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Sustainability Statement

Homes England

Brislington Meadows
Sustainability and Energy Statement

Outline Planning Application

For

Homes England

By

Kovia CONSULTING

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Legal statement

About Kovia

Kovia is a Cornish word meaning "protect" and reflects the core value of our business to protect human health, communities, and the natural environment. The Kovia group of companies includes Kovia Ltd and Kovia Environmental Services Ltd. Kovia Ltd is an established statutory compliance inspection, testing and training provider specialising in asbestos, fire, legionella, and energy efficiency services. Kovia Environmental Services Ltd specialises in all aspects of asbestos remediation and removal, demolition, maintenance, and re-instatement works.

Kovia Consulting Ltd provides advice and research that draws on a deep understanding of several technical disciplines from earth, environmental and climate science; finance, economics and business management; sustainability; social research and development studies; education; engineering and construction.

Contents

1 Introduction

1.1 Scope

1.1.1 LDA Design have been instructed by Homes England ('the Applicant') to prepare an outline planning application with all matters reserved except access for development on 9.6 hectares of land to the south of Broomhill and north of Victory Park in the southeast of Bristol (grid reference: 362615 (eastings); 171114 (northings) (referred to in this document as 'the Site'). Kovia Consulting have been instructed to prepare a Sustainability and Energy Statement to support this application to demonstrate that the Proposed Development at the site contributes to sustainable development as well as addressing the challenges of climate change.

1.2 Site location

1.2.1 The Site is located in Brislington in the southeast of Bristol within the administrative boundary of Bristol City Council and the Ward of Brislington East. The Site comprises an irregular shaped parcel of land (9.6 hectares) known as Brislington Meadows, as shown on Drawing: 7456_037 (Site Location Plan).

1.2.2 To the northeast, the Site is bound by Broomhill Road and residential properties in Condover Road. To the north the Site is bound by residential dwellings on Belroyal Avenue and an associated rear access lane, Broomhill Junior School and Mama Bear's Day Nursery, and residences accessed off Allison Road. To the east the site is bound by Bonville Road and the protected employment area comprising the Brislington Trading Estate. To the west of the site is School Road and allotments. To the south lie Victory Park and paddocks which comprise protected open space and a Site of Nature Conservation Interest.

1.3 Site description

1.3.1 The Site currently comprises open fields crossed by two public rights of way and a network of informal trodden paths. The Site is not subject to specific environmental or landscape designations and has an allocation for housing development in the Council's Local Plan.

1.3.2 The Site is characterised by a steeply sloping topography from the northern boundary down to the southern boundary, with the gradient reducing towards the east. There are overhead electricity cables and a pylon on the lower slopes towards the southern boundary of the Site. A telecommunications mast towards the northeast of the Site will be relocated following the grant of planning consent for the proposed development.

1.3.3 The Site is well located to make use of existing services and facilities. Broomhill Infant School, Broomhill Junior School and Mama Bear's Day Nursery are all located adjacent to the Site's northern boundary. Broomhill local centre, including a small convenience store, public house, salons and takeaway shops, is located approximately 200m north of the Site.

1.3.4 There is no public vehicular access into the Site at present. There are two public rights of way across the Site, one running east-west along the southern boundary connecting Bonville Road and School Road, and one north-south between Belroyal Avenue and Bonville Road. In addition, a network of informal trodden paths crosses the Site. The Applicant is in the process of formalising public access rights and the proposed development will accommodate pedestrian and cycle access across and within the Site.

1.3.5 The Site has a direct informal connection to Victory Park to the south. Eastwood Farm Local Nature Reserve is located approximately 150m north of the Site on the northern side of Broomhill Road. Nightingale Valley Park is located approximately 600m west of the Site off Allison Road.

1.4 The development proposal

1.4.1 The Site has an allocation for housing development under Bristol City Council's Local Plan: Site Allocations and Development Management Policies, adopted July 2014, as Allocation BSA1201 (Land at Broom Hill, Brislington). The site is suggested to have indicative capacity for 300 homes. The sustainable location of the site in close proximity to existing services is noted in the Council's reasoning for the allocation of the site.

1.4.2 The proposed development has been informed by thorough analysis of the site's context and character and regard had to relevant opportunities and constraints. The overarching vision is to create a sympathetically designed sustainable neighbourhood, located within Broomhill and in proximity to existing services and amenities available. The landscape-led masterplan seeks to retain significant amount of open space on the site and public routes through the site, enhancing connection to Victory Park and Eastwood Farm, as well as access to the local centre itself to support existing services and encourage further investment. The Applicant is committed to delivering 30% affordable housing in line with policy requirements and will deliver a 10% net gain in biodiversity (through on and off site measures).

1.4.3 The site seeks to make use of its highly sustainable location, within close proximity of existing shops and services of Broomhill Local Centre helping to sustain these, as well as being accessible for the wider Brislington and Bristol area including by public transport and active means of travel.

1.4.4 The 'proposed development' comprises development of up to 260 dwellings with pedestrian, cycle and vehicular access, cycle and car parking, public open space and associated infrastructure. All matters except access are reserved.

1.4.5 The application is submitted in outline, with all matters reserved apart from access for which we are applying in detail. Detail relating to matters of appearance, layout, scale, and landscaping are reserved for future determination, known as the reserved matters stage.

1.4.6 A series of Parameter Plans have been prepared which define the proposed extents of development across the Site. An Illustrative Masterplan has also been prepared which shows one way in which the development could come forward within the parameters identified. A Design Code has also been prepared by LDA Design and is submitted for approval, which provides further detailed design requirements that must be complied with at reserved matter stage, to help ensure the quality of the overarching vision is retained.

1.5 Assumptions and limitations

1.5.1 As the development is at outline planning stage, the detail of fixed layout, appearance of the buildings, scale of built form of the detailed landscape proposals or exact dwellings size and mix is not yet fixed. This will be determined through subsequent, detailed reserved matters applications, which will also be subject to further public consultation. Figures presented in this report should be regarded as high-level estimates only based on the maximum development parameters set out in this outline submission, to be used to confirm the outline application has considered significant impacts and does not prevent suitable detailed applications to come forward.

2 Scope of sustainability and energy statement

2.1.1 The Sustainability and Energy Statement has been prepared as part of a planning application for the Proposed Development and the scope is set by National and Local policy requirements. This chapter sets out policy and scope.

2.2 National policy

2.2.1 The first chapter of the National Planning Policy Framework[1] (NPPF 2021) defines the "purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs." (Paragraph 7). At the heart of the NPPF is a "…presumption in favour of sustainable development." (Paragraph 10) and that approval is given to "…development proposals that accord with an up-to-date development plan without delay" (Paragraph 11).

2.3 National Planning Policy Framework (NPPF)

2.3.1 An updated NPPF was published in July 2021. The NPPF sets out the Government's planning policies for England and how development should happen in the country. The aim of this framework is to achieve sustainable development according to the three pillars: economic, social and environmental for both plan-making and decision making. The term sustainable development is defined as "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*".

2.3.2 Chapter 14 "*Meeting the challenge of climate change, flooding and coastal change*" contains relevant policy for the purpose of this energy and sustainability strategy:

2.3.3 Paragraph 140 states: "New development should be planned for in ways that:

> (a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
> (b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the government's policy for national technical standards."

2.3.4 The NPPF states, at Paragraph 156, that "Local planning authorities should support community-led initiatives for renewable and low carbon energy, including developments outside areas identified in local plans or other strategic policies that are being taken forward through neighbourhood planning."

2.3.5 Paragraph 157 stipulates that "in determining planning applications, local planning authorities should expect new development to:

[1] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework, February 2019.

(a) comply with any development 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
(b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption."

2.4 Building Regulations Part L and Future Homes Standard

2.4.1 Development that comes forward at the Proposed Development will need to demonstrate as part of building regulations approval that it conforms to the requirements set out in Approved Documents Part L (Conservation of Fuel and Power) of the Building Regulations 2013, as amended. The Approved Documents are issued by the Secretary of State to provide guidance on compliance with specific aspects of building regulations in some of the more common building situations. They set out what, in ordinary circumstances, may be accepted as a reasonable provision for compliance with the relevant requirement(s) of the Building Regulations to which they refer.

2.4.2 Part L of the Building Regulations covers the carbon emissions that are attributable to buildings in use, resulting from lighting, heating, cooling and ventilation excluding small power. Part L is divided into two separate parts: new domestic developments come under Part L1A and new non-domestic developments come under Part L2A of the Building Regulations.

2.4.3 Amendment regulations come into force (and includes revisions to above documents) on 15th June 2022. The Amendment Regulations provide for a new metric for the measurement of energy efficiency in the form of the target primary energy rate. Homes will be expected to produce 31% less CO_2 emissions compared to current standards. They also introduce new regulations for on-site electricity generation and in relation to overheating. They also make provision about ventilation standards when work to which Part L (conservation of fuel and power) applies. The Building (Approved Inspectors etc.) Regulations 2010 are amended accordingly so that the new requirements operate in an equivalent way when the building work is subject to an initial notice.

2.4.4 The above are brought in as part of the Government's Future Homes Standard which aims to improve energy efficiency through graded improvements to the Building Regulations that developers will need to consider as part of their design process. The Future Homes Standard includes an effective restriction on the use of gas fired boiler in new build from 2025 and Homes England, along with development partner, will ensure that gas boilers are not installed. Work and consultation on the Future Homes Standard continue and will include a technical specification for homes to be consulted on in 2023 and other measures. Homes England and development partner will be committed to achieving Future Homes Standard as minimum at Brislington Meadows.

2.5 Bristol Local Plan

2.5.1 Bristol City Council's core strategy policies (following adoption of the Core Strategy on 21 June 2011) for sustainable developments include:

- BCS13 Climate Change - Requires development to both mitigate and adapt to climate change;
- BCS14 Sustainable Energy - Provides criteria for assessing new renewable energy schemes, with a presumption in favour of large-scale renewable energy installations. Requires new development to minimise its energy requirements and then incorporate an element of renewable energy to reduce its CO_2 emissions by a further 20%. This policy supports the delivery of a district heating network in Bristol; and
- BCS15 Sustainable Design and Construction - Requires all development to engage with issues around sustainable design and construction. Requires larger non-residential developments to be assessed against

BREEAM. This policy also contains additional policy content relating to refuse storage and broadband provision.

2.5.2 Bristol City Council's Core Strategy requires developments to demonstrate how they will be designed and constructed in a sustainable manner to minimise natural resource use. Specifically, the policies pertinent to this energy and sustainability strategy are BC13, BC14 and BC15 described above. BC16 (Flood Risk and Water Management: requires new developments to be resilient to flooding and include mitigation measures where necessary) is also described but excluded from detailed consideration in this document and reference is made to Campbell Reith Flood Risk Assessment and Drainage Strategy (including SUDS strategy) also submitted as part of application for planning permission.

2.5.3 The Council's Site Allocations and Development Management Policies Plan is also relevant to this proposal and following policy relates to designing for sustainable development:

- DM27 Layout and Form – Requires new development to respond appropriately to climatic conditions including solar orientation to maximise opportunities for energy efficient design and access to sunlight.

Climate Change and Sustainability Practice Note – How to design low carbon resilient developments (BCC, July 2020)

2.5.4 The practice note describes the principles and how they would be applied to new development (and detailed / reserved matters applications). In terms of requirements this confirms the need to submit a Sustainability Assessment with an energy strategy and BREEAM Communities assessment, the scope of these is discussed below.

One City Climate Strategy (Bristol Environmental Sustainability Board, Feb, 2020)

2.5.5 BCC was the first authority to declare a Climate Emergency. Bristol's Environmental Sustainability Board came together to develop a climate strategy for the city. The result is the One City Climate Strategy (2020) - a strategy for a carbon neutral, climate resilient Bristol by 2030. This outlined ten key areas for climate action and includes:

1. Transport: switching to significantly more walking, cycling and zero carbon public transport modes; converting the remaining vehicles to zero carbon fuels; transforming freight, aviation and shipping;
2. Buildings: retrofitting and building them to become carbon neutral and resilient to a changing climate, calling on central government to develop a supportive planning framework to deliver this;
3. Heat decarbonisation: implementing a carbon neutral energy method for heating and hot water. This is one of the areas that will be supported by City Leap Energy Partnership, a radical new approach to delivering energy infrastructure in Bristol;
4. Electricity: make our electricity use as smart and flexible as possible (to support electricity decarbonisation nationally), maximise local renewable energy generation and increase system resilience;
5. Consumption and waste: responsible buying of goods and services, alongside zero carbon from waste management;
6. Business and the economy: Bristol businesses move to be carbon neutral and climate resilient, capturing job opportunities for all through the transition;
7. Public, voluntary, community and social enterprise services: carbon neutral public and VCSE services and supply chains that are also prepared for future climate conditions and hazards;

8. Natural environment: restoring, protecting and enhancing these spaces and wildlife within them as the climate continues to change;
9. Food: a resilient supply chain, with food and drink produced locally, sustainably and moving to a more plantbased diet; and
10. Infrastructure interdependencies: collaboration in running vital services to the city such as water, transport, waste, ICT and energy to improve their climate resilience and embed carbon neutrality across different systems.

2.6 Developing an approach to this statement

2.6.1 This sustainability and energy statement outlines several commitments to be secured through the outline planning application and provide a framework to guide the detailed design of subsequent reserved matters planning applications. There are some limitations to the level of detail that this Statement can provide at this outline stage, and some assumptions are applied, as described below.

2.6.2 Policy and guidance in relation to carbon reduction requirements are evolving and while the recommendations made are in light of current policy the recommendations need to include some flexibility to respond to future change and encourage ambition.

Sustainability assessment

2.6.3 Brislington Meadows is allocated for 300 homes in the Local Plan (2014) and is classed as a 'Super Major' development due to its size (over 100 residential units). Bristol City Council planning policy (Climate Change and Sustainability Practice Note, BCC, July 2020) requires that all 'Super Major' schemes are reviewed against the BREEAM Communities scheme document. BREEAM Communities was developed for assessing large-scale mixed-use masterplans, particularly at outline planning stages. As the scheme is for housing (not mixed use) a modified form of BREEAM Communities is considered appropriate, rather than formal assessment and that the principles contained with the technical manual are adopted. This assessment is indicative only and a formal BRE assessment not undertaken. This is an approach that has been applied in recent outline applications by and to BCC.

2.7 Pre-application advice

2.7.1 A number of sustainable design features were identified during pre-application discussions with BCC officers to be considered further, as noted below:

a. Site layouts and passive approaches to design and construction which provide resilience to climate change (particularly spells of higher temperature or rainfall – BCC note use of 2050 and 2080 medium emissions scenarios);
b. Impact of aspect (e.g. duel) and shading created by homes (e.g. balconies) on energy demand (both heating and cooling);
c. The use of green infrastructure to minimise and mitigate the heating of the urban environment including brown and green roofs (with potential net biodiversity gain);
d. Thermal modelling assessment (CIBSE or equivalent) will be left for detailed application but principals considered;
e. Mitigating carbon emissions through BCC energy hierarchy (policy BCS14) and to achieve 20% saving on residual emissions with renewable energy sources;
f. Life cycle impact of homes and construction activities;
g. Future proofing and provision of connectivity (HSB) and charging (EV); and
h. Potential to connect / develop energy networks.

2.7.2 As the application is at outline stage all elements of the sustainability and energy statement will be preliminary, pending further design work prior to any reserved matters submissions and once details relating to final building design and appearance and site layout are known. However, the Client wants to ensure that sustainability and energy objectives are met as part of any detailed design with practical suggestions and ensuring the scheme remains attractive to the market to secure the much-needed sustainable homes for Bristol.

2.7.3 The content of this Sustainability and Energy Statement directly addresses the requirements of local policy as set out in Table 2.1:

Table 2.1 Sections of report

Section	Policy
Section 3 - Climate change – A statement of how adaptation and mitigation measures against the effects of climate change have been considered in the Development Proposal	BCS13
Section 4. – Sustainable energy – A statement of how the Development Proposal enables detailed schemes coming forward to minimise their energy requirements and incorporate renewable and low-carbon energy supplies (to reduce their associated CO_2 emissions.). This includes the future detailed layout and building design to maximise opportunities for energy efficient design.	BCS14, DM27
Section 5. Sustainable design and construction – A statement of how the Development Proposal enables detailed schemes coming forward to be designed and constructed to minimise their environmental impact and contribute to meeting CO_2 emissions reduction targets.	BCS15

3 Climate change

3.1 Adaptation

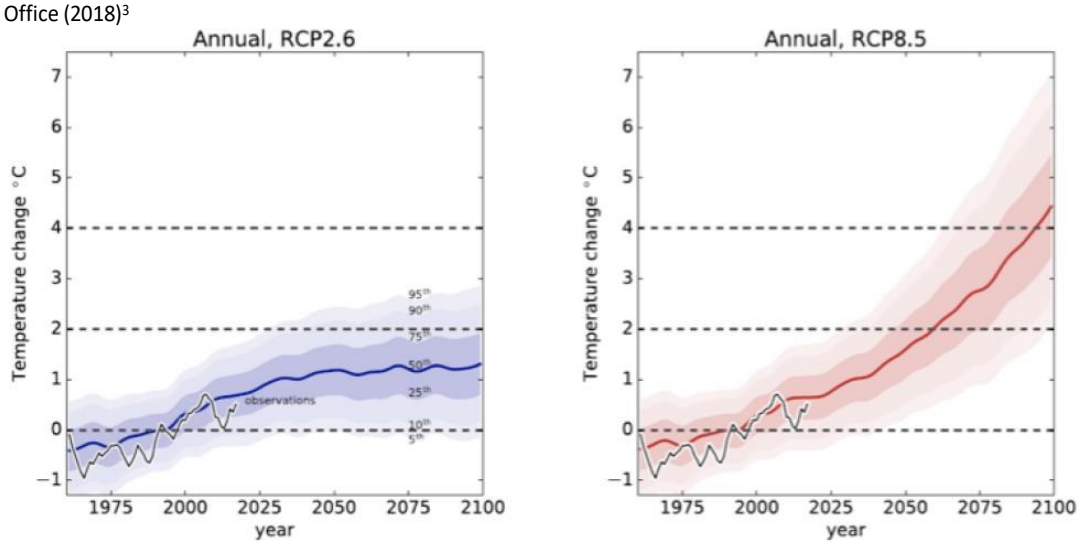
Overview

3.1.1 Policy BCS13 requires that adaptation and mitigation measures against the effects of climate change have been considered in the Development Proposal, i.e. projected changes in temperature, rainfall, wind and sea level in its design with the aim of mitigating and remaining resilient to the effects of changing climate. The potential consequences of climate change and the potential impact on the Proposed Development is considered below followed by a review of how the Proposed Development has taken account of the predicted impacts.

Consequences of climate change

3.1.2 The UK Met Office published projections[2] in 2018 and were an assessment of how the climate of the UK may change until 2100: referred as UKCP18. A number of alternative future scenarios were modelled including a situation where there is a continuation of high emissions of greenhouse gases and global population and economic growth (called RCP8.5) as well as a scenario where some mitigation and reduction in emissions occurs (RCP2.6 strong global mitigation with falling emissions):

Figure 3.1: Future UK Temperatures, Falling Emissions (left) and Continuation of Emissions (right) Scenarios
Source: Met Office (2018)[3]



3.1.3 The following presents the projected consequences of climate change on temperature, rainfall, wind and sea level in the Bristol under the high emission scenario (RCP8.5) and the average (RCP 4.5)[4] and the implied potential impact on the Proposed Development:

2 Further detailed information can be found at: https://www.metoffice.gov.uk/research/collaboration/ukcp. For the purposes of this section a summary is provided and based on Bernie D, Gohar G, Good P and Lowe JA, 2018. UKCP18 Applied Projections of Future Climate over the UK, Met Office.

3 Met Office (2019) ukcp18-overview-slidepack-notes.ff a pdf document from https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-overview-slidepack-notes.ff.pdf.

4 For a summary see: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/spf/bcc_factsheets_resultshighlevel.pdf

Temperature

Table 3.1: Projected Change* in Temperature in the Bristol under High Emission Scenario (RCP 8.5) and Mean (RCP 4.5)

Year	Likelihood	Winter mean temperature (°C)	Summer mean temperature (°C)	Summer mean maximum temperature (°C)
2030's	50% chance less than	+0.8	+1.0	+1.3
	90% chance less than	+1.9	+2.2	+2.8
2050's	50% chance less than	+1.2	+1.7	+2.2
	90% chance less than	+2.9	+4.0	+4.9
2080's	50% chance less than	+1.9	+3.0	+3.5
	90% chance less than	+4.8	+8.0	+9.2

Source: Met Office (2018) UKCP18 Climate Projections

* The temperature changes shown in this table are in relation to baseline 1981-2000.

3.1.4 UK Climate Projections for the Bristol suggest that by the 2080's the region will experience an increase of between 3.0 to 8.0°C in summer mean temperature and between 1.9 to 4.8°C in winter compared to the 1981-2000 baseline records. In summary: warmer summers and winters.

3.1.5 The construction phase of the Proposed Development will not be affected as the predicted climate effects are unlikely to have changed significantly by the time the works commence. However, later in the life of the operational phase of the Proposed Development, a relative increase in temperature will affect demand for heating and cooling within buildings. Methods of passive cooling will be important to reduce reliance on air conditioning.

Rainfall

Table 3.2: Projected Change* in Rainfall in Bristol under High Emission Scenario (RCP 8.5) and Mean (RCP 4.5)

Year	Likelihood#	Winter mean rainfall (%)	Summer mean rainfall (%)
2030's	50% chance less than	+6	-12
	90% chance less than	+18	-34
2050's	50% chance less than	+9	-18
	90% chance less than	+28	-45
2080's	50% chance less than	+17	-26
	90% chance less than	+48	-68

Source: Met Office 2019) Bristol Climate Change UKCP Results factsheet, 2019

* The rainfall changes shown in this table are in relation to the average for 1981-2000 baseline.

3.1.6 UK Climate Projections for Bristol suggest that by the 2080's the region will experience an change of between -26% to -68% (less) summer mean rainfall and an increase of between 17 to 48% (more) mean rainfall in winter compared to the 1981-2000 baseline. In summary; drier summers and wetter winters.

3.1.7 The main predicted impact from changing rainfall on the Proposed Development is the potential for an increase in surface water run-off with an impact on and drainage. Potential future changes to rainfall and the impact on likelihood of flooding as well as measures needed to adapt to them are examined in Campbell Reith Flood Risk Assessment and Drainage Strategy (including SUDS strategy). The Assessment concludes that the effect of climate change will not be of any significant impact to most of the flood risks sources indicated. Climate change will however increase the potential of flooding from surface water to occur and measures to control and mitigate this on site are identified.

Wind

3.1.8 There is some uncertainty regarding how climate change will affect wind. Karnauskas et al. (2017)[5] found for both high emission scenarios (RCP8.5 as discussed above) and scenarios including some mitigation (RCP4.5), that the wind *energy* resource would fall in the Northern Hemisphere predicting a loss of between 2 to 3% by 2050 and 10% by 2100. A study commissioned by the Association of British Insurers[6] modelled the effects of climate change on the frequency and intensity of UK windstorms. The report used the same scenarios (RCP4.5 and RCP8.5) and found "*the frequency of (wind)storms over the UK will increase by 0.3 to 1.2 over the majority of the UK, apart from over southern UK where the number of storms will decrease by up to 0.3 storms per year.*"

3.1.9 Both of these sources suggest that climate change will reduce the intensity and frequency of storm events in Southern UK and on that basis will not have an impact on the Proposed Development.

Sea Level Rise

3.1.10 UK Climate Projections for the Southwest suggest that (in a high emissions scenario) by the 2080's the relative sea level will experience an change of between 43cm to 90cm. This may have significant implication for coastal areas and areas vulnerable to storm surges. In view of the inland and elevated location of the Proposed Development, sea level rise is not considered likely to impact on the Proposed Development and is not considered further.

Adaptation measures

3.1.11 Adaptation refers to features of the development that represent measures to reduce the vulnerability of the development to projected effects of climate change. In summary, projections suggest warmer, wetter winters and drier, hotter summers.

3.1.12 Table 3.3 set out proposed adaptation measures identified in the application documents:

[5] Karnauskas, K. B. et al. (2017) Southward shift of the global wind energy resource under high carbon dioxide emissions, Nature Geoscience, http://nature.com/articles/doi:10.1038/s41561-017-0029-9 / https://www.carbonbrief.org/uk-wind-power-potential- could-fall-2100-because-climate-change

[6] Air Worldwide and Met Office (2017) UK Windstorms and Climate Change – An update to ABI Research Paper No 19, 2009; January 2017

Table 3.3: Potential climate change impact and adaptation measure

Potential climate change impact	Proposed Adaptation measure
Increased winter rainfall	A site-specific Flood Risk Assessment (FRA) has been carried out as part of the outline planning application, which included assessing risks of flooding from all sources on site and risk management measures. The FRA includes consideration of flood risk due to climate change (see Campbell Reith Flood Risk Assessment and Drainage Strategy)
Increased summer and winter temperatures with drier summers	The "Energy Load" of the development has been considered in the next section. This describes how the more detailed design at the reserved matters stage can further consider how to reduce heating and cooling requirements through the shape, scale and position of building structures. Thermal mass of buildings and effective insulation could be used to provide passive cooling in warm summer temperatures. A thermal / overheating assessment of the Proposed Development should be undertaken at reserved matters stage and can be secured by planning condition. The Green Infrastructure parameter plan includes planting and roads lined with trees which will provide important shade and passive cooling of buildings. The enhancements to surrounding green spaces and hedges at the site will be significant to the local micro-climate. Options to develop heating / cooling networks are considered later in this statement and will need to be established at reserved matters stage and can be secured by planning condition.

3.2 Mitigation

Overview

3.2.1 This section demonstrates how the Proposed Development has been designed to enable aspects that minimise the use of natural resources during construction and operational phases as well as contribute to the mitigation of greenhouse gases (GHG).

Natural Resources - sustainable construction

3.2.2 The Proposed Development will involve the use of natural resources either directly or embedded within the products and materials used to build out the development. This outline proposal does not include any detailed design which might otherwise include specification of materials and structure, etc. This impact which includes the whole lifetime impacts of the development, including designing for durability and ease of maintenance needs to be assessed and minimised in subsequent detailed reserved matters applications and secured by planning condition.

Reuse and recycling of natural resources

3.2.3 With respect to reuse and recycling of natural resources a framework Site Waste Management Plan (fSWMP) could be secured by condition and to set out:

- In relation to the construction phase: the volume and type of material to be demolished and/or excavated during the construction phase, opportunities for the reuse and recovery of materials and to demonstrate how off-site disposal of waste will be minimised and managed; and
- Operational phase anticipated waste that is likely to be generated once the houses are occupied and how these waste arisings will be managed in a sustainable fashion in accordance with current policy.

Greenhouse gas emissions

3.2.4 The assessment of GHG emissions[7] [8] involves identifying direct and indirect emissions. There are three "scopes" of impacts:

- Scope 1: direct GHG emissions;
- Scope 2: indirect GHG emissions from consumption of electricity, heat or cooling; and
- Scope 3: other indirect emissions – those embedded within extraction and production of materials, energy and fuels used, waste disposal, etc.

3.2.5 Scope 1 and 2 emissions[9] are considered qualitatively below in Table 3.4 and sets out some mitigation measures to be considered as part of more detailed design stages:

Table 3.4: Potential source of greenhouse gases (GHGs) and mitigation measure

Source GHG	Mitigation measure
Scope 1 Direct Emissions	
Construction	
GHG emissions from combustion of fuel by vehicles and generators on site	The main source of direct GHG emissions during construction will relate to emissions when fuels are combusted in engines used to transport of building materials and in the use of construction equipment. A detailed Construction Environmental Management Plan (CEMP) would be prepared and will be implemented to ensure that construction activities minimise their impact in this respect.
GHG emissions from disposal and transport of waste during construction.	The proposed SWMP (to be prepared as part of reserved matters applications) would include measures to ensure that materials are handled efficiently and waste managed appropriately – this reduces raw material use and waste disposal to landfill with a knock-on impact on the number of journeys and fuel required.
Operational Phase	
Carbon Sequestration: removal of carbon dioxide by woodland and woodland soils.	The sustainable management of habitats is important for carbon storage. Open and woodland soils can act as a sink for carbon as plants remove it from the atmosphere. Carbon storage associated with open land use occurs primarily in live wood, soils and harvested products. The carbon locked into live wood is directly linked to timber volume which itself is a function of tree species. The carbon held in soils can be much greater than that in trees. At present, the areas of open space have not been managed extensively and there the Development Proposal includes manage and enhance open space to improve the biodiversity and may present opportunities to improve carbon sequestration rates.
GHG emissions from vehicle use	A Transport Assessment has been undertaken and includes recommendations to improve connectivity and sustainable modes in the Proposed Development including pedestrian and cycling linkages and active transport as well as electric vehicle charging points.
GHG emissions from disposal and transport of waste during operation.	The proposed use of a SWMP as part of detailed design to include measures to ensure that materials are handled efficiently, and waste managed appropriately – this reduces raw material use and waste disposal to landfill with a knock-on impact on the number of journeys and fuel required.

[7] World Resources Institute and World Business Council for Sustainable Development (2005) The Greenhouse Gas Protocol for Project Accounting, November 2005

[8] IEMA (2017) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance

9 All other indirect emissions (Scope 3 emissions), emissions that are a consequence of the activities of the operational development but occur at sources owned or controlled by another entity have been scoped out as not considered proportionate

Scope 2 Indirect Emissions	
Construction	
Embodied GHG emissions in construction materials.	The Proposed Development is at an outline stage and specific design and construction materials will need to be set out in subsequent reserved matters applications. Materials with lower embodied GHG emissions should be used where possible to reduce impacts.
GHG emissions from construction facilities	During construction, temporary construction welfare and office facilities will be provided on site. Energy will be required to power these facilities. Good environmental practice can be promoted within the proposed CEMP such as energy efficient equipment and lighting, to reduce the energy demand of construction facilities.
Operational Phase	
GHG emissions from energy and fuel use during use	The Proposed Development is at outline stage and specific design and construction materials will need to be set out in subsequent reserved matters applications. A following section of this report presents a review of technical, environmental and financial viability of a range of low carbon heating (and cooling) and power options that could be incorporated into the Proposed Development to achieve a an overall reduction in regulated CO_2. Other potential options considered in includes passive measures to combat overheating (in preference to active cooling systems); and use of sufficient insulation to reduce heating/cooling demand.

3.2.6 As this is an outline application, the proposed measures in this Sustainability Statement are intended to provide a framework to guide future detailed applications. Detailed measures will need be defined and assessed through subsequent reserved matters applications.

3.2.7 It is noted that, improvements to connectivity and more sustainable, low carbon and active modes of travel will be delivered at this Site and because of the Proposed Development and are a significant positive contribution to GHC mitigation.

4 Sustainable energy

4.1 Overview

4.1.1 Estimates of energy demand will need to be undertaken in relation to the detailed proposals coming forward as part of reserved matters applications once final building form and design and site layout are confirmed. It should be assumed that the buildings will be designed to meet the minimum requirements of the Future Homes Standard and Building Regulations applicable at the time as a minimum.

4.2 Energy efficiency

4.2.1 Many of the design features which support energy efficiency, such as building fabric specifications and the selection of heating, ventilation and air conditioning systems, will be determined during detailed design of the buildings. Ventilation and minimum standards are not specified for building services, including heating systems and lighting, and these will need to be determined during detailed design.

4.2.2 The Access and Movement Parameter Plan shows indicative alignments of pedestrian and cycling routes and fixes the key points of access into the site. Detailed applications coming forward as part of subsequent reserved matters planning applications need to apply the following energy saving features to green infrastructure:

- pedestrian and cycle paths through the site will be safely designed and the lighting scheme will use LED light sources that will provide a reduction in the maintained light levels required for roads and streets; and
- A lighting control system will be operated during the night to control the streetlights, which will include measures such as dimming and/or part-night lighting.

4.2.3 Opportunities to make the development highly energy efficient, including to consider the use of renewable or low carbon energy, will be considered further at detailed design stage.

4.3 Energy load

4.3.1 The detailed scheme design coming forward should aim to reduce the energy load of the development by good layout, orientation and design to maximise natural heating, cooling and lighting. As part of the development of parameter plans and an illustrative masterplan early consideration was given to solar gain (passive design). This considered the potential layout of the streets, aspect of the buildings and density of development to ensure thermal comfort within buildings while minimising the need for heating, mechanical ventilation, and cooling. Aspects considered and recommended for incorporation in detailed design are set out in Table 4.1, below:

Table 4.1: Design aspects of the Proposed Development that result in reduced energy demand.

Aspect	Considerations	Feature of Proposed Development
Density	In energy terms, higher density development can be preferable for two reasons. Terraced houses and apartments have lower space heating demands as they have a lower external surface area. They also support the feasibility of shared heating systems, by minimising the length of pipework needed to connect individual properties. A benefit of lower density development is that it provides more scope for building integrated renewable and low carbon energy, with a higher proportion of roof space per unit floor area and more space for accommodating plant and fuel storage if biomass is used on-site.	Scheme includes an average density of 51 dwellings per hectare and includes apartments, as well as semi-detached and terraced properties.
Layout	The layout of the site should enable buildings to be protected from sources of noise and pollution, to maximise the potential for natural ventilation. The street layout should also be designed where possible to provide some shelter from prevailing winds. Designing some areas of the site for a mix of uses, potentially combining some commercial space with residential and community uses, could also increase the feasibility of communal heating systems, particularly where combined with higher density.	The site is generally screened from adjacent uses (particularly commercial and industrial uses to the east) by existing trees and hedges. The Landscape Parameter Plan shows many areas of hedgerow with trees as retained and enhanced include a strong landscaped boundary along the east of the site. The prevailing winds[1] are from the SW but local topography and tree line affects local wind patterns and the western lower half of the site is likely to be relatively sheltered. A higher density are located in the east.
Orientation	The orientation of the streets homes and blocks should seek to reduce solar gains in buildings during the summer and make use of them in winter, while encouraging good daylighting. If possible, the development should enable dwellings to be orientated with roof space and one of the main facades within 30° of south. East-west orientation of glazing should be avoided where possible as it allows access to low angle sunlight during the summer which is harder to control through shading and presents a risk of overheating or raises the requirement for mechanical cooling. North-facing glazing should be encouraged for schools and commercial uses, where overheating or high cooling energy demands are a particular risk.	The Parameter Plans do not fix the orientation of buildings and the detailed applications coming forward as part of subsequent reserved matters planning applications need to take this into account. In an illustrative masterplan prepared for the Proposed Development, the orientation of the majority of buildings responds the topography of the Site and includes many dwellings within 30° of south which is also helpful for use of roof mounted solar PV. The illustrative masterplan included proposed planting which can help provide summer shade.
Massing	Massing should take into account the need to avoid over-shading of roof space where possible. It should also seek to avoid wind acceleration, to reduce heat loss from buildings during winter as well as pedestrian discomfort. The prevailing wind direction in the south of the UK tends to be from the south west[1].	The Building Heights Parameter Plan fixes **maximum** building heights across the site. The detailed applications coming forward as part of subsequent reserved matters planning applications need to take this into account. In an illustrative masterplan prepared for the Proposed Development, the height of the majority of buildings showed that over-shading could be minimised.

4.4 Onsite low carbon and renewable energy

4.4.1 There are a range of technology options available which could meet the required emissions reduction from that required to comply with Buildings Regulations Part L. Table 4.1 provides a qualitative review of the potential technology options that could be applied to the Proposed Development and considers their feasibility.

4.4.2 Based on Table 4.1, the following technology options are put forward and expected to be part of a combination of measures that meet the required emissions reduction from that required to comply with Buildings Regulations Part L:

- Opportunities to maximise Solar PV systems;

- Air source heat pumps (ASHPs) and / or ground source heat pumps via individual systems for houses and communal systems for flats;
- Site-wide district heating network fed by biomass combined heat & power (CHP), with supplementary solar photovoltaic (PV) systems; and
- Site-wide renewable community heating system fed by biomass boilers.

4.4.3 This strategy confirms that requirements can be met but does not prescribe or test specific combinations to retain flexibility for subsequent reserved matters applications.

4.4.4 It is expected that a planning condition will require a detailed energy statement to be submitted with each reserved matters application demonstrating the technologies selected and how the requirements have been met.

Table 4.1 Review of Technical Options

Technology	Description	Technical feasibility	Financial / commercial factors	Environmental factor	Conclusion	Recommended as likely part of solutions to meet prevailing policy target reduction.
Combined Heat and Power Combined heat & power (CHP): Stirling Gas-engine Turbine Biomass Fuel cell	Co-generation from a range of potential sources generally recovering and utilising heat used in electricity production.	Individual gas-fired micro or small scale CHP units (typically either stirling-engine or gas-engine respectively) could be installed in each property, although these can be relatively costly to install and maintain, and give lower efficiency than larger scale CHP systems. A larger scale CHP system could be installed in an energy centre and supply a district heat network for the proposed development. The more suitable technology in this case would be gas-engine CHP. A turbine based system is not considered suitable in this case, due to a combination of factors such as high heat to power ratio, lower turndown efficiency, and typically larger scale required for viability. Biomass-fired CHP is typically only viable at much larger scales than the proposed development, and would require substantial fuel storage, handling, and vehicle movement provisions. This particular CHP technology will not be considered further here. Fuel cell CHP technology is available, however currently the fuel source is typically natural gas (rather than a pure source of Hydrogen for which the infrastructure is not yet widely present), and this yields similar overall efficiencies as gas-engine CHP.	In terms of land take/visual impact, requiring an energy centre is a key consideration here for the larger scale CHP and district heat-based systems. Fuel cell CHP is not yet considered to be commercially viable, with efficiencies similar to that of gas-engine CHP but much greater capital expenditure and no significant incentive schemes currently available.	All CHP systems except fuel cells require consideration of potential noise disturbance, however for gas-engine or stirling systems this can readily be reduced to acceptable levels using appropriate containerisation or housing. Air quality and particulates are not expected to be significant issues for gas-engine CHP systems for the proposed development. Low NOx systems are available if required.	A larger scale gas-fired CHP supplying a district heat network for the new development would contribute to meeting requirements in reserved matters applications but the location of energy centre and any flue would need consideration in light of the Parameter Plans.	**Low**
Tri-generation (Tri- gen) or combined cooling, heat and power (CCHP)	The process to generate heat and electricity also creates chilled water for cooling.	- There is no significant space-cooling demand in the proposed development, however, the demand from adjacent offsite uses is unknown.	- Modern absorption chillers can be relatively efficient however installation and operating costs can be relatively high.	- Minimal additional environmental considerations over and above the associated CHP systems which would be present.	Unless there are significant space cooling demands that are expected from offsite locations. This option has not been explored further.	**Low**
Solar photovoltaic panels (PV)	Photovoltaic panels installed either in arrays (large groups) or on buildings converting energy from sunlight into electricity.	- A PV array could potentially be installed on the roofs of buildings.	- There is insufficient space on the site for a ground-mounted PV array.	- The design and layout of PVs and relationship with proposed roof forms would need to be considered to ensure no adverse visual impacts	Individual PV arrays for houses and/or blocks of flats should be further considered as part of the mix of potential technologies that can meet requirements in reserved matters applications.	**High**
Solar thermal hot water (STHW)	Generation of hot water from the direct collection of energy from sunlight by solar panels.	Individual STHW arrays could be installed on the roofs of houses and/or blocks of flats, however in order to meet a 20% reduction in residual emissions a significant proportion (e.g. over 75%) of the annual hot water demand for each dwelling would need to be met with STHW (which is understood to be beyond the typical capabilities of these systems under normal economic sizing conditions). STHW could be supplemented with another such as solar PV, however there is then a potential issue of available roof space, additional complexity, additional maintenance burden, etc.	- STHW systems require a hot water storage tank to be installed, plus other ancillary equipment such as a circulating pump. These systems would require space in each property, albeit an allowance could potentially be made for this.	- There are no visual impact concerns for solar STHW	Unable to meet the 20% target reduction in emissions as a sole technology, and in the case of the proposed development it is not considered economically viable to combine this with another technology such as solar PV due to additional complexity and maintenance burden. This option has not been explored further.	**Low**
Wind turbines (WT) - small and large scale.	Wind turbines convert wind (kinetic energy) into electricity.	Domestic sized wind turbines could be installed directly onto roofs of dwellings. However there is likely to be local turbulence / poor average wind velocity due to residential and wooded area, making this option technically unfeasible. A large open location with high non-turbulent air flow is ideal for large wind turbines, so this technology is not considered to be feasible here.	- Planning regulations would restrict the development of large wind turbines, at this location and they are not suitable for residential areas.	- Visual impacts	Technically unfeasible due to anticipated local turbulence / poor average wind velocity. This option has not been explored further.	**Low**
Biomass boilers (Biomass)	Biomass technology involves the combustion of wood chips and pelletised fuel.	Domestic sized individual small-scale biomass boilers are not considered to be suitable for the houses in this development as this would require multiple individual deliveries of wood, plus multiple wood stores and separate small scale biomass boilers. Higher density buildings could potentially have a commercial sized biomass boiler serving communal space heating and hot water systems. Biomass boilers are considered technically feasible on a development-wide scale, which would enable this technology to serve both houses and flats. In this case the boiler and fuel store could be located in an energy centre.	- Access for regular fuel deliveries and fuel storage is a key consideration. Potentially high CO_2 savings if transport and air quality concerns are mitigated.	Biomass boilers can have a negative impact on local air quality due to particulate emissions, although flue heights could be designed to mitigate this. The energy centre and flue are considerations in terms of visual impact here.	The logistics of fuel delivery and negative visual impact of boiler flues make individual domestic-sized biomass boilers an unviable option. However, a district heat network fed by a biomass boiler either alone or supplementary to another LZC system such as gas-engine CHP is a potentially viable option and should be considered as part of the mix of potential technologies that can meet requirements in reserved matters applications.	**High**
Air source heat pumps (ASHPs)	Work by extracting (heating mode) or rejecting heat (cooling mode) into suitable air, aided by an electricity driven vapour compression cycle.	- Domestic sized ASHPs could be installed on individual dwellings, either on the roof or external wall, and can provide all space heating and hot water demands, the latter potentially being supplemented by an electric immersion heater for pasteurisation and occasional top-up purposes.		- Noise from ASHPs is a consideration, in particular when operating at or near to full load, however again with appropriate placement this can typically be overcome, and under	ASHPs appear potentially feasible and should be considered be further considered as part of the mix of potential technologies that can meet requirements in reserved matters applications.	**High**

Technology	Description	Technical feasibility	Financial / commercial factors	Environmental factor	Conclusion	Recommended as likely part of solutions to meet prevailing policy target reduction.
Air source heat pumps (ASHPs) [Continued]	Work by extracting (heating mode) or rejecting heat (cooling mode) into suitable air, aided by an electricity driven vapour compression cycle.	- For blocks of flats a communal space heating and hot water arrangement served by larger commercial-sized ASHPs is considered more appropriate, potentially with separate systems for each service.		normal operating conditions the noise levels are very low. - There may be some objections to the visual impact of ASHPs on each house, however with appropriate placement this can usually be strongly mitigated.		
Ground source heat pumps (GSHPs)	Work by extracting (heating mode) or rejecting heat (cooling mode) into ground / sink, aided by an electricity driven vapour compression cycle. Involves installing vertical or lateral loops of pipe in the ground at suitable locations.	A minimum land area of around 50-150m^2 per kW thermal load is typical for horizontal ground loops (dependent on whether 'slinky' or 'straight' pipe configuration is used), so on this basis at least ~150-300 m^2 per dwelling would be required. Ground loops should not be buried beneath buildings or structures, and supplementary electric immersion heaters would still be required in this case to provide for peak hot water demand. There is unlikely to be sufficient land area available for horizontal ground loops on the development. Vertical borehole collectors typically require around 30-50m^2 per borehole allowing adequate spacing to avoid thermal linkage, but deep boreholes could potentially be used to reduce the total number required to perhaps one or two per household. The feasibility and technical challenge of a vertical borehole array is also highly dependent on the geology of the location. Aside from the above issues, a ground source heat pump system of this nature might also need to be approached from a communal perspective, i.e. with a centralised energy centre and heat network, otherwise multiple separate ground loops or borehole arrays and heat pumps would be required. This introduces a further conflicting issue that efficient heat pump flow temperatures (i.e. to achieve high seasonal coefficient of performance in the heat pump system) are not generally suitable for a heat network, which requires sufficiently high flow temperatures to function efficiently and provide adequate temperature differential across the various heat exchangers and secondary / tertiary circuits.	Even if the land area and geological issues could be overcome, the marginal improvement in seasonal coefficient of performance over and above ASHPs is unlikely to arrant the substantial additional technical complexity and costs in this case. - Potential installation complexities with other buried services and/or geological considerations are an important issue for this technology, especially with the lack of available open space in the proposed development. Boreholes are substantially more expensive than ground loops (up to double the cost per kW thermal). Lack of many commercially viable large scale ground source heat pump arrays of this nature are known of at the present time.	- Noise and vibration during operation is not usually of concern for this technology.	Good, pending investigation of suitability from ground investigations. Useful combined with ASHP in local low T°C systems	**High**
Deep geothermal	Harnessing of heat at high temperatures (>100C°) and heating water	The location of the site is such that the site has slate bedrock overlying granite (the source of heat from the breakdown of radiogenic minerals) at depth. Trial hot rock projects in Cornwall (to date) have found cooling rates within granite problematic suggesting locations with cover of “insulating” slate bedrock may improve viability.	Significant likely uncertain cost and as yet unproven technology. May also require large area for heat exchange / turbines.	Potentially perceived to be similar to fracking.	Not considered further.	**Low**
Water source heat pumps (WSHPs)	Work by extracting (heating mode) or rejecting heat (cooling mode) into suitable water bodies, aided by an electricity driven vapour compression cycle.	- There is no suitable water source heat potential within close proximity to the site.	Reliant on decarbonisation of electricity grid for competitive CO_2 savings.	Environmental considerations can apply where natural water courses are used as the heat source. Minimal restrictions would apply if the heat source was an existing process. Noise and vibration are not usually of concern for this technology.	No available water source, so this technology has not been considered further here.	**Low**
Hydroelectric generation (Hydro)	Gravitational potential energy of water harnessed to turn turbines and create electricity.	There is no suitable water course within close proximity to the site for hydroelectric generation. While a watercourse is not available, a local closed circuit pumped storage hydroelectricity system may have been possible utilising former settling tanks (before they were demolished).	Any resource is likely to be of insufficient scale.	Environmental considerations apply to the use of existing water courses for hydroelectric power generation. Noise and vibration can also be an issue for these systems.	No available hydro power source, so this technology has not been considered further here.	**Low**
Anaerobic Digestion (AD)	Various biological feedstocks mixed and digested (by bacteria) to produce biogenic gas combusted and converted into heat/power.	There is currently no AD facility in the immediate local vicinity available to provide biomethane or biogas directly to the new development. Installing a scheme of this nature requires significant available land for digesters, vehicle movements, and a range of other ancillary plant, plus a ready and substantial supply of feedstock. The technology typically needs to be implemented at relatively large scale to be commercially viable. AD is not considered suitable for the proposed development.	Likely significant cost transporting suitable source of local feedstock.	- It is likely that there would be significant environmental considerations and restrictions associated with an AD facility in this location.	Large area of land required. Uncertain if readily available feedstock for a new AD facility to be produced.	**Low**

4.5 Off-site carbon reduction measures

4.5.1 Whilst delivering carbon reductions through off-site measures may be a less desirable consideration in the energy hierarchy for the site, there are factors such as the scale and location of the Proposed Development that justify consideration of the potential for off-site measures.

4.5.2 It would be expected that parts of the site would connect to any existing district / clean energy networks in the locality or, where there is a future network planned, to be designed to be capable of connection to that network.

4.5.3 No current residential district energy networks are known to be sufficiently close to the site that could be connected to.

4.6 Planned off-site systems

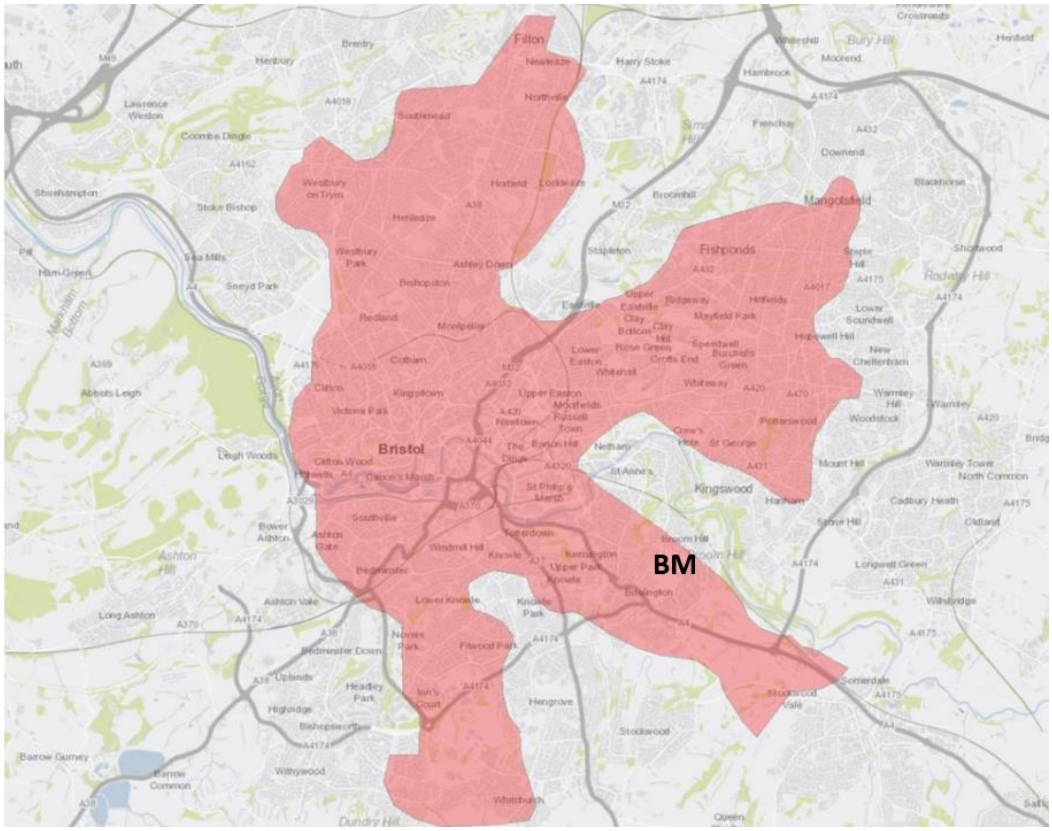
4.6.1 The Proposed Development is located within the Bristol heat priority area[10] (see Figure 4.1 below) and policy BCS14 requires that "within Heat Priority Areas (as identified in the Core Strategy), major developments should connect to existing heat networks where available. Where a network is not available major developments within Heat Priority Areas should incorporate infrastructure to connect to district heating networks in the future where feasible."

4.6.2 The approximate location of the site is marked with a "BM" on this figure.

4.6.3 It will be important for energy strategies developed in subsequent detailed planning application will need to investigate the potential presence and potential feasibility of connection to any nearby networks.

[10] See: https://www.energyservicebristol.co.uk/business/heat-networks/

Figure 4.1 Bristol Heat Priority Area.



4.7 Potential off-site district energy networks

4.7.1 The Proposed Development is currently constrained for future off-site connections due to highways and other features surrounding the site including protected hedgerows. The Proposed Development includes plans for greater pedestrian connectivity with the opportunity to develop new service corridors along these routes and could include consideration of a proposed energy upgrade to adjacent school buildings or manufacturing sites to the east.

4.7.2 Potential connection to such localities should be further explored at reserved matters stage as part of a mix of solutions that may meet requirements.

5 Sustainable design and construction

5.1.1 Brislington Meadows is classed as a 'Super Major' development due to its size (over 100 residential units). BCC's Climate Change and Sustainability Practice Note (July 2020) requires that all 'Super Major' schemes are reviewed against the BREEAM Communities scheme document. BREEAM Communities was developed for assessing large-scale mixed-use masterplans, particularly at outline planning stages.

5.1.2 As the scheme is at the lower threshold of 'Super Major' developments, and mainly for housing (not mixed use), a modified form of BREEAM Communities (a scoping exercise) has been undertaken, rather than formal assessment and that the principles contained with the technical manual are adopted. This assessment is indicative only. This is an approach that has been applied in other recent outline applications by and to BCC.

5.1.3 Detailed development proposals should target the following sustainability principles under the BREEAM methodology (**these do not represent commitments but features that will be expected to be considered as part of detailed design)**:

Health and Wellbeing

- Designing residences to have a good level of daylighting (where feasible);
- Designing residences to not overheat in summer months;
- Meeting the housing needs of local people, including the delivery of affordable homes;
- Improvements to circulation and connectivity to local services and facilities and elements that will promote walking and active travel;
- Delivering a significant amount of high quality, publicly accessible open space, despite the loss of some existing open space; and
- Improvements to access and security.

Land Use and Ecology

- Development will deliver 10% BNG through on and off site measures, strategy to be agreed at reserved matters stage with final calculation and following discussion with BCC
- Significant habitat retention on site
- Retain existing trees and landscape where possible. No loss of veteran tree proposed
- Incorporate the use of SUDs as part of the landscape
- Ensure compliance with measures for protecting wildlife and ecology during construction as set out in the Construction Environmental Management Plan

Pollution

5.1.4 Pollution can harm both the natural environment and the human environment and consequently can negatively influence the wellbeing of wildlife and humans. Best practice pollution prevention measures will be implemented throughout construction to reduce the potential negative impacts on water, and air, to minimise disturbance to the surrounding areas. In addition, the design of the building has been undertaken in a way which negates or reduces the impact of pollution:

Air Quality

5.1.5 The development will aim to reduce exposure to poor air quality, as well as reduce emissions from development, including during the demotion and construction phases. Comply with recommendations of air quality assessment and be designed to be 'air quality neutral' where practicable and minimise the generation of air pollution during construction (e.g. Minimise impacts using necessary mitigation measures relating to demolition, earthworks, construction, trackout, and non-road mobile machinery (NRMM), as appropriate)

Land Quality

5.1.6 Any existing land contamination will be assessed and remediated, as appropriate, prior to the commencement of construction activities on site.

Noise

5.1.7 The main sources of noise and vibration in the vicinity of the site are generated from

- Road traffic; and
- Plant and mechanical equipment.

5.1.8 Internal noise will be controlled to provide a comfortable environment for the desired use and if required, attenuation measures will be specified.

Light

5.1.9 Light pollution can result from any adverse effect of artificial lighting and includes the following:

- Glare – the uncomfortable brightness of a light source when viewed against a dark sky;
- 'Light trespass' – the spread of light spillage the boundary of the property on which a light is located; and
- 'Sky glow' – the orange glow seen around urban areas caused by a scattering of artificial light by dust particles and water droplets in the sky.

5.1.10 All external lighting for the site will be designed in line with current British Standards and ILP Guidelines.

Energy (note recommendations elsewhere in this report)

- Use of south-west facing pitched roof for solar PV panels to be integrated into the roof;
- Introducing "fabric first" and passive design principles to reduce carbon emissions; and
- Consideration of whole life and embodied carbon in construction.

Transport

5.1.11 The site is well situated for travel by active and sustainable modes given its proximity and access to public transport, good walking and cycling routes as well as all of the services and amenities the location can offer:

- Active travel prioritised with a number of new pedestrian and cycler routes and improved connections from the site to the surrounding area;
- Providing cycle storage spaces for all residential dwellings and additional spaces for visitors, to encourage sustainable and active transport use;
- A high number of public or sustainable transport options are available adjacent to the site;
- Provision of electric vehicle charging points; and
- Traffic calming measures proposed across the site and designed for 20mph limit.

Water

- Water efficient equipment such as low flow taps and dual flush toilets;
- Water meters fitted to monitor water consumption and detect leaks; and
- BR limit to encourage water efficiency and water use of no more than 110 litres per person per day;
- External planting will rely on manual watering, or precipitation only;
- Consider plumbed rainwater harvesting and other energy and water saving measures; and
- All areas of the development will connect to the public foul sewer network.

Sustainable Design and Construction (see statement elsewhere in report)

5.1.12 Passive design measures, including daylight access, natural ventilation and risk of overheating, and active design measures including building services, district or shared heating infrastructure and renewables are covered under the energy strategy sections of this report.

Materials

- Construction materials will be responsibly sourced where practicable and consider whole life / embodied impacts;
- The building will be designed to protect vulnerable and exposed parts of the building from damage;
- Roof material considered to blend and incorporate the PV panels to ensure visual impacts addressed;
- Use of natural materials within the landscape and public realm where possible;
- The BRE 'Green Guide to Specification' is proposed to be used when selecting the construction materials, to encourage the use of materials which have been produced with minimal impact to the environment in line with good-practice methodology. The Guide promotes the use of sustainable materials with low embodied energy, ecotoxicity and long-life span;
- Additionally, the materials selected will be responsibly sourced and where practicable meet the following guidelines:
    - ISO14001;
    - BES6001;

- PEFC / FSC;
- Chain of Custody.

Waste

- The new development aims to minimise waste throughout construction and also to reduce waste throughout operations by providing appropriate facilities, in accordance with good-practice principles. Throughout construction, the appointed contractor will make effort to minimise waste and, where possible, divert waste from landfill through reuse or recycling.
- Waste will be minimised throughout the construction phase through a framework site waste management plan.
- Throughout the operation of the development waste storage facilities will be provided for recyclable and non-recyclable waste. The design and size of these facilities will meet the requirements of BCC waste guidelines. The waste strategy has been designed to reduce walking distances to storage points and kept close to the roadside for waste transport vehicles.
- Waste will be segregated on-site into the main waste streams for recycling and collection purposes. The site will contain communal stores that include mini-recycling centres. The site will be actively managed by the management company to ensure that refuse is collected by the appropriate agencies and the refuse stores are kept clean and tidy.

Security

- The development has been designed in a manner which minimises the risk of crime. The site will be designed securely and seeks to ensure a safe working environment and ensure that the building is safe and accessible. The applicants as part of the detailed design phase will consider applying for Secured by Design certification.

6 Summary and conclusions

6.1.1 The proposed development at Brislington Meadows comprises development of up to 260 dwellings with pedestrian, cycle and vehicular access, cycle and car parking, public open space and associated infrastructure. The application is submitted in outline, with all matters reserved apart from access for which we are applying in detail. Detail relating to matters of appearance, layout, scale, and landscaping are reserved for future determination, known as the reserved matters stage.

6.1.2 The overarching vision is to create a sympathetically designed sustainable neighbourhood, located within Broomhill and in close proximity to existing services and amenities available. The landscape-led masterplan seeks to retain significant amount of open space on the site and public routes through the site, enhancing connection to Victory Park and Eastwood Farm, as well as access to the local centre itself to support existing services and encourage further investment. The Applicant is committed to delivering 30% affordable housing in line with policy requirements and will deliver a 10% net gain in biodiversity through on-site and off-site measures.

6.1.3 Kovia Consulting have been instructed to prepare an outline Sustainability and Energy Statement to demonstrate that the Proposed Development at the site contributes to sustainable development as well as addressing the challenges of climate change.

6.1.4 The Statement identifies the sustainable placemaking principles that have informed the current proposals and detailed parameter plans, as well as setting out future measures relating to sustainable design and construction that will need to be considered at reserved matters stage.

6.1.5 The measures set out in this Assessment demonstrate how the proposed development would be designed to comply with the relevant policies contained within the Bristol Local Plan and also current and any future Building Regulations targets as a minimum.

6.1.6 This statement confirms that the design undertaken for the Brislington Meadows at this outline stage will enable more detailed applications made at reserve matters stage to address, and potentially exceed the sustainability and energy requirements of the above policies with practical suggestions that are attractive to the market in order to secure the much-needed sustainable homes for Bristol.

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