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Shaviram Group

35-39 Friar Street

210771

**Sustainable Design and
Construction Statement**

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Sustainability at our core.

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Contents

Section	Description	Page No
1.0	Executive Summary	5
2.0	Introduction	6
2.1	Background	6
2.2	Description of the Development	7
3.0	Planning Requirements	8
3.1	National Planning Policy Framework (2021)	8
3.2	Reading Borough Council Planning Policy	8
4.0	Proposed Sustainability Strategies and Measures	10
4.1	Energy	10
4.2	Water	15
4.3	Materials	15
4.4	Flood Risk and Surface Water Management	16
4.5	Waste	18
4.5.1	Waste Management Strategy Summary	18
4.5.2	Sustainable Construction Waste	18
4.6	Pollution	18
4.6.1	Noise	18
4.6.2	Air Quality	19
4.6.3	Lighting	21
4.7	Health and Wellbeing	21
4.7.1	Daylighting	21
4.7.2	Noise and Vibration	21
4.7.3	Private Open Space	22
4.8	Management	22
4.8.1	Design Development	22
4.8.2	Construction Phase	22
4.8.3	Building Operation & Maintenance	23
4.8.4	Security	23
4.9	Land Use, Ecology and Biodiversity	23
4.9.1	Ecological Assessment - Baseline	23
4.9.2	Ecological Mitigation & Enhancement Strategy	23
4.10	Transport	24
4.10.1	Vehicle Trips	24

Contents

Section	Description	Page No
4.10.2	Car Parking	25
4.10.3	Cycle Parking	25
4.10.4	Travel Plan	25
5.0	Summary and Conclusions	26

1.0 Executive Summary

The Sustainability Statement has been prepared in response to the relevant local, regional and national policies to support the planning application for the proposed Friar Street Development on Friar Street. This report details how the design has considered the potential environmental impacts and how these impacts can be managed and mitigated in line with the relevant planning policies.

The proposed development has targeted sustainability throughout the lifetime of the building. In particular, energy, pollution and water efficiency measures will be integral to the building's design as their contribution to retaining sustainability is highly significant.

This report details the policies required to comply with, as set out in the National Planning Policy Framework (2021), Reading Borough Council Local Plan (2019) and the Sustainable Design and Construction SPD adopted December (2019).

In order to deliver an environmentally responsible development, an exemplar approach is being proposed based on low energy design principles. In summary, this approach involves energy demand minimisation through effective building form and orientation, good envelope design and proficient use of services.

All dwellings within the proposed development will be provided with water efficient fixtures and fittings to reduce water consumption to comply with regulatory requirements.

Environmentally friendly and responsibly sourced materials will be specified, where possible.

To comply with Policy EN18, Flooding and Sustainable Drainage Systems have been considered from the outset of the design process and significant areas of green roofs and soft landscaped areas have been included at roof level, including two large roof terraces to minimise surface water runoff. In addition, a blue roof will cover a large area (up to 1,160m²) and collect and attenuate the majority of the roof area (1,535m³) to restrict peak surface water sewer flows for rainfall events from 59.7 (existing) to 10l/s during the 1 in 100 year event including a 40% allowance for climate change following development.

This will offset the foul increase (3.79l/s) to the combined sewer from the proposed development, and create an overall reduction of 75% in overall peak combined flows from the site in the 1 in 100 year event including a 40% allowance for climate change.

To minimise air quality impacts during construction a number of good practice mitigation measures will be implemented by the contractors.

The scheme will include good practice design standards in regard to light and pollution.

Health and wellbeing of the occupants will be improved by providing good daylight levels, sufficient private outdoor space and indoor comfort.

In general, the proposed development will be constructed using good standards of sustainability which will meet Reading Borough Council sustainability planning policy requirements.

2.0 Introduction

2.1 Background

This document has been prepared by CPW LLP on behalf of Shaviram Group (“the Applicant”) to accompany a Full Planning Application for the redevelopment of 35-39 Friar Street (“the Application Site”), with the demolition of the existing restaurant, office and retail units on Friar Street and the construction of a new development accommodating a mix of residential, retail and restaurant uses.

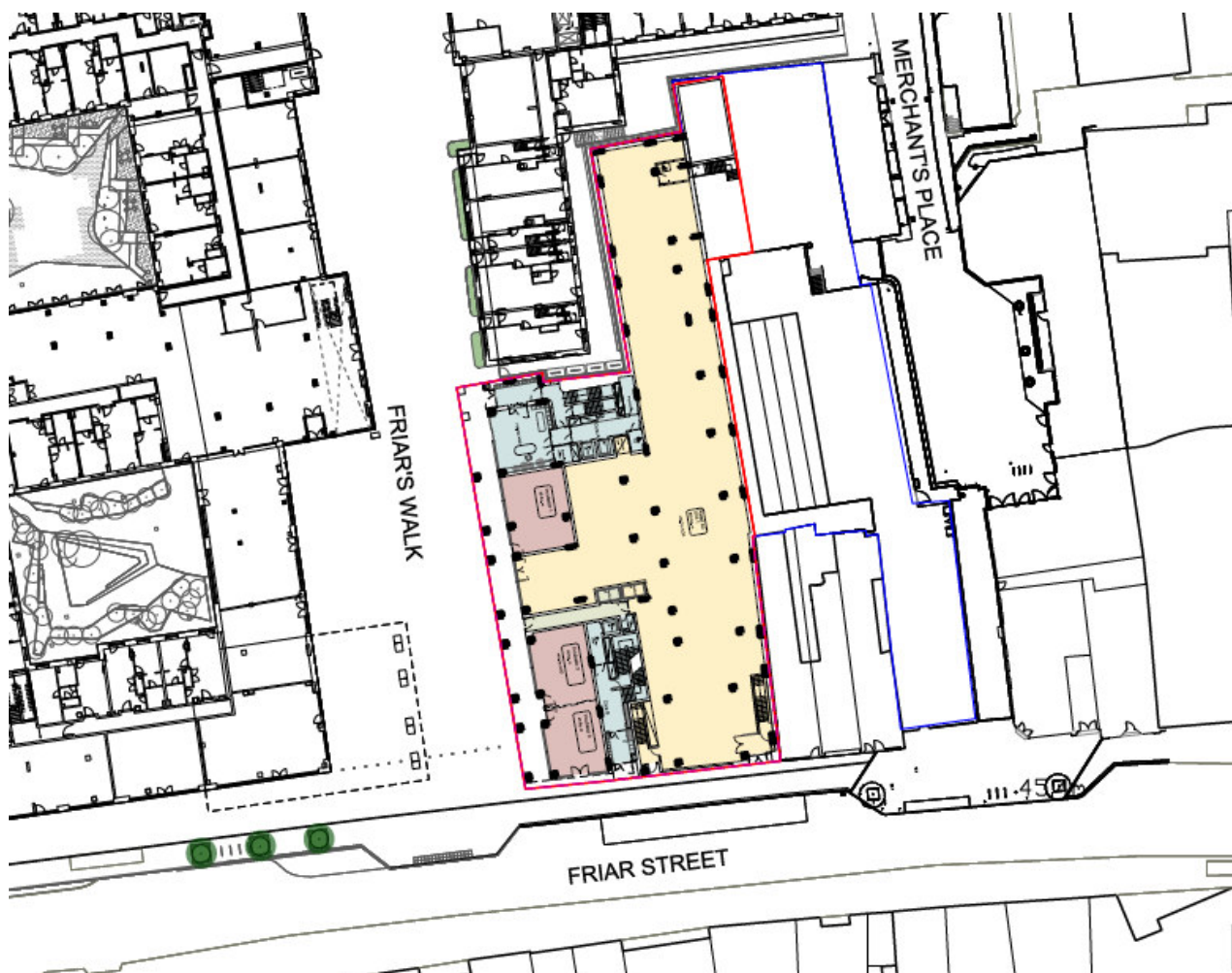
The Friar Street development lies in the town centre within the Reading Town Centre. The Site is situated within the Station Hill redevelopment area as detailed within the Design Access Statement in the planning package.

Reading town centre is currently in a period of extensive urban change with several development proposals set to be brought forward in the coming years, including Station Hill, Market Square and Broad Street Mall.

The entire Station Hill South development is made up of 7 developments to be built in 3 phases. The final element introduces Friar’s Walk to Friar Street with 35 Friar Street development providing the missing corner piece finishing off the wider development of the area. The Friar Street development shall take the opportunity to create a cohesive streetscape along the northern side of Friar Street and create an entrance to a newly created public route.

The Friar Street proposal aims to facilitate a comprehensive and deliverable scheme which provides many benefits, including the redeveloped underutilised restaurant and office building with a more attractive shopping parade along Friars Walk in the district centre, supporting growth and accommodating the local population to sustain it.

The inclusion of the landscaped Friars Walk aims to attract visitors to the retail parade and increase time spent in the area. Its flexibility of use would also have the benefit of improving the cultural and evening offer of the locality to further improve and enrich the locality.



Proposed Site Layout

The information provided in this report should be treated as indicative at this stage and should be used to inform the planning application for the proposed development with respect to relevant planning policies.

2.2 Description of the Development

The Friar Street development will comprise of the demolition of the existing restaurant and offices fronting Friar Street and the construction of:

- 103 new homes
- 130sqm residential co-working space
- 600sqm of external residential communal amenity spaces
- Ecologically rich landscape in the form of rooftop communal gardens, private gardens and biodiverse roofs
- 1,622 sqm of retail and restaurant space
- 75m of active frontage to Friar Street and Friars Walk

3.0 Planning Requirements

This section summarises the relevant sustainability and energy policy context for the proposed development. The relevant policies and regulations related to energy and sustainability are summarised below.

3.1 National Planning Policy Framework (2021)

The National Planning Policy Framework (NPPF) document sets out the Government's planning policies for England and was published in June 2021.

The NPPF is designed to consolidate all policy statements, circulars and guidance documents into a single, simpler National Planning Policy Framework, making the planning system more user-friendly and transparent.

In regard to climate change, the NPPF supports a reduction in greenhouse gas emissions and the delivery of renewable and low carbon energy. Climate change is covered in Section 14 'Meeting the challenge of climate change, flooding and coastal change'. In summary the framework advises:

To support the move to a low carbon future, local planning authorities should:

- plan for new developments in locations and ways which reduce greenhouse gas emissions;
- actively support energy efficiency improvements to existing buildings; and
- when setting any local requirement for a building's sustainability by adopting nationally described standards.

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

- comply with adopted Local Plan policies on local requirements for decentralised energy supply, unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
- take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

3.2 Reading Borough Council Planning Policy

Reading Borough Council has developed a local development framework (LDF) which aims to manage development in Reading up to 2036. The Sustainable Design and Construction SPD contains many policies set out to improve energy and sustainability.

The development is required to comply with the following energy and sustainability policies from the Sustainable Design and Construction SPD:

- Policy CC2 Sustainable Design and Construction – 'Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of the buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- 1) All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;
- 2) All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;
- 3) All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting systems are energy and cost effective.

Sustainable Design & Construction Statement

- Policy CC3 Adaptation to Climate Change – ‘All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:
 - 1) Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;
 - 2) Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc.
 - 3) Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and
 - 4) All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change
- Policy CC4: Decentralised Energy – In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and/ or non-residential development of over 1,000sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

What follows in this report is a short description of each discipline and how they achieve a sustainable design approach and ensure compliance with the policies. Further information on each item can be found in their corresponding consultancy reports.

4.0 Proposed Sustainability Strategies and Measures

4.1 Energy

CPW LLP has undertaken an initial Part L compliance assessment of the proposed Friar Street development. This is to demonstrate through the use of accredited thermal modelling software, how the scheme will incorporate energy efficiency measures and Low and Zero Carbon (LZC) technology solutions to reduce the predicted regulated CO₂ emissions of the development in accordance with Reading Borough Council energy planning conditions.

Grid Decarbonisation

Over the past decade there has been a significant shift in the way electricity is generated in the UK. Managed decline in the use of coal-fired power stations, and the rapid increase in renewable energy technologies like Wind and Solar PV have effectively pushed down the embodied carbon of the electrical grid. This has brought about some fundamental changes:

- Gas-fired CHP rapidly becomes less attractive over time from a carbon perspective (CO₂ Increase). Still a good economic case for Gas-fired CHP as an owner/operator
- Electric driven heat generation systems become much more attractive from a carbon perspective (CO₂ Decrease). Heat Pump technology (Air-source, Ground-source, Water-source, Waste water-source) should be pursued

SAP12 – Standard Assessment Procedure for Domestic Buildings employed under the Reading Borough Council Local Plan have provisional Carbon Emission Factors applicable to all current Reading based schemes:

- Electricity: 519gCO₂e/kWhr
- Mains Gas: 216gCO₂e/kWhr

However SAP12 is a very dated methodology with SAP10 providing a much more up to date standard procedure reflective of the current carbon factors for gas and electricity. The far reduced carbon factors used in SAP10 methodology are:

- Electricity: 233gCO₂e/kWhr
- Mains Gas: 210gCO₂e/kWhr

Part L regulations are lagging behind real world conditions but is following suit and will be revised to further improve the shift to wards zero carbon developments; Part L regulations are due to be published formally in June 2022 with further improved carbon factors.

Residential

CPW's proposal is to provide the residential element of the development with Air Source Heat Pumps (ASHP). The network will run at approximately 55-35 degrees Celsius Flow and Return:

- Communal plant: The communal plants will comprise of a series of air source heat pumps, a 3-port valve arrangement and pipework circulation pumps that work to maintain the system temperature at approximately 55C.
- Space Heating and cooling: A Heat Interface Unit (HIU) will transfer heat from the communal system in order to serve the apartment heating system accordingly. Space heating will be provided via radiators to meet the thermal comfort requirements within each space of the apartments.

Sustainable Design & Construction Statement

- Domestic Hot water: Hot water shall be transferred through the apartment Heat Interface Units from the communal heating system. This will minimise any DHWS network distribution losses.

ASHP's take full advantage of the improving carbon emission factors in the National Grid as they are powered by electricity, this technology has assisted the energy performance of the building and is required to comply with the Planning Policy set out by the Reading Borough Local Plan.

The ASHP's are expected to have a SCOP of 3 and an SEER of 4.

The noise levels associated with an ASHP installation should not be overlooked. Typically, acoustic buffer kits are employed to ensure noise levels don't exceed 65dBA when 1m from the unit.

The thermal buffer is important to allow the ASHP system to continue operating when heating/hot water load demand falls during the course of the day.



The use of Photovoltaic Panels has been implemented into the Friar Street development proposal.

The roof space allocation has been estimated to accommodate 34 panels with the following estimated output and carbon savings under both SAP2012 and SAP10 methodology:

SAP2012 Methodology

ENERGY & CARBON

THE ANNUAL PREDICTED ENERGY OUTPUT IS AROUND

11,272 kWh

THE ANNUAL SITE-GENERATED ELECTRICITY SAVES

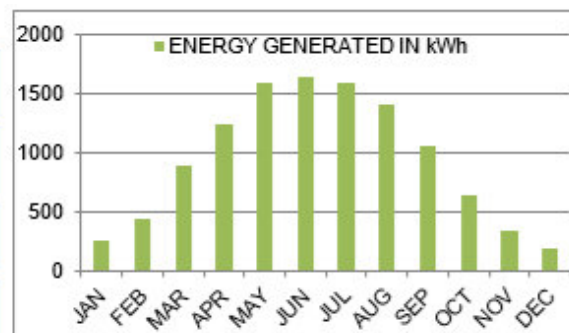
5,850 kg CO2

THIS SAVING IS EQUAL TO DRIVING AN AVERAGE UK CAR AROUND

34,821 km

OR TAKING A RETURN FLIGHT FROM LONDON TO

**HOUSTON
FOR 3 PERSON(S)**



SAP10 methodology

ENERGY & CARBON

THE ANNUAL PREDICTED ENERGY OUTPUT IS AROUND

11,272 kWh

THE ANNUAL SITE-GENERATED ELECTRICITY SAVES

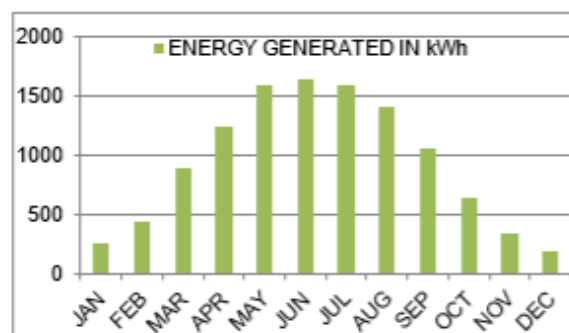
2,626 kg CO₂

THIS SAVING IS EQUAL TO DRIVING AN AVERAGE UK CAR AROUND

15,633 km

OR TAKING A RETURN FLIGHT FROM LONDON TO

HONOLULU
FOR 1 PERSON(S)



CPW LLP has undertaken an initial Part L compliance assessment of the proposed Friar Street development. This is to demonstrate through the use of accredited thermal modelling software, how the scheme will incorporate energy efficiency measures and Low and Zero Carbon (LZC) technology solutions to reduce the predicted regulated CO₂ emissions of the development in accordance with Reading Borough Council energy planning conditions.

Residential

Initial SAP calculations have been made to demonstrate how the scheme will incorporate energy efficiency measures and Low and Zero Carbon (LZC) technology solutions to reduce the predicted regulated CO₂ emissions of the development by at least 35% (CO₂ reduction on 2013 building regulations) for new build residential developments. The calculations have been performed with SAP2012 methodology in accordance with The Sustainable Design and Construction SPD adopted 2019.

SAP 2012 methodology:

	Total Regulated Emissions (Tonnes CO ₂ /year)	CO ₂ Savings (Tonnes CO ₂ /year)	Percentage Savings (%)
Target Emission Rating	167.4	-	-
Dwelling Emission Rate	92.4	75	45
	Total Fabric Energy Efficiency (kWh/m ²)	Energy Savings (kWh/m ²)	Percentage Savings (%)
Target Fabric Energy Efficiency	47.91	-	-
Dwelling Fabric Energy Efficiency	28.09	19.82	41

These results demonstrate compliance with the planning requirement of achieving 35% betterment on Part L 2013 for residential developments. The Dwelling Emission Rate has been calculated at a 45% improvement upon the Target Emission Rate from the notional building as per Part L of the Building Regulations. To ensure a zero carbon

Sustainable Design & Construction Statement

building as per Reading Borough Sustainable Design and Construction SPD document, a cash in-lieu contribution payment of £166,320 will be required as part of the Section 106 calculation based on £60 per tonne for a period of 30 years.

SAP2012 methodology is very dated with updated SAP10 methodology more commonly used and more inline with the updated Part L Building Regulations to be updated in June 2022. When assessed against SAP10 methodology the proposed development has the following calculated CO₂ emission savings:

SAP10 methodology:

	Regulated domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: Savings from energy demand reduction	19.1	18%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	50.0	47%
Cumulative on site savings	69.1	65%
Annual savings from off-set payment	37.4	-

The use of SAP10 methodology clearly shows the benefit of opting for an electrically driven heat generation plant such as Air Source Heat Pumps due to the more accurate Carbon Factors associated with the guidance.

We have shown the SAP10 methodology broken down into Be Lean, Be Clean and Be Green iterations as common with projects referable to the London Plan to indicate how the passive design measures of the building (Be Lean stage) are efficient in providing Carbon saving for the development against Part L of the Building Regulations at 18% savings.

SAP10 methodology calculates the Dwelling Emission Rate achieves a total 65% improvement upon the Target Emission Rate from the notional building as per Part L of the Building Regulations. Significantly above the 35% requirement set out by the Reading Borough Council Planning requirements.

Sustainable Design & Construction Statement

CPW have also conducted initial BRUKL analysis to show the carbon efficiency performance of the commercial spaces in their assumed operation. The BRUKLs show that the commercial spaces had the following improvements on Part L regulations, detailed in Table . From this we have also calculated the sitewide cumulative savings on Part L Building Regulations 2013.

The building emission rate is compared to a Target Emission rate below to demonstrate the savings achieved.

	Regulated carbon dioxide savings			
	Target Emission Rate	Building Emission Rate	Reduction (Tonnes CO ₂ per annum)	(%) improvement
Non-Domestic Buildings	38.8	34.7	4.1	11%
Domestic Buildings	167.4	92.4	75	45%
Total Cumulative Savings		127.1	79.1	38.4%

Note 1. CO₂ emission factors of 0.216 for Gas and 0.519 for Electricity have been used to calculate the above and are taken from Building

These results demonstrate borderline compliance with the planning requirement of achieving 35% betterment on Part L 2013 for residential developments. This narrow margin of compliance is due to outdated electricity carbon efficiency factors embedded within SAP2012 methodology.

It is CPWs recommendation that Reading Borough Council Planning Committee assess the proposed development based on updated SAP10 methodology, more commonly used and more inline with the updated Part L Building Regulations to be updated in June 2022. This ensures a more accurate carbon efficiency performance of the proposed development is reflected and the greater calculated carbon reductions can be fully acknowledged.

Spatial allocation and future connection capabilities have been implemented into proposed designs for the development so that the development is able to connect to a future local district heating network if the opportunity presents itself as viable.

Overheating

As part of the energy assessment, dynamic thermal modelling of the overheating risk associated with the apartments has been undertaken in accordance with CIBSE TM59 guidance.

As stated in the acoustic consultant report it has been determined that there are high levels of noise pollution being generated towards the southern side of the side of the site. The effect of this means that a number of apartments predominantly located towards the south elevations, are unable to rely on opening windows to deal with the effects of overheating. This is due to the duration of window opening required throughout the year, and the levels of noise experienced within the apartments.

Additionally, the Air Quality consultant has advised that due to NO₂ levels being close to the limit on the southern façade, and therefore the opening of windows is not advised for dwellings that are south facing.

The results indicate that all of the bedrooms, kitchen and living which are considered high risk of overheating within the development fail the required criteria within TM59.

Sustainable Design & Construction Statement

An Overheating Study was undertaken to incorporate passive measures and an overheating strategy for the building to mitigate overheating risks within the apartments. Ultimately the following strategy has been implemented:

- South facing Apartments directly adjacent to Friar Street between levels 1 and 5 shall incorporate Acoustic Ventilation Panels within the glazing fitting and a triple glazed window build-up.
- South facing Apartments directly adjacent to Friar Street on level 6 shall incorporate Acoustic Ventilation Panels within the glazing fitting and a triple glazed window build-up and Mesh screens.
- South facing Apartments directly adjacent to Friar Street between levels 7 and 10 shall incorporate Mesh Screens, a triple glazed window build-up, and openable windows.

The implementation of this overheating strategy shall result in the vast majority of dwellings passing the overheating criteria set out in CIBSE TM59 guidance. Those dwellings that do not pass experience shall experience a maximum simulated value of 364 of the total annual 4745 occupied hours over 26 degrees, approximately 7.7% of the time. Annual occupied hours assessed are detailed in TM59 guidance. Further enhancement of the passive measures would be detrimental to the daylighting levels which already do not meet BRE guidance.

Alternatively, if it can be agreed with the planning officers that given the Town Centre location of the site, acoustic and air quality guidance can be relaxed based on the view that these elements should be expected in this location, utilising openable windows to mitigate overheating would likely see all spaces pass the CIBSE TM59 criteria.

4.2 Water

All residential dwellings within the proposed development will be provided with water efficient fixtures and fittings to reduce water consumption and comply with the regulatory requirements. Potable water reduction measures such as flow restrictors to taps and showers and dual flush toilets can be provided to reduce consumption. These measures will help to place less of a burden on the freshwater infrastructure and reduce water bills for the homeowners.

4.3 Materials

Materials have been specially selected so as to retain the local character of Reading. Use of red/orange and grey/blue bricks can be seen throughout Reading's historic and emerging context and have been adopted within the scheme. The primary facade material is brickwork, which is the prominent facade material in the locality. Brickwork is low in maintenance and has the potential to be re-used.

The energy that has been used during manufacture, processing and transportation of materials to site comprises of embodied carbon emissions. These emissions will be decreased by the selection of materials for all building elements that are characterised by reduced environmental impact.

Preference will be given to the use of local materials and suppliers, where viable, to reduce transport distances and support the local economy.

Any opportunities to re-use and/or recycle materials will be identified and pursued, where feasible.

Rather than looking to introduce sustainability measures into the scheme as afterthoughts, the structural design targets re-use and material efficiency as a priority. By maximising efficiency throughout the design of the structure, the total volume of concrete will be reduced, and less waste and embodied carbon produced.

Through coordination with the landscape architect our priority is to re-use the existing car park structure to avoid the need to demolish and rebuild. The new build structure has been optimised to ensure the slab thickness is most suitable as a response to the architectural layouts and site constraints. When preparing the concrete specification during the next stage we will seek to utilise cement replacement materials as far as practical which will have a positive effect on the overall embodied carbon in the development.

4.4 Flood Risk and Surface Water Management

A Flood Risk Assessment has been carried out for the proposed development. The Site is wholly located in Floodzone 1 and so no significant flood risk issues have been identified. The development is considered 'appropriate' in terms of flood risk in line with local and national planning policy.

To mitigate any flood risk, the contractor shall ensure live/retained sewers and water mains within the site boundary are decommissioned, diverted or adequately protected during construction. The construction management plan should prevent silt/concrete entry to all retained drainage during the works including highway drainage and the private drainage at the rear of the car park. The contractor shall also ensure that all water mains are removed to at least the site boundary and made safe. All water mains should be adequately protected by the contractor during construction.

The drainage hierarchy has been considered in preparation of the drainage strategy, as follows:

- Infiltration – Due to the proposed building footprint across the site, the use of infiltration systems has been discounted;
- Discharge to surface watercourse – No direct connection to a surface watercourse is available. Site is more than 675m away from the nearest watercourse in an urban area and therefore it is not considered feasible to make a direct connection.
- Discharge to Surface Water sewer - The scheme as shown is based upon the principle of minimising the impact on the existing public sewer network by controlling the peak runoff using SUDS with discharge at rates as close as practicable to greenfield rates to the existing surface water public sewer network adjacent to the site.

The surface water drainage strategy has been informed by a SuDS appraisal which has considered the SuDS hierarchy (Table 4.1). SuDS measures have therefore been implemented where possible within the bounds of the scheme to meet the requirements of the national, regional and local planning policy requirements and best practice guidance.

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SuDS Option	Suitability/ Included in the Scheme?	Comments
Soakaways and porous paving (infiltration)	X	Although the ground is potentially suitable for infiltration forms of SuDS, due to the proposed building footprint across the site, and the presence of made ground, the use of infiltration systems has been considered, but discounted.
Soft landscaping including rain gardens, verges or raised planters, tree pits	✓	Figure 5.3 and Architect drawings in Appendix A show two rooftop terraces at first (central part of the site) and 7 th floor which will include significant planted areas will provide some source control and reduce runoff. The need to provide some paved amenity areas on the terraces restrict further soft landscaping at these levels. The soft landscaped parts of the communal roof gardens will cover approximately 250m ² , approximately 15% of the site area, according to architects roof plan.
Green Roofs/Brown Roofs/Blue Roofs	✓	The roof of the 1 st floor (rear of the site), a small area on the 2 nd floor, and part of the 10 th floor roof will include a biodiverse roof. The remainder of the 10 th floor roof will be required for plant but green roof space has been maximised for amenity and ecological enhancement. The biodiverse roof will cover 513m ² , approximately 31% of the site area, and will also contribute to further reduce runoff. Blue roof is the primary method of attenuation for the scheme. 1,160m ² of the roof, approximately 70% of the site area, has been modelled as a blue roof. This includes the areas beneath the biodiverse roof at 1 st and roof, and the landscaped terraces at 1 st and 7 th floor and will capture a total of 1,535m ² of the runoff from the site (93% of the site area).
Porous paving (sub base treatment/ storage)	X	As the building covers the whole of the site except for a small ramp on the entrance to the basement at the rear of the site, permeable paving is not a viable system for this scheme.
Rainwater Harvesting	X	There is insufficient space alongside the commercial and residential MEP plant spaces to provide enough storage to make it economically viable to use rainwater harvesting for the irrigation. This is principally due to the large area of planted areas and the need to pump back up to roof level.
Swales	X	Building covers the whole of the site except for a small ramp on the entrance to the basement at the rear of the site thus this is not a viable system for this scheme.
Attenuation ponds (above ground storage)	X	Building covers the whole of the site except for a small ramp on the entrance to the basement at the rear of the site thus this is not a viable system for this scheme.
Below ground storage in cellular systems	X	Not required.
Flow control devices	✓	Flows will be restricted at roof level as part of the blue roof system.

To comply with Policy EN18, SuDS have been considered from the outset of the design process and significant areas of green roofs and soft landscaped areas have been included at roof level, including two large roof terraces to minimise surface water runoff. In addition, a blue roof will cover a large area (up to 1,160m²) and collect and attenuate the majority of the roof area (1,535m²) to restrict peak surface water sewer flows for rainfall events from 59.7 (existing) to 10l/s during the 1 in 100 year event including a 40% allowance for climate change following development.

This will offset the foul increase (3.79l/s) to the combined sewer from the proposed development, and create an overall reduction of 75% in overall peak combined flows from the site in the 1 in 100 year event including a 40% allowance for climate change.

The proposed development will result in a significant reduction in overall flows in the public foul sewer network in Friar Street as long as there is sufficient capacity in the surface water sewer in Friar Street to accommodate the proposed outfall arrangements. A predevelopment enquiry has been submitted to Thames Water to confirm that the changes proposed can be accommodated without the need for upgrade.

4.5 Waste

4.5.1 Waste Management Strategy Summary

A waste management strategy has been compiled to address requirements for waste storage and management and demonstrate appropriate assessment of waste management during the operational phase of Friar Street Development ("the Application Site").

With regards to waste generation and composition, as the development comprises both commercial and residential units, separate storage areas will need to be provided for both uses. Therefore, separate assessments have been undertaken to quantify the adequate bin numbers required for this development in regard to both residential and commercial accommodation.

The position and design of the residential and commercial refuse areas have considered the impact of noise and odour on existing / proposed neighbours, whilst providing suitable room with suitable impermeable hardstanding, ventilation, light and a water supply with a cleanable floor with a run-off drainage point.

All refuse store will be serviced on a daily basis by a private refuse collection contractor. On collection days the building management team will transport the bins from the basement level up the ramp to a collection point within the rear car park accessed by Merchant's Place. Due to distance from the bin stores to the presentation point a 'tug' vehicle shall be utilised to transport the bins. A store for the tug vehicle has been provided at basement level.

Consideration has been applied to access and egress to ensure collection vehicles can safely enter and leave the site in forward gear using the temporary parking areas near the temporary external waste storage.

4.5.2 Sustainable Construction Waste

Contractors will be required to minimise waste at source and maximise recycling and re-use of demolition and construction materials wherever possible and practicable; such situations will be dealt with in a manner that reduces environmental effects and maximises potential re-use of materials;

All wastes that cannot be reused or recycled, including contaminated soils and materials, will be disposed of in accordance with legislation and best practice;

The control and handling of any contaminated materials will also be carried out in accordance with the relevant legislation. Any ACMs will be surveyed prior to demolition and removed by an appropriately licensed contractor in accordance with the Control of Asbestos Regulations 2006.

QC employees will, where reasonably practicable, separate waste into relevant waste streams on site, for example metals, plaster board and timbers separated on site for recycling.

4.6 Pollution

4.6.1 Noise

Internal design noise level targets have been produced using BS8233. Assessments carried out indicate design levels are exceeded with partially opened windows therefore windows are recommended to remain closed other than for purge ventilation services. Internal design noise level targets are met when spaces with closed windows were assessed.

Additional mitigation measures are recommended such as acoustically attenuated ventilation and suitable glazing specifications to reduce impacts from environmental noise.

Sustainable Design & Construction Statement

4.6.2 Air Quality

An air quality assessment has been undertaken in accordance with the Department of Environment, Food and Rural Affairs (Defra) current *Technical Guidance on Local Air Quality Management (LAQM)* and addresses the effects of air pollutant emissions from traffic using the adjacent roads, and emissions associated with the development of the site. In addition, a risk-based assessment of the likely impact of construction on the air quality of the local environment has been conducted in accordance with the Institute of Air Quality Management's 2014 edition of the Guidance on the assessment of dust from demolition and construction.

Throughout the construction phase the following mitigation measures shall be put in place where possible:

Construction Activity	Mitigation Measures
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make a complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.
Monitoring	Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.
Preparing and maintaining the site	Plan site layout: machinery and dust causing activities should be located away from receptors.
	Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery	Ensure all non-road mobile machinery (NRMM) comply with standards.
	Ensure all vehicles switch off engines when stationary – no idling vehicles.
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).
	Use enclosed chutes, conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
Waste Management	Reuse and recycle waste to reduce dust from waste materials
	Avoid bonfires and burning of waste materials.

Sustainable Design & Construction Statement

With regards to the impacts of construction on air quality, dust and other pollutant emissions from the various phases of the construction of the proposed development will see the dust emission magnitude as follows:

- Demolition = Medium
- Earthworks = Small
- Construction = Medium
- Track Out = Medium

However, incorporating the sensitivity of the surrounding area to dust soiling and human health

The risk of dust risk is as follows:

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Track out
Dust Soiling	Medium Risk	Low Risk	Medium Risk	Low Risk
Human Health	Medium Risk	Low Risk	Medium Risk	Low Risk

Baseline pollutant concentrations on site have been investigated using both existing monitoring data and through predictions using the ADMS-Roads Detailed Dispersion Model methodology. At present, and in the opening year of the proposed development (2022), concentrations of all pollutants are below the Air Quality Objectives at each residential level of the proposed development, despite exceedances being predicted to continue at street level. Consequently, it is not necessary to implement mitigation to reduce the exposure from NO₂ or any other pollutant to future occupiers of the proposed development.

NO₂ concentration have been calculated from the predicted NO_x concentrations using the latest spreadsheet from the Air Quality Archive. The ADMS annual mean objective of 40 ug/m³ is approached along the southern façade, below 4th floor, however all receptors fall below this value.

Receptor ID	2019					2027				
	1 st	2 nd	3 rd	4 th	5 th	1 st	2 nd	3 rd	4 th	5 th
1	39.3	38.9	38.7	38.6	34.5	39.6	39.2	38.9	38.8	34.5
2	39.4	38.9	38.7	38.6	34.5	39.7	39.2	38.9	38.8	34.5
3	39.1	38.8	38.6	38.5	34.5	39.3	39.0	38.8	38.7	34.5
4	35.6	35.0	34.7	34.6	34.5	35.6	35.0	34.7	34.6	34.5
5	35.3	35.0	34.7	34.6	34.5	35.3	35.0	34.7	34.6	34.5
6	34.9	34.8	34.7	34.6	34.5	35.0	34.8	34.7	34.6	34.5
7	34.8	34.7	34.6	34.6	34.5	34.8	34.7	34.7	34.6	34.5
8	34.9	34.8	34.7	34.6	34.5	34.9	34.8	34.7	34.6	34.5
9	35.1	34.9	34.7	34.6	34.5	35.1	34.9	34.7	34.6	34.5
10	35.3	35.0	34.7	34.6	34.5	35.3	35.0	34.8	34.6	34.5
Objective	40.0									

To mitigate the impact of poor air quality on the future occupants, occupants shall not rely on openable windows to provide ventilation to their apartments. The apartments shall be provided with mechanical ventilation to provide sufficient ventilation to all apartments. Air drawn in for the ventilation shall be filtered within the Mechanical ventilation unit to reduce the concentrations of NO₂ to well below the air quality objectives of the building.

Air Source Heat pumps have been proposed for heat generation for Heating and Hot Water. The use of Air Source Heat pumps eliminates the use of gas-fuelled plant for this system therefore eliminating their atmospheric pollutants.

4.6.3 Lighting

It is imperative that the lighting design philosophy provides the correct quality of lighting with minimum energy input and hence reduce internal heat gains. The latest low energy lighting technology will be employed throughout, including LED's, where appropriate. External lighting will be designed with consideration to security requirements and minimising nuisance glare and light pollution to the surrounding area.

4.7 Health and Wellbeing

Each unit has level access to private external amenity space that meets or in cases exceed National Space standards. The balconies of the facades facing Friar Street and Friars Walk have been recessed to increase the amount of privacy and protection from the elements.

All residents have access to 2 communal roof terraces (1st and 7th floor) which will provide an ecologically rich environment for residents to enjoy. At 7th floor children's play areas have been provided and located to the southern edge of the rooftop so as to be away from residential units to prevent any noise complaints.

All plant, servicing and back of house areas have been located in the basement to ensure that the ground floor remains as open and flexible as possible should the needs of future tenants differ.

5% of units will be designed to be wheelchair adaptable.

4.7.1 Daylighting

The aspect and natural lighting for the residential units was considered early on in the design development. High levels of natural daylight will be provided, wherever possible, through effective window design. 66% of the residential units are dual aspect and there are no north facing single aspect units. Where possible open plan living/ dining/ kitchen spaces have been located on corners to improve aspect and light levels.

The glazing specification for the new development will be optimised to ensure that the glazed elements provide excellent thermal performance combined with optimum solar reflectance to minimise summer solar heat gains along with high daylight transmittance factors to maximise daylight factors.

Internal daylight and sunlight assessment results show that the proposed dwellings will benefit from acceptable levels of light for the immediate surrounding area.

The daylighting results show that 90% of neighbouring windows will experience no more than a low adverse reduction in daylight, and 95% of neighbouring living rooms will experience no more than a low adverse reduction in sunlight.

Encouraging the correct quality and quantity of daylight to penetrate the building is key to reducing the amount of light required from artificial sources and hence energy requirements.

4.7.2 Noise and Vibration

Hann Tucker Associates have provided a preliminary assessment of requirements for acoustics, ventilation and overheating (AVO) in relation to the Friar Street development.

The key principle described in the AVO Guide 2020 is that increased noise levels in habitable rooms can be considered acceptable provided the risk of this occurring is relatively low. For example, if noise levels in habitable rooms exceed reasonable limits (see BS 8233: 2014) with windows open for natural ventilative cooling then this can be considered acceptable if the risk of overheating is low i.e. windows are required to be open rarely or infrequently.

Our AVO assessment is based on detailed noise modelling of the application site and the proposed buildings.

The assessment indicates North and South Facades are categorised as high-risk according to the AVO guide. Therefore, habitable rooms have been designed to avoid the reliance on openable windows to satisfy overheating targets. Whole-house ventilation will be provided using MVHR units. MVHR units with a boost function shall be implemented as well as the provision of mechanical cooling to mitigate overheating.

All mechanical services will be designed to ensure these noise limits are met at the proposed new residences as well as those existing in the community. All equipment installed will also have anti-vibration mounts to ensure no structure borne noise or vibration has a detrimental effect on any residences.

Sustainable Design & Construction Statement

In terms of noise from the commercial sources potentially affecting existing and proposed new residences, the building envelope (i.e. façade, glazing and roof) shall be designed with sufficient sound insulation to avoid such disturbance.

Internally, where party walls or floor are located between commercial (including leisure) uses and residential accommodation, the internal structures shall be designed to protect the residences from both noise and vibration. This is based upon solid concrete floors with acoustic ceilings beneath (to an appropriate specification) where necessary

Internal design noise level targets have been produced using BS8233. Assessments carried out indicate design levels are exceeded with partially opened windows therefore windows are recommended to remain closed other than for purge ventilation services. Internal design noise level targets are met when spaces with closed windows were assessed.

Additional mitigation measures are recommended such as acoustically attenuated ventilation and suitable glazing specifications to reduce impacts from environmental noise.

With all the above noted acoustic aspects taken into consideration, noise and vibration will be suitably controlled to and from all areas of the site, commercial and residential, to within appropriate standards in line with national and local planning policy.

For further details on Noise and Vibration please refer to the project acoustic report.

4.7.3 Private Open Space

In order to positively respond to the different environmental characteristic of the development, the privacy amenity strategy provides three different solutions. The majority are in the form of projecting balconies with the south facade of building having inset balconies. All these spaces provide a safe and comfortable external amenity space from the different wind conditions.

4.8 Management

4.8.1 Design Development

The design process has very much been a collaborative process working with the Council through two Pre-Applications and two Design Review Panels with Design South East. All comments from each meeting have been incorporated into the design which was presented at the public consultation, whereby response from the local community was generally supportive.

4.8.2 Construction Phase

Construction workers will be encouraged to travel to site via the vast array of sustainable transport options available to and from the site. Positive action shall be taken to reduce the number of heavy construction vehicles entering and exiting site. This will include 'backloading' vehicle operation, where site delivery vehicles are utilised to remove waste materials from the site as part of the same trip.

A construction Traffic Management Plan (CTMP) can be conditioned by Reading Borough Council in the aim to minimise the impact of the construction phase, this can be produced and agreed with Reading Borough Council following the appointment of a construction contractor prior to works commencing.

Construction has the potential for pollution, mostly through pollution to air (through dust emission) and to water via water courses and ground water. To minimise construction site impacts the contractor will adopt best practice policies in respect of air (dust) pollution and water (ground and surface) pollution.

Noise Related to demolition and construction activities will be controlled to limit noise emissions. 'Best Practicable Means' will be used to control and reduce levels in accordance with the Control of Pollution Act.

Vibration could be minimised through use of appropriate non-percussive piling techniques. The CEMP will contain specific approaches for work relating to demolition and construction phases.

4.8.3 Building Operation & Maintenance

Contractors shall provide residents with operation and maintenance manuals for all plant items and appliances within their dwelling to allow for a smooth transition into operating the M&E systems within their dwelling effectively. O&M manuals will also be provided to building management to allow for sufficient maintenance and operation of communal plant within landlord areas.

All refuse store will be serviced on a daily basis by a private refuse collection contractor. On collection days the building management team will transport the bins from the basement level up the ramp to a collection point within the rear car park accessed by Merchant's Place. All refuse areas and communal roof gardens are to be provided with washdown and irrigation cold water supplies via a CAT-5 tanked supply.

Maintenance of the landscaped areas shall be of the responsibility of the building management team. However, biodiverse green roof or green wall maintenance shall be undertaken by the individual suppliers annually, for the lifetime of the roof or wall.

4.8.4 Security

Safety for the users of the building and for the public has been incorporated carefully into the design of the scheme. Residential entrances will be lobbied in order to have two lines of fob access doors to prevent tailgating. Security cameras will be located around entrances and monitored by the on site security team located at ground floor in Core A. The ground floors along Friar Street and Friars Walk are almost entirely active and glazed and house a mixture of uses to encourage passive surveillance throughout the day. Residential entrances are covered but avoid creating dark corners where individuals can be hidden. External soffit lighting to the colonnade and external covered spaces will ensure the ground floor is well lit and that the lights cannot be tampered with.

All private balconies and communal roof terraces will be designed with balustrades to provide edge protection. Landscape will be designed to avoid any climbing aides in rooftop areas. Windows will be provided with safety latches and external window cleaning will be undertaken by trained building operators. For elements of security please refer to point 4

4.9 Land Use, Ecology and Biodiversity

4.9.1 Ecological Assessment - Baseline

The site comprises a series of flat roofed brick commercial buildings with associated hardstanding. No vegetation is present on site. The site has been confirmed to be of low ecological value with limited coverage of semi-natural habitats. There are no ecological receptors of note, such as records for protected species or designated site within the likely zone of impact of the scheme. The site has negligible potential to support the majority of notable and/or protected habitats and/or species.

4.9.2 Ecological Mitigation & Enhancement Strategy

The ecological enhancement strategy for the site is considered to be an optimal solution for the urban redevelopment nature of this project and its setting in Reading Town Centre. The enhancement measures therefore focus on habitat creation that incorporates a mixture of both native and ornamental planting and features considered appropriate for the location, this includes a considerable level of tree and shrub planting which will be located on the first floor and seventh floor communal gardens, with the provision of numerous raised planting beds throughout the proposed amenity spaces, and provision of substantial resources for invertebrates including plants for pollinators and refugia/hibernacula features.

Sustainable Design & Construction Statement

Proposed areas of shrub and herbaceous planting for wildlife, species listed on the Royal Horticultural Society Good for Pollinators Guide shall be favoured where possible. The selection of species can flower in spring, summer and winter which could mean a constant resource of nectar throughout the year

Where possible, green walls consisting of climbing plants supported by trellis systems shall be installed where suitable.

Integrated nesting features for bird and bee species will also be incorporated into development. These could include Bee bricks/posts, habitat panels, Bat boxes, Swift boxes, House sparrow boxes and generalist bird boxes.

Given the restricted and formal nature of the ecological enhancements on site, which have been designed to blend with the proposed amenity spaces and landscaping, it is therefore considered that ongoing aftercare and management of the habitats will continue in perpetuity and form part of the general site maintenance programme.

4.10 Transport

The Friar Street Development is in a highly accessible town-centre location with a range of sustainable modes of transport on offer. The accessible nature of the site is reflected in the Census modal share which shows a high proportion of trips, 78% of residents and 57% of workplace population, made by sustainable mode.

The Friar Street development, is located in Reading Town Centre, is 300m from Reading Train Station, 10m from Friar Street (Stop FM) bus stop with a further 6 stops located within 120m.

All refuse store will be serviced on a daily basis by a private refuse collection contractor. On collection days the building management team will transport the bins from the basement level up the ramp to a collection point within the rear car park accessed by Merchant's Place. Due to distance from the bin stores to the presentation point a 'tug' vehicle shall be utilised to transport the bins. A store for the tug vehicle has been provided at basement level.

Post boxes are provided within Core A. A concierge service along with post and parcel room are also provided within the Core A Foyer. For larger goods, delivery drivers and couriers shall contact the concierge at which point the owner/occupier shall be informed.

It is considered that deliveries to the retail units and restaurant will be in accordance with the existing ground floor units at the site, with deliveries either made to the rear servicing area off of Merchant's Place or larger delivery vehicles utilising the existing loading bays on Friar Street which permit loading for up to 20 minutes.

4.10.1 Vehicle Trips

The Transport Assessment undertaken as part of the planning submission demonstrates that the Existing Development of the Restaurant, Fitness Studio and office sees 74 two way person trips during the peak morning hour and 153 two-way trips in the PM peak hour. The proposed residential development is anticipated to generate 52 two-way trips in the AM peak period and 87 two-way trips in the PM peak period with 519 two trips per day. The net change in trips results in a net decrease of 22 two-way trips during the AM peak hour and a decrease of 13 two-way trips during the PM peak hour with an overall net reduction of 290 two-way trips.

Mode	AM Peak (0800-0900)			PM Peak (1700-1800)			Total Daily		
	Arr.	Dep.	Two-Way	Arr.	Dep.	Two-Way	Arr.	Dep.	Two-Way
Train	-15	15	0	16	-8	8	5	4	9
Bus	-17	5	-12	0	-15	-15	-65	-63	-128
Taxi	0	0	0	0	0	0	-1	-1	-2
Motorcycle	-1	0	-1	0	-1	-1	-4	-4	-8
Car Driver	-1	0	-1	1	-1	0	0	0	0
Car Passenger	0	0	0	0	0	0	0	0	0
Bicycle	-5	0	-5	1	-3	-2	-13	-13	-26
On Foot	-17	13	-4	8	-12	-4	-74	-65	-139
Other	0	1	1	1	0	1	2	2	4
TOTAL	-56	34	-22	27	-40	-13	-150	-140	-290

Sustainable Design & Construction Statement

The reduction of vehicle movements and associated pollution occurs throughout the day, with the most pronounced reductions occurring in the morning and afternoon peaks which would have previously occurred due to the peak demands of the existing fitness studio and office at the start and end of the working day.

4.10.2 Car Parking

Car parking standards for A1 Food Retail, A1 Non-food retail and A3 Restaurants & Cafes state that public parking will be provided in line with RBC's current parking strategy, with no private parking required. The standards state that for A1 Food Retail, consideration should be given for vehicle parking associated with an internet/home delivery services, which should be agreed on an individual application basis. Therefore, the proposed retail and restaurant units are to be provided as car free, which will be no change to the existing units which provide no parking.

Disabled parking is to be provided at a minimum of 3 spaces. In accordance with Reading Borough Council standards, one parking space will be equipped with an 'active' electric vehicle charging point.

Major applications within Reading Town Centre have been provided as car-free or car-lite, in their pre-application response Reading Borough Council highways officers accepted the car free nature of the scheme due to the location of the site within Reading Town Centre which provides amenities, leisure facilities, employment opportunities and access to a range of public transport links all within walking and cycling distance of the site.

500m from Oracle Holy Brook Car Park that can provide electric vehicle charging. 3,000 public car parking spaces are available within 550m of the site.

4.10.3 Cycle Parking

To support travel by sustainable means the proposal incorporates significant levels of cycle parking in accordance with the Reading Borough Council standards as detail within their Revised Parking Standards and Design SPD.

Cycle parking for A1 Food retail is required to be provided at a rate of 1 space per 6 staff and 1 space per 300sqm. Cycle parking for A1 Non-food retail is required to be provided at a rate of 1 space per 6 staff and 1 space per 250sqm. Applying this to the development a minimum of 2 long stay cycle parking spaces has been provided in a standalone, secure, sheltered cycle store within the basement for use of the retail spaces.

Cycle parking for A1 Restaurants & Cafes is required to be provided at a rate of 1 space per 6 staff and 1 space per 300sqm. Applying this to the development a minimum of 13 long stay cycle parking spaces has been provided in a standalone, secure, sheltered cycle store within the basement for use of the restaurant spaces.

93 cycle store spaces have been provided for the use of the residential units. This is in excess of the 55 cycle spaces required by the DfT Cycle Infrastructure Design guide adopted by Reading Borough Council.

4.10.4 Travel Plan

The proposed development will be supported by a Travel Plan that identifies objectives for mode shift towards sustainable methods of travel. The Travel Plan will be a live document that is monitored and updated to remain current and applicable to any changing conditions or new opportunities.

A welcome pack will be developed and issued to all new residents. These pack will provide relevant walking and cycle maps, public transport information, local car clubs, contact details for local taxi operators and car sharing organisations.

5.0 Summary and Conclusions

The proposed sustainability approach is developed to meet the targets and standards set by the relevant planning policies. The proposed development has incorporated a number of key sustainability measures and features which are tabulated below:

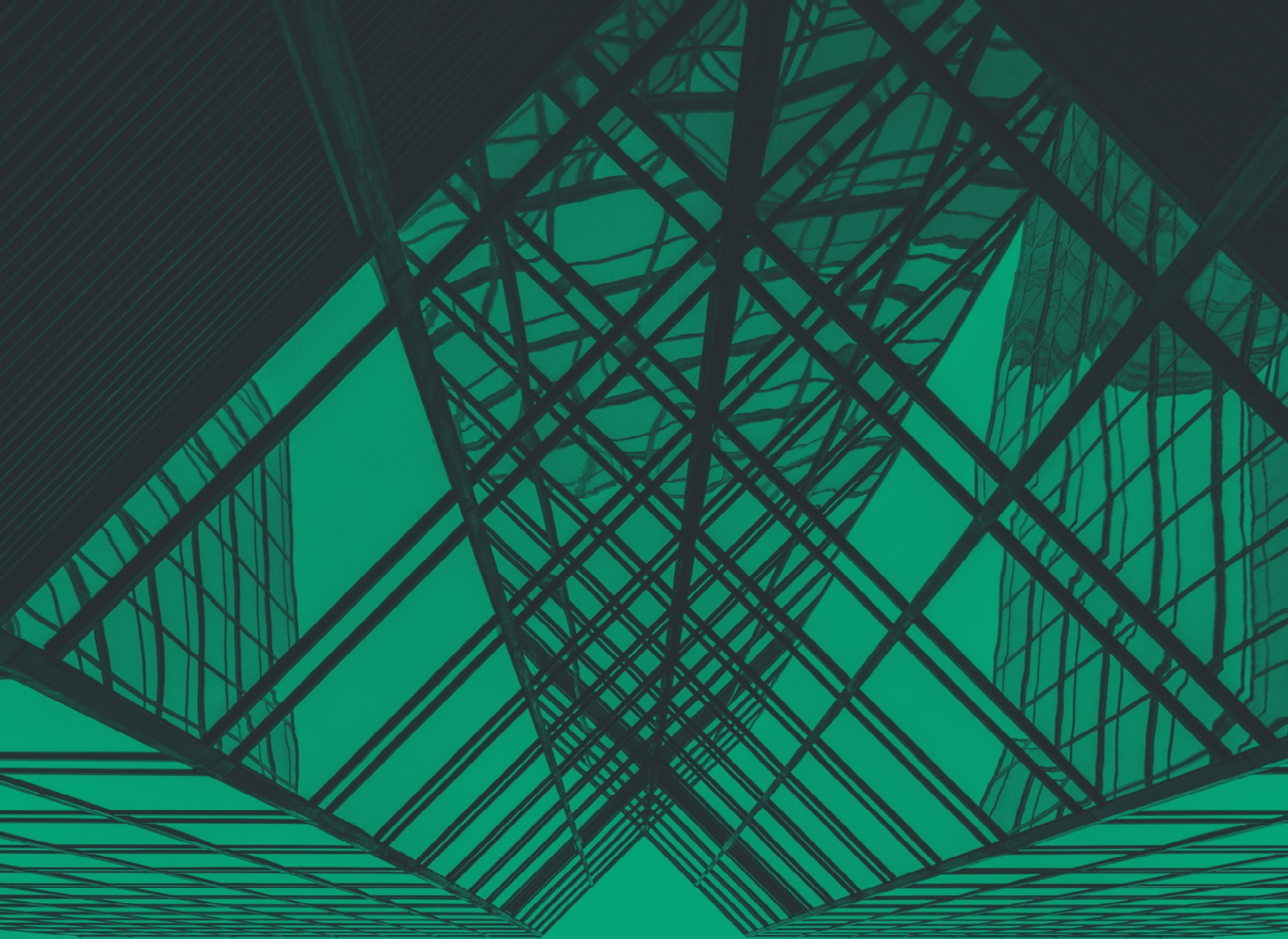
Issue	Proposed Key Sustainability Measures
Energy	Good quality sustainable construction standards, along with good levels of insulation, and efficient heat generation strategy.
Water	All dwellings within the proposed development should be provided with water efficient fixtures and fittings to reduce water consumption and comply with the regulatory requirements.
Materials	- Materials have been specially selected so as to retain the local character of Reading. Use of red/orange and grey/blue bricks can be seen throughout Reading's historic and emerging context and have been adopted within the scheme - The energy that has been used during manufacture, processing and transportation of materials to site comprises of embodied carbon emissions. These emissions will be decreased by the selection of materials for all building elements that are characterised by reduced environmental impact.
Surface Water Run-off	SUDS have been considered from the outset of the design process and significant areas of green roofs and soft landscaped areas have been included at roof level, including two large roof terraces to minimise surface water runoff. In addition, a blue roof will cover a large area (up to 1,160m²) and collect and attenuate the majority of the roof area (1,535m³) to restrict peak surface water sewer flows for rainfall events from 59.7 (existing) to 10l/s during the 1 in 100 year event including a 40% allowance for climate change following development.
Waste	The position and design of the residential and commercial refuse areas have considered the impact of noise and odour on existing / proposed neighbours, whilst providing suitable room with suitable impermeable hardstanding, ventilation, light and a water supply with a cleanable floor with a run-off drainage point.
Pollution	- The energy strategy proposes a Air Source Heat pump Ambient Loop system with no on site NO₂ emissions - Sustainable travel measures will help to further reduce the air quality impacts - External light pollution will be minimised by incorporating daylight and presence detection as appropriate.

Health and Wellbeing	- It is anticipated that all main rooms in the apartments will achieve good daylight. - The proposed dwellings will be provided with private and semi-private open space - Sound insulation is expected to be provided on all separating walls and floors between habitable spaces to improve indoor comfort by reducing the likelihood of nuisance noise in line with Part E.
Management	- The design process has very much been a collaborative process working with the Council through two Pre-Applications and two Design Review Panels with Design South East. - To minimise construction site impacts the contractor will adopt good practice policies in respect of air pollution and water pollution. Construction workers will be encouraged to travel to site via the vast array of sustainable transport options available to and from the site. - Safety for the users of the building and for the public has been incorporated carefully into the design of the scheme. Residential entrances will be lobbied in order to have two lines of fob access doors to prevent tailgating. Security cameras will be located around entrances and monitored by the on site security team located at ground floor in Core A.
Land Use, Ecology and Biodiversity	- Proposed areas of shrub and herbaceous planting for wildlife, species listed on the Royal Horticultural Society Good for Pollinators Guide shall be favoured where possible. The selection of species can flower in spring, summer and winter which could mean a constant resource of nectar throughout the year - Integrated nesting features for bird and bee species will also be incorporated into development.
Transport	- The scheme shall be considered due to the location of the site within Reading Town Centre which provides amenities, leisure facilities, employment opportunities and access to a range of public transport links all within walking and cycling distance of the site. - To support travel by sustainable means the proposal incorporates significant levels of cycle parking in accordance with the Reading Borough Council standards - The net change in trips results in a net decrease of 22 two-way trips during the AM peak hour and a decrease of 13 two-way trips during the PM peak hour with an overall net reduction of 290 two-way trips. - The Friar Street Development is in a highly accessible town-centre location with a range of sustainable modes of transport on offer. The accessible nature of the site is reflected in the Census modal share which shows a high proportion of trips, 78% of residents and 57% of workplace population, made by sustainable mode.

Sustainable Design & Construction Statement

This Sustainability Statement demonstrates that the proposed development is targeting good standards of design and build-quality. Much attention has been given to reducing the environmental impact throughout the lifetime of the development.

In conclusion, this report demonstrates that the proposed development can meet the sustainability planning policy requirements. The design team have carefully considered the site's potential environmental impacts, which will be managed and mitigated in line with the relevant planning policies.



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