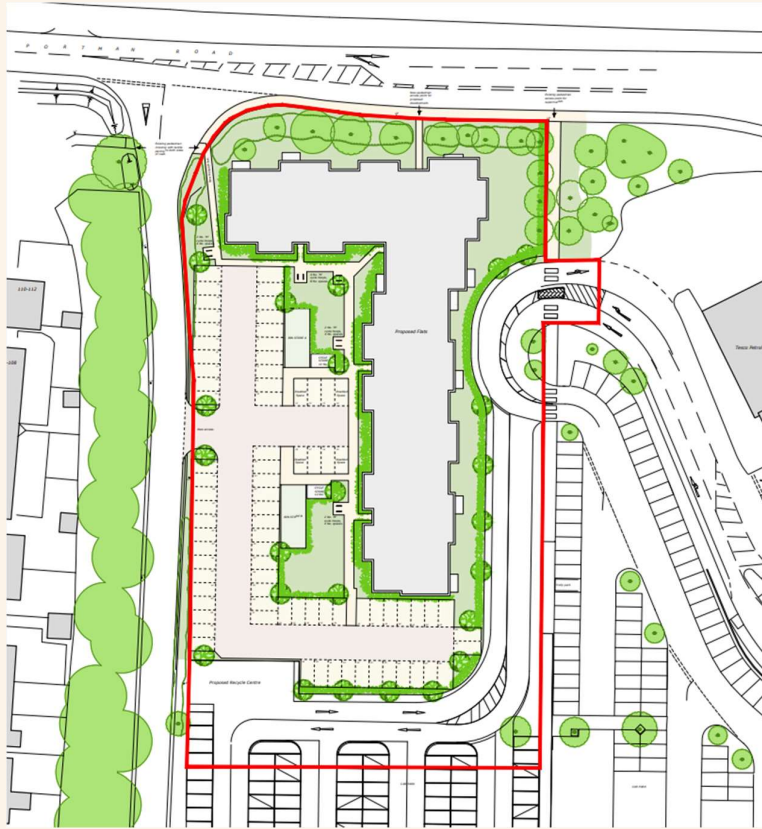


Figure 2: Red Line Plan denoting the Outline of the Site

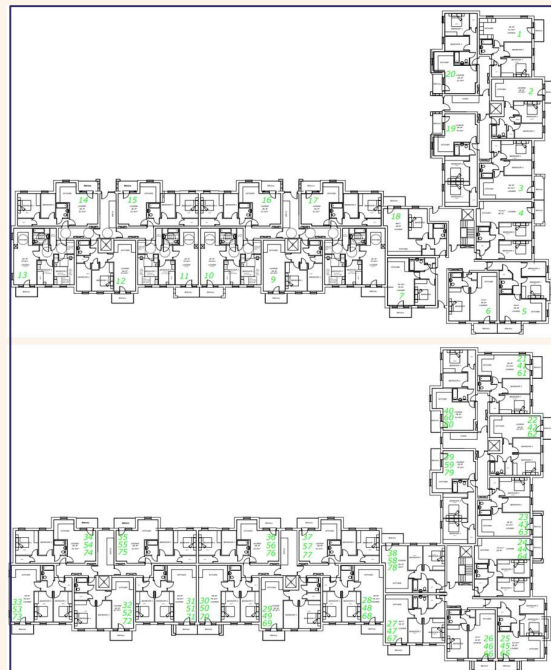


Figure 3: Ground Floor & Typical Floor Layout

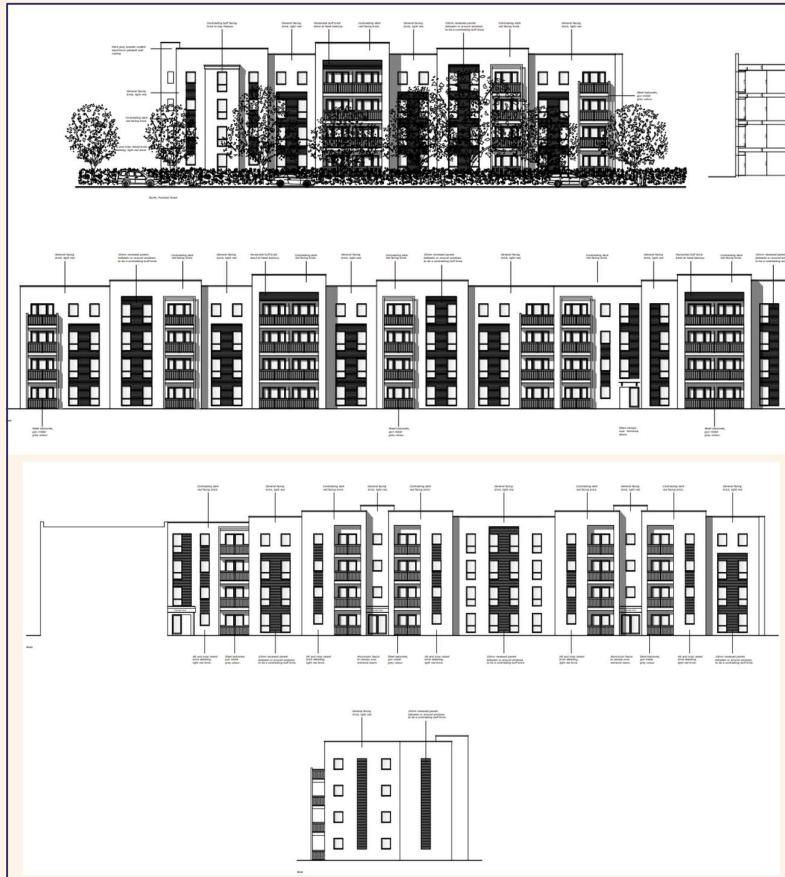


Figure 4: View of proposed building as an elevation

5. SUSTAINABLE ENERGY STRATEGY

1. The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.
2. Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical. It is possible to exceed Building Regulations requirements (Part L 2013) through demand reduction measures alone, which typically include a combination of passive design measures (e.g. building design and efficient building fabric) and active design measures (e.g. Building services)

5.1. Passive Design

1. Passive design is a key principle of sustainable design and can be used to reduce the building's energy demand. Passive design responds to local climate and site conditions to maximise the building users' comfort and health while minimising energy use.
2. At the earliest stage the buildings have been designed using a fabric first approach as to initially minimise energy and resulting CO2 emissions. Particular attention will be paid to thermal envelope and a high level of insulation will be specified to all thermal elements to minimise heat losses.
3. Passive solar gain reduces the amount of energy required for space heating during the winter months. As this is a development in an relatively built up area, the layout of the dwellings is dictated by the existing street scene and associated adjacent buildings. However, the buildings is designed to maximise passive solar gain by the specification of fenestrations to the south, east and west where possible.
4. The development has been designed to improve daylighting in all habitable spaces, as a way of improving the health and wellbeing of its occupants. The majority of the habitable rooms, such as living rooms, will benefit from large windows to increase the amount of daylight within the internal spaces. Blinds will be installed for minimizing glare and regulating solar gains during hottest summer months.
5. A portion of the buildings heat loss will occur due to air infiltration. Good construction detailing and the use of best practice construction techniques will minimise the amount of air infiltration. Extra attention to detail will be paid, with adequate sealing to all junctions in the thermal envelope, service penetrations and window casements. This will ensure an air test target of 4m³/m² at 50Pa or better is achieved.

6. Natural ventilation will be used to provide fresh air to all units to minimise energy demand for mechanical ventilation. All units will be equipped with operable windows in order to prevent overheating during hottest summer months.
7. Given the early stage of this project the construction of certain thermal elements have not been finalised. Target u-values, which the client will achieve with their final specification, have been used in these instances.
8. The following tables provide a summary of the energy efficient and carbon reducing design characteristics incorporated across the development.

5.2. Outline SAP Design

1. Incorporating passive design in to the SAP, lone with renewable technology

Design SAP Data Input Table			
	Element	Details	Comments
Floor U-Values	Ground Floors	0.11 W/m ² K	NuSpan Flooring System
Wall U-Values	External Walls	0.18 W/m ² K	150mm Blown Fibre ($\lambda=0.034\text{W/mK}$), Celcon ($\lambda=0.011\text{W/mK}$), Blockwork($\lambda=0.18\text{W/mK}$)
Roof U-Values	External Flat Roof	0.13 W/m ² K	150mm PIR Insulation
Opening U-Values	Windows	1.2 W/m ² K	Double Glazed, Low-E Coated. G Value: 0.63
Thermal Bridging	y - value	Varies per flat	Supplier PSI Values, Accredited Construction details is used
Ventilation	Air Tightness	4	
	Mechanical Ventilation Heat Recovery	MVHR	dMev systems – Vent Axia Low Carbon x 2 per dwelling (assumed basic model 474496)
Heating and Hot Water	Primary heating system Houses	From Panel Heaters	Electric panel heaters
	Controls	Programmer and TRVs	Programmer and room thermostat
	Main Heating 2	From Heat Pump cylinder	Dimplex Edel Heat Pump Cylinder – Edel 170UK
	Water heating	From Main heating 2	Cylinder volume 170litres, loss 1.92kwh/day
Low Energy Lighting		100% Low-Energy Fittings	Minimum Efficiency 45 Lumens per Circuit Watt
Renewables		Photovoltaics Panels	4 Panels per dwelling, panel size 410W, Panels are oriented in South direction with an 35 degree elevation.

Table 2: Energy Efficient Measures of SAP Calculations

6. CARBON REDUCTION REQUIREMENTS

1. SAP calculations have been produced for the dwellings as a means of determining the Target and Dwelling Emission Rate (TER & DER) using the approved modelling software Elmhurst SAP 2012.
2. SAP 2012 has got out dated Fuel Carbon Factors, which is due to the grid using more clean fuel, this has been updated in the latest Part L Building Regulation. Due to the H5 planning policy SAP 2012 is still to be used, but with the SAP 10 Fuel Carbon Factor, the differences can be seen below.

Fuel type	Fuel Carbon Factor (kgCO ₂ /kWh)	
	SAP 2012	SAP 10
Natural Gas	0.216	0.210
Grid Electricity	0.519	0.233

Table 3: Fuel Carbon Factors

3. Incorporating the energy saving measures from the previous section into the design SAP Assessment will reduce the sites overall energy demand and subsequent CO₂ emissions beyond the requirements of Part L Building Regulations by 83%.
4. Tables of the results of the SAP assessments have been provided in Appendix A. Appendix B has floor plans which show the sample units that have been modelled. The summary of the final results are below.

$$\frac{(\text{Target Emissions} - \text{Proposed Emissions})}{\text{Target Emissions}} \times 100 = \% \text{ Improvement}$$

$$\frac{(112 - 20)}{112} \times 100 = \mathbf{83.04\%}$$

5. Total Target Emission Rate: **112 Tonnes CO₂/Year**
6. Total Design Emission Rate: **20 Tonnes CO₂/Year**
7. Total CO₂ Savings over Part L: **93 Tonnes CO₂/Year**
8. Improvement over Part L: **83%**
9. On site PV accounts for 23% of the CO₂ reductions this will produce around 100MWh of electricity and reduce the need of grid electricity. This will satisfy planning condition CC4

7. CONCLUSION AND SUMMARY TABLES

1. This statement has reviewed the sustainability performance of the proposed development at Land at Tesco Extra Car Park against national and local policies. The material specification and servicing strategy for the scheme and the building (carbon dioxide) emission rates for the various uses throughout the development have also been reviewed.
2. The developer has considered all sustainable solutions and has reduced the energy demand and resultant carbon dioxide emissions of the development above and beyond the requirements of the Building Regulations Part L1A. The proposed energy strategy has been proven to meet the key regulatory and local planning policy targets established by the RIDGEPOINT HOMES.
3. The client proposes to introduce 131,200 kWp of photovoltaic panels.
4. These improvements to the specification will ensure the development achieves a reduction in emissions of 83% over the baseline which is over the minimum 35%. A Section 106 will be used to achieve net zero.
5. The overall energy strategy through the combination of a fabric first approach, sustainable design and the use of on-site generation will ensure the proposed development at Land at Tesco Extra Car Park achieves a reduction in CO2 against the developments Residual case and complies with Policy H5.
6. Decentralised energy infrastructure is in place by the PV on the roof, this complies with Policy CC4.

8. APPENDIX A

Dwelling (based on block)	Multipliers	Floor Area m2	Target Emission Rate kgCO ₂ /m ² /yr	Dwelling Emission Rate kgCO ₂ /m ² /yr
05	4	65.09	24.0	4.8
07	5	50.76	23.7	2.7
17	9	61.7	23.6	4.2
20	2	61.7	22.5	3.3
25	8	65.09	20.6	2.8
27	12	62.48	18.6	1.4
37	16	61.7	22.6	3.6
40	4	61.7	19.3	1.4
65	4	65.09	26.1	7.1
67	6	62.48	23.2	5.2
77	8	61.7	28.2	8.1
80	2	61.7	25.2	6.1

Table 4: Summary of SAP 10 results.

9. APPENDIX B

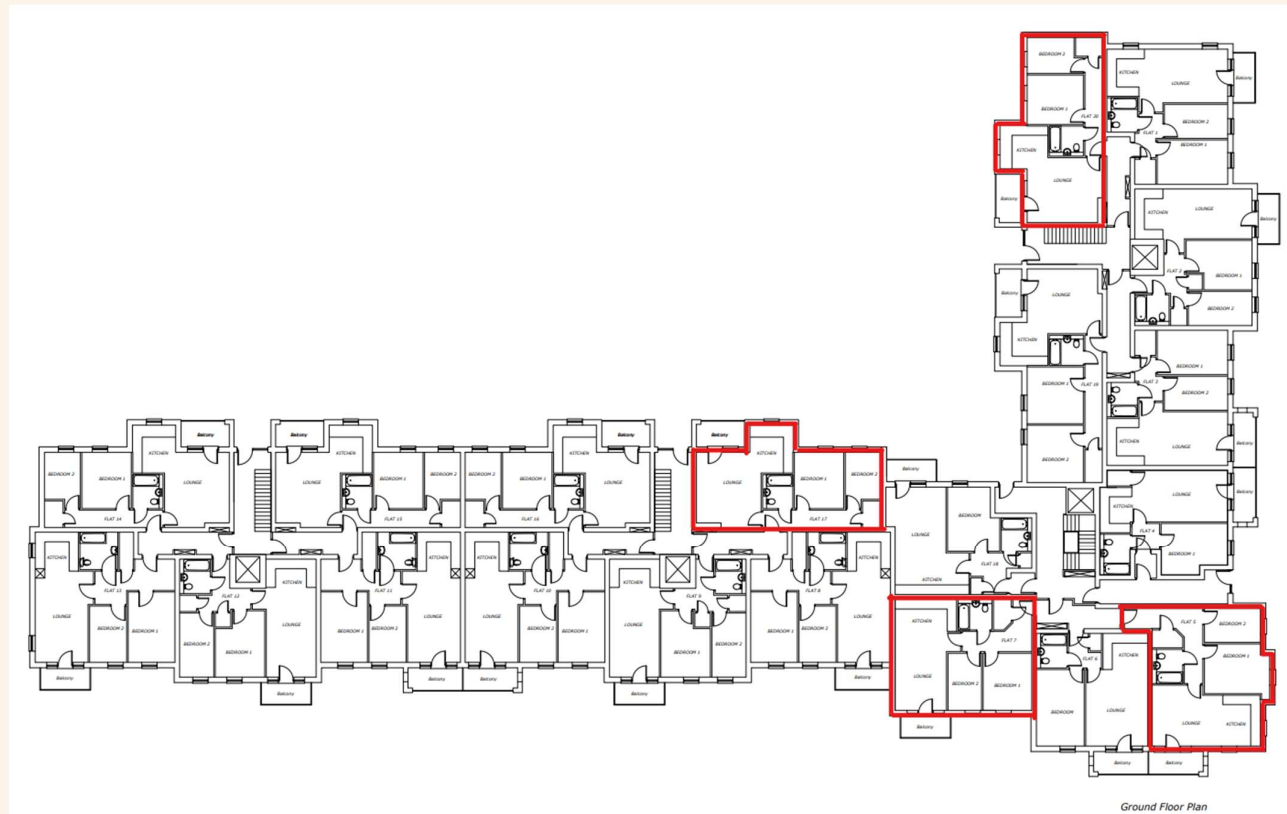


Figure 5: Sample units modelled on ground floor.

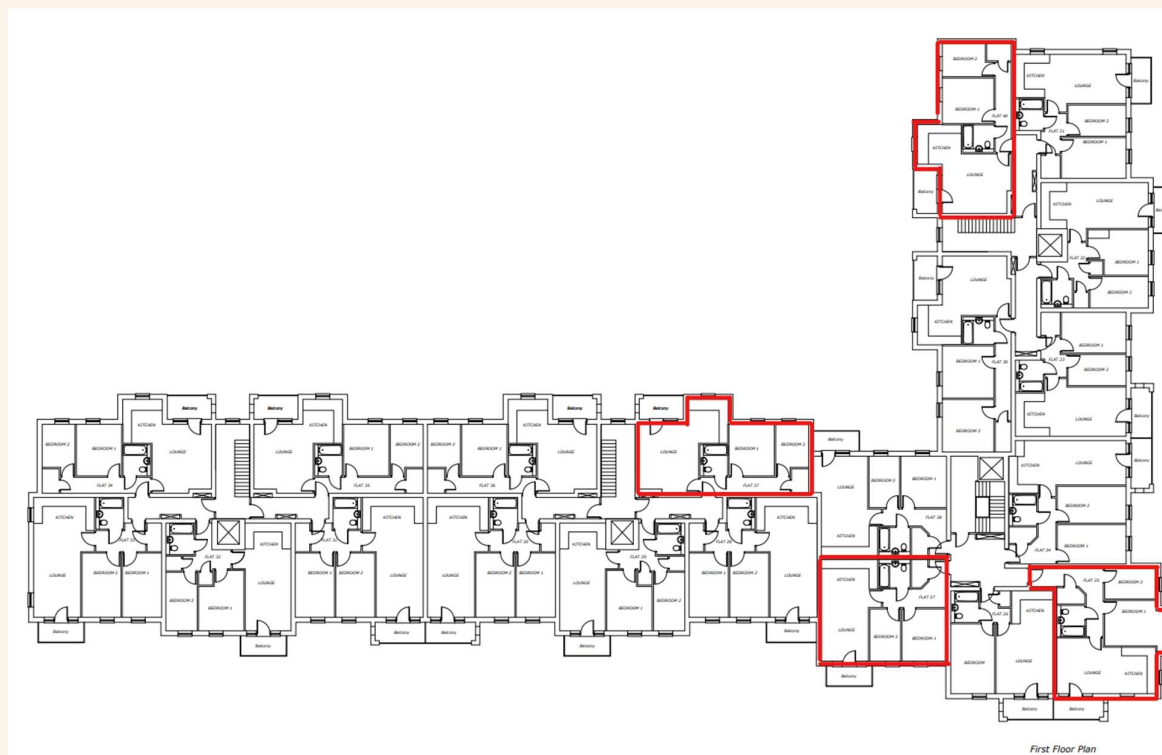


Figure 6: Sample units modelled on first floor.

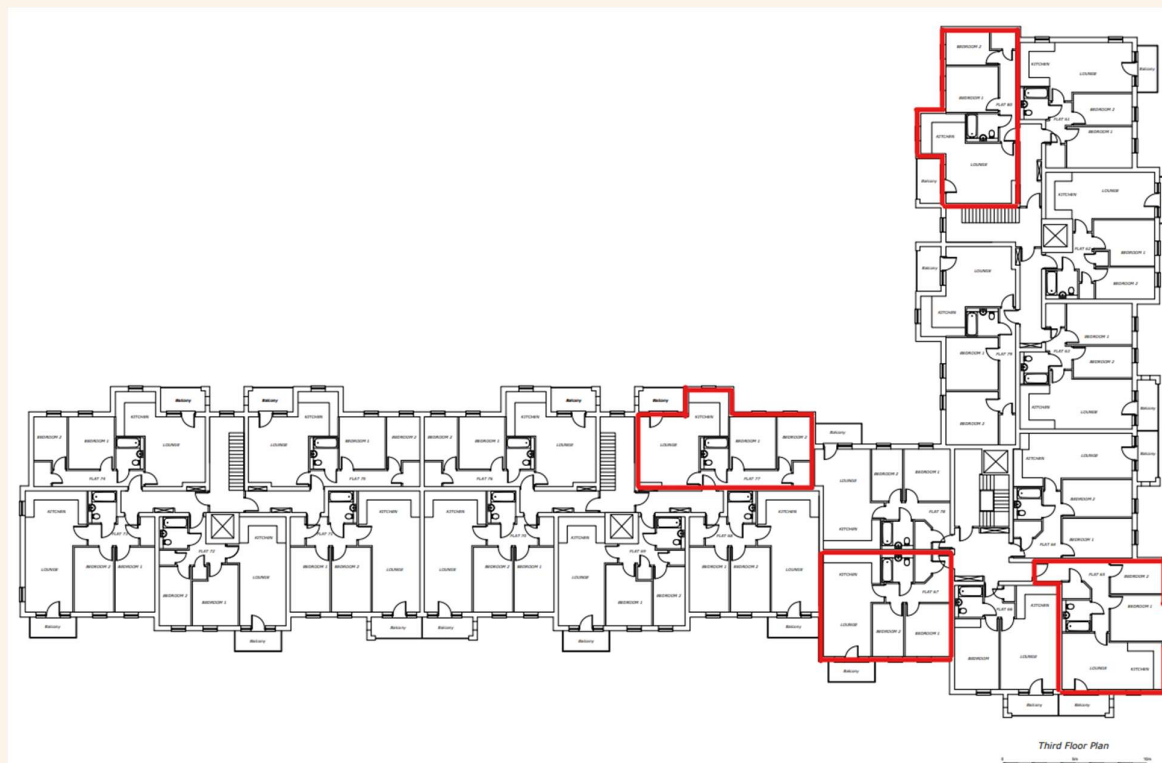


Figure 7: Sample units modelled on top floor.

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