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2026

Sustainability & Energy Statement

Land North of Camer Road, Meopham

Iceni Projects Limited on behalf of
The McManus Family

February 2026

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ON BEHALF OF THE
MCMANUS FAMILY

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Sustainability & Energy Statement

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1. EXECUTIVE SUMMARY

- 1.1 Icen Projects Ltd has been commissioned by The McManus Family to produce a Sustainability & Energy Statement to accompany the outline planning application for the proposed residential-led development of the Land North of Camer Road, Meopham.
- 1.2 This outline planning application proposes the provision of up to 725 homes, a new two-form entry primary school, a Local Centre, and public open space, alongside sport and recreation facilities, landscaping, parking and infrastructure.
- 1.3 Sustainability is a core consideration of the application and has been incorporated from the project outset. Energy and water efficiency have been maximised, whilst the production of waste and pollution is to be minimised, thus ensuring the impact of the proposals on its immediate surroundings and the environment as a whole is minimised.
- 1.4 Consideration has been given to Chapter 14 of the National Planning Policy Framework (NPPF), the Kent Design Guide, and the Gravesham Local Plan Core Strategy in the overall formulation of this strategy, with two key elements proposed for the approach to the Proposed Development's sustainability proposals, as follow:
- The overall development has been assessed using the Gravesham Local Plan Core Strategy to demonstrate that the proposed dwellings and buildings will maximise resource efficiency, minimise the generation of waste and pollution, and ensure the risk of flooding on-Site is mitigated during both construction and in operation, and to provide a scheme that meets the recommended standards of well-being for future residents, visitors and Site users; and
 - The carbon dioxide (CO₂) emissions reduction strategy for the proposals is based on the energy hierarchy to provide a rigorous methodology, which aims to reduce the carbon dioxide emissions from the development as far as possible. This is intended to be achieved through the employment of highly efficient building fabric components to reduce energy demand, and the potential inclusion of renewable technologies to deliver further carbon dioxide emissions reductions on-Site. It is anticipated that the proposed measures will deliver significant carbon dioxide emissions reductions, and ensure that the Proposed Development is future-proofed to achieve net-zero carbon emissions in operation in the future, subject to the ongoing decarbonisation of the national electricity grid. This is in exceedance of the current requirements set out within Gravesham Borough Council policies.
- 1.5 The outline nature of this application means that the strategies contained within this Statement will inform the detailed design of the Proposed Development, which will be determined at a later date as part of Reserved Matters applications.

1.6 The proposed strategy has been based around the objectives of the Kent Design Guide and the Gravesham Local Plan Core Strategy. In summary, based on this strategy, the Proposed Development will;

- make efficient use of land;
- promote the use of sustainable and active modes of transport;
- reduce the risk of flooding on-Site and in the surrounding area;
- minimise internal water consumption to 105 litres per person per day;
- embed circular economy principles to minimise waste, and incorporate low-impact materials, according to the BRE Green Guide to Specification;
- seek to minimise embodied carbon emissions;
- mitigate the risk of overheating;
- incorporate measures to improve Site biodiversity, including biodiverse planting;
- provide access to extensive areas of green and open space, as well as allotments and recreation facilities;
- ensure air, noise, ground, light and water pollution are minimised as far as possible;
- minimise energy demand through the specification of low u-values, high levels of air tightness, and the minimisation of thermal bridging to reduce heat loss;
- deliver fossil fuel-free dwellings, utilising electric-only systems to serve the space and water heating demands;
- deliver fossil-fuel free non-domestic buildings, where appropriate and feasible, utilising electric-only systems to serve the space and water heating demands and, where necessary and appropriate, the space cooling demands; and
- achieve a significant reduction in carbon dioxide emissions, following the Energy Hierarchy methodology, with the aim of achieving net-zero carbon emissions in the future, subject to the ongoing decarbonisation of the national electricity grid.

1.7 Overall, the proposals constitute sustainable development in accordance with national and local policy requirements and will provide a development that seeks to promote these principles in operation, throughout its lifetime.

2. INTRODUCTION

- 2.1 Icen Projects Ltd has been commissioned by The McManus Family to produce a Sustainability & Energy Statement to accompany the outline planning application for the proposed residential-led development of the Land North of Camer Road, Meopham.

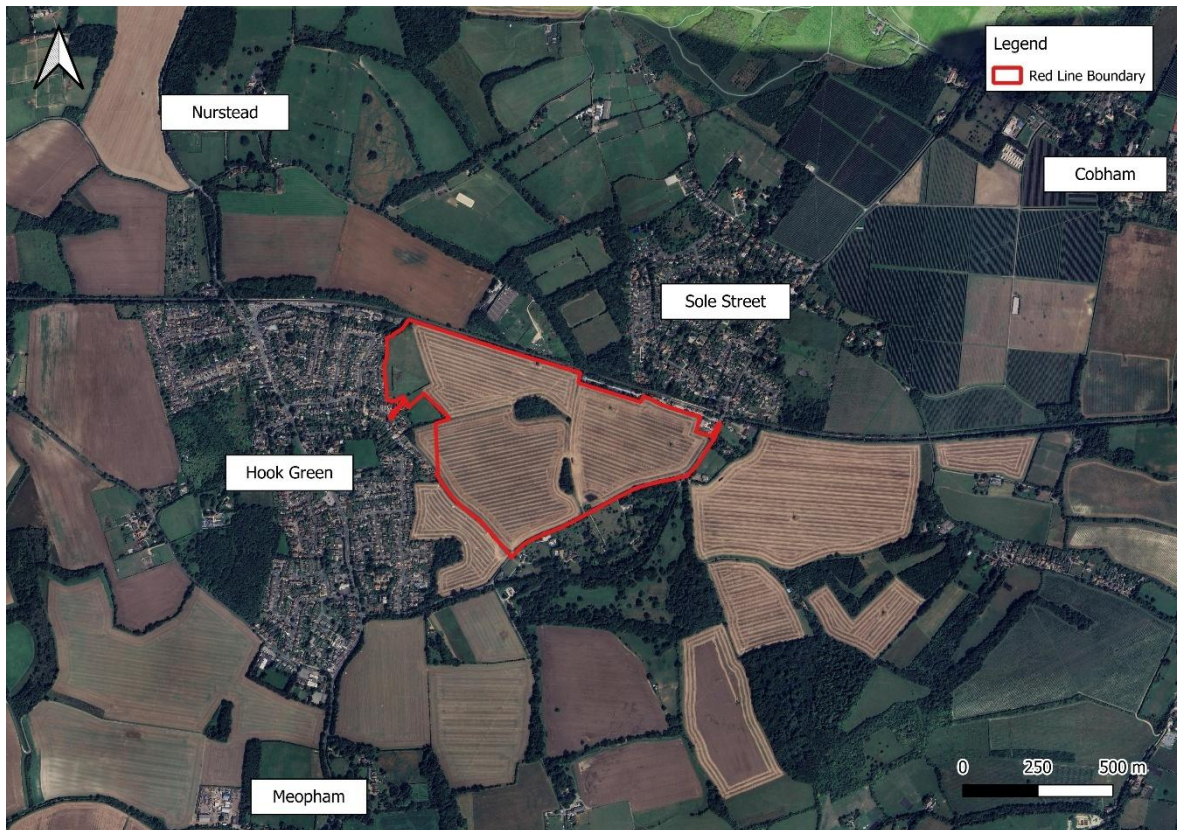
Report Objective

- 2.2 This document details the sustainable design and construction measures adopted by the Proposed Development and gives an overview of the design proposals that will ensure the development operates in a sustainable manner over the lifespan of the scheme. The Sustainability & Energy Statement report headlines will provide a framework for the project team to operate consistently within sustainability guidelines set out by Gravesham Borough Council.
- 2.3 The report is structured to meet these guidelines as follows:
- Section 3 discusses the planning context and policies which are relevant to sustainability;
 - Section 4 discusses the development response to the policy drivers for sustainability;
 - Section 5 sets out the development's energy strategy to minimise CO₂ emissions; and
 - Section 6 summarises the development's design response.

Site and Surroundings

- 2.4 The Site (Appendix A1) is located to the east of Hook Green/Meopham and to the southwest of Sole Street and comprises c.44ha of predominantly flat, readily developable land which is currently used to cultivate arable crop. Alongside the agricultural land, there are 6 acres of closely mown grass in the form of paddocks in the north-western corner of the Site, with an associated small stable block, and two (small) areas of woodland within the central portion of the Site, and a small agricultural building within the western section of the Site.
- 2.5 The Site is located outside the development boundary of both Sole Street and Hook Green/Meopham, and lies wholly within the Metropolitan Green Belt. The Site is bordered by a railway line to the north, Camer Road to the southeast, and Northwood Lane to the southwest. The northwestern boundary is marked by the rear gardens of the properties along Nursery Road, within the village of Hook Green/Meopham. Overall, the Site is well-contained and is bordered by defensible boundaries on all four sides.
- 2.6 The approximate Site location is shown in Figure 2.1 below.

Figure 2.1 Location of the Proposed Development



The Proposed Development

2.7 The description of development is as follows:

“Outline planning application for up to 725 dwellings (Use Class C3), a new two-form entry primary school (Use Class F1), a Local Centre (up to 500sqm of Class E floorspace), the provision of Public Open Space including sport and recreation facilities alongside associated access, landscaping, parking, and infrastructure; with all matters reserved except for access.”

2.8 The concept masterplan is shown in Figure 2.2 below, whilst the red line boundary of the Site is displayed in Appendix A1.

Figure 2.2 Concept Masterplan



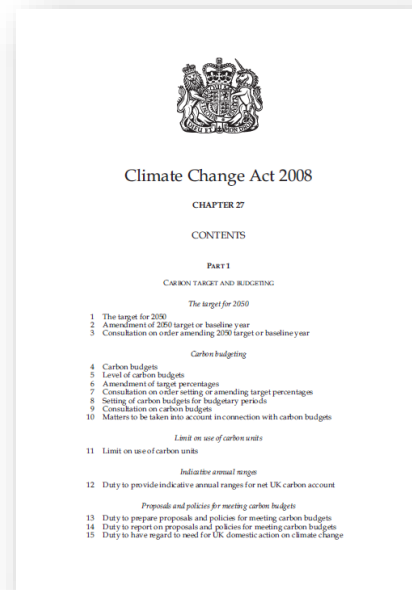
3. PLANNING POLICY FRAMEWORK

- 3.1 Built environment sustainability is incorporated within policy and regulation at a national and local level, as set out below.

National

Climate Change Act 2008 (November 2008)

- 3.2 On 26th November 2008, the UK Government published the Climate Change Act 2008; the world's first long-term legally binding framework to mitigate against climate change. Within this framework, the Act sets legally binding targets to increase greenhouse gas emission reductions through action in the UK and abroad from the 60% target set out in the Energy White Paper, to 80% by 2050.

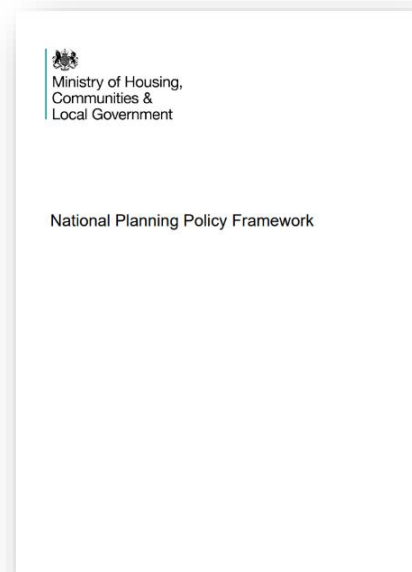


- 3.3 As required under Section 34 of the Climate Change Act, the Sixth Annual Carbon Budget was accepted by the Government in April 2021. This sets out a budget for UK emissions for the period 2033 – 2037.

- 3.4 Following a commitment in June 2019, the Climate Change Act has been amended to target net zero carbon emissions by 2050.

National Planning Policy Framework (December 2024)

- 3.5 The Ministry of Housing, Communities & Local Government determines national policies on different aspects of planning and the rules that govern the operation of the system. Accordingly, the National Planning Policy Framework (NPPF), which came into force in March 2012 and was updated in February 2019, aims to strengthen local decision making. Additional updates have since been made through the latter half of 2020 and in January and July 2021 to reflect changes related to use classes, permitted development rights, the calculation of housing need, and requirements to achieve beauty alongside sustainability. Further updates were



made in September and December 2023 with respect to onshore wind development, and beauty, design, infrastructure, neighbourhood and the environment, respectively. In December 2024, the NPPF was revised in response to reforms to the Framework, and consultations on other changes to the planning system.

- 3.6 Paragraphs 10 and 11 of the NPPF confirm that at the heart of this document is a “*presumption in favour of sustainable development*”, and that development proposals that accord with an up-to-date development plan should be approved without delay.
- 3.7 Paragraph 7 states that 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.
- 3.8 Achieving sustainable development means that the planning system has three overarching activities, which are interdependent and need to be pursued in mutually supportive ways, so that opportunities can be taken to secure net gains across each of the different objectives:
- **An Economic Role** – ensuring the provision of land and infrastructure needed to help build a *strong, responsive and competitive economy*.
 - **A Social Role** – supplying the required amount of housing while at the same time ensuring and building *strong, vibrant and healthy communities*. Ensuring that the built environment is sited around accessible local services which help support a community’s *health, social and cultural well-being*.
 - **An Environmental Role** – ensuring development contributes to the protection and enhancement of the *natural, built and historic environment* through the improvement of biodiversity, minimising the use of natural resources and production of pollution/waste, and guaranteeing sufficient adaptation to climate change.

Future Homes Standard (March 2019)

- 3.9 Within the Spring Statement 2019, the Chancellor announced the future introduction of the Future Homes Standard. The Standard will mandate the end of fossil fuel heating systems in new homes from 2026 and target “world-leading levels of energy efficiency”. In doing this, the Standard aims to utilise green technology to reduce environmental impacts, as well as reducing consumer energy bills.

- 3.10 This Standard is expected to build on the Prime Minister’s Clean Growth Grand Challenge mission, which aims to at least halve the energy usage of new build properties by 2030. It also looks to halve the costs of renovating existing buildings to achieve a similar standard of energy efficiency as new buildings, whilst improving their quality and safety.



Future Buildings Standard (January 2021)

- 3.11 On 19th January 2021, the government announced the future introduction of the Future Buildings Standard. The Standard will deliver new non-domestic buildings that are zero-carbon ready from 2026 onward, which use low-carbon heat, and which have the best fabric standards possible. As the electricity grid continues to decarbonise, buildings built to the Standard will become net zero carbon over time, with no need for further energy efficiency retrofit work as they will not rely on fossil fuels for heating and hot water.

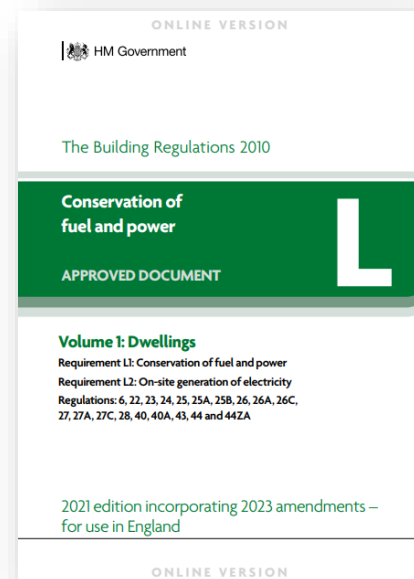
- 3.12 This Standard is expected to build on the Prime Minister’s Clean Growth Grand Challenge missions, which aims to at least halve the energy usage of new buildings by 2030. It also looks to halve the costs of renovating existing buildings to achieve a similar standard of energy efficiency as new buildings, whilst improving their quality and safety.



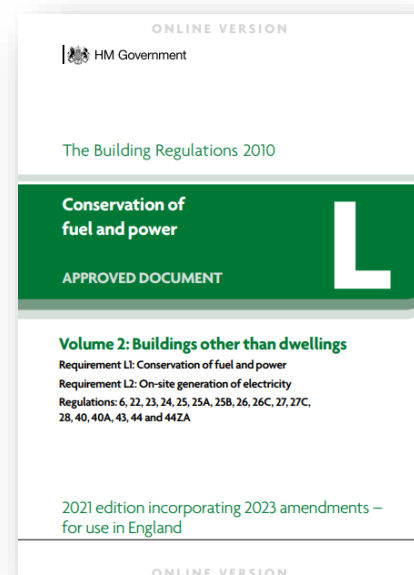
Part L:2021 of the Building Regulations (June 2022)

- 3.13 Part L of the Building Regulations relates to the conservation of fuel and power, and applies to both new and existing buildings. The current edition covers the energy efficiency requirements of the building regulations as set out in Part L of Schedule 1 to the Building Regulations. Technical guidance is contained in two Part L Approved Documents.
- 3.14 Considering the Proposed Development includes domestic and non-domestic land uses, the documents of relevance to the Proposed Development include:

- **Approved Document L Volume 1: Dwellings.** This provides the methodology for new build, domestic buildings to meet current energy efficiency standards, including backstop U-values, carbon dioxide emissions calculations and minimising the risk of overheating. Carbon dioxide emissions reductions are prescribed for 'regulated' emissions only, and relate to heating, hot water, lighting, auxiliary and cooling (where specified) . Emissions from domestic appliances (cooking, for example) are considered to be unregulated emissions, and are excluded from the analysis.



- **Approved Document L Volume 2: Buildings other than dwellings.** This provides the methodology for new build, non-domestic buildings to meet current energy efficiency standards, including backstop U-values, carbon dioxide emissions calculations and minimising the risk of overheating. Carbon dioxide emissions reductions are prescribed for 'regulated' emissions only, and relate to heating, hot water, lighting, auxiliary and cooling (where specified). Emissions from other equipment (computers, for example) are considered to be unregulated emissions, and are excluded from the analysis.



Regional

The Kent Design Guide

3.15 The Kent Design Guide (2020) provides a number of design principles that aim to deliver high quality new development across Kent. It states that good design adds environmental, economic, social and cultural value. The Guide provides the criteria necessary for assessing planning applications, and covers a number of design principles, including mixing uses, designing for movement and environmentally sustainable design. Under the subheadings of 'Environmentally Sustainable Design' and 'Utilities & Energy' the following guidance is provided:



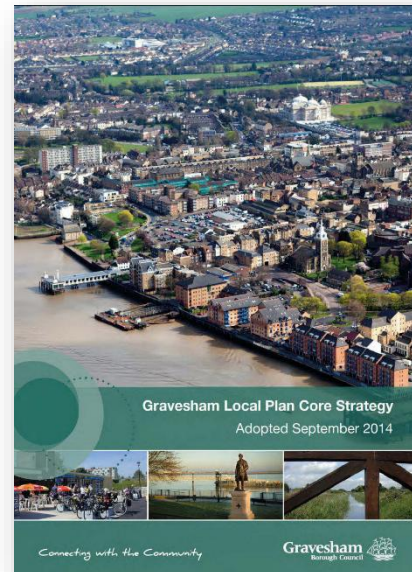
- The South East England Development Agency (SEEDA) checklist is noted as a useful resource for identifying good practice with respect to environmental, social and economic impacts;
- The key themes set out in DEFRA's 'Building a Better Quality of Life', which include lean construction and conserve water resources, are also put forward for consideration during the design and construction of developments;
- The topics that should be covered within an assessment of a development's environmental performance are listed, including the use of renewable energy, an indication of how the proposals will encourage the use of sustainable modes of transport, and how waste will be minimised both in construction and operation;
- It is highlighted that sustainability mechanisms should be put in place with respect to the durability of construction, and the care and management of planting and amenity space;
- Measures that may be incorporated within designs to ensure adaptability over time are also set out for consideration, for example the configuration of rooms so that internal uses and circulation can be easily changes, and delivering design that would allow for future extension if needed; and
- Under the 'Utilities & Energy' section of the Guide, a number of principles are set out to aid in achieving high levels of energy efficiency and mechanical energy savings. Guidance is also provided with respect to the provision of renewable technologies, and measures that may be embedded to aid the conservation of water.

Local

Gravesham Local Plan Core Strategy (September 2014)

3.16 The Gravesham Local Plan Core Strategy (2014) is used to help shape the future of the Borough, and to determine individual planning applications. The Core Strategy is the overarching strategic document, and outlines the strategic objectives for the Borough based on the characteristics of the area and the key issues to be addressed. The following policies are considered of great relevance to this proposal:

- **Policy CS01: Sustainable Development** states that planning applications that accord with the policies in the development plan for Gravesham will be approved without delay, unless material considerations indicate otherwise.



When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework and in this Core Strategy. It will work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise, taking into account whether:

- Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or
 - Specific policies in that Framework indicate that development should be restricted.
- **Policy CS11: Transport** states that new developments should mitigate their impact on the highway and public transport networks as required. As appropriate, transport assessments and travel plans should be provided and implemented to ensure the delivery of travel choice and sustainable opportunities for travel. Transport assessment work is required to be undertaken in accordance with national and local policy guidance, and to identify detailed highway and public transport network requirements and management arising from the development.

Sufficient parking in new development will be provided in accordance with adopted parking standard which will reflect the availability of alternative means of transport and accessibility to services and facilities.

The Council will support proposals which improve public transport provision and facilities in the Borough. In particular, it will:

- seek to maintain and expand, where justified, segregation lanes for Fastrack and existing bus priority measures elsewhere;
- require Key Sites to include provision for buses;
- support the development of transport hubs at Gravesend Town Centre and Ebbsfleet (in Dartford Borough Council area) to provide high quality interchange facilities between bus, rail, walking and cycling; and
- ensure an adequate supply of public car parking.

The Council will seek improvements to walking and cycling facilities and networks in the Borough including provision in new development as appropriate. These should provide improved access to Gravesend Town Centre and Ebbsfleet and to other services and facilities in the Borough. In particular, the Council will seek the provision of pedestrian and cycle links between Northfleet and Ebbsfleet stations and along the River Thames, as part of the proposed Thames Estuary Path.

Land required for the possible future extension of Crossrail and to protect the High Speed 1 (HS1) railway is safeguarded on the Policies Map and proposals that would prejudice these will be refused.

The Council will support proposals which improve the efficiency of freight transport and provide opportunities for alternatives to road transport where possible. The Council will safeguard wharves, as shown on the Policies Map, subject to the provisions of paragraph 5.1.36 of Policy CS07 (Economy, Employment and Skills).

The Council will support proposals which facilitate the use of the River Thames for passenger transport and enable cruise liners to visit the Borough.

- **Policy CS12: Green Infrastructure** states a multifunctional linked network of green spaces, footpaths, cycle routes and wildlife stepping stones and corridors will be created, protected, enhanced and maintained. The network will improve access within the urban area, from the urban area to the rural area and along the River Thames.

Sites designated for their biodiversity value will be protected, with the highest level of protection given to internationally designated Special Protection Areas, Special Areas of Conservation and

Ramsar sites, followed by nationally designated Sites of Special Scientific Interest, followed by Local Wildlife Sites and then by other areas of more local importance for biodiversity.

There will be no net loss of biodiversity in the Borough, and opportunities to enhance, restore, re-create and maintain habitats will be sought, in particular within the Biodiversity Opportunity Areas shown on the Strategic Green Infrastructure Network map and within new development.

Where a negative impact on protected or priority habitats/species cannot be avoided on development sites and where the importance of the development is considered to outweigh the biodiversity impact, compensatory provision will be required either elsewhere on the site or off-site, including measures for ongoing maintenance.

The overall landscape character and valued landscapes will be conserved, restored and enhanced. The greatest weight will be given to the conservation and enhancement of the landscape and natural beauty of the Kent Downs Area of Outstanding Natural Beauty and its setting. Proposals will take account of the Kent Downs Area of Outstanding Natural Beauty Management Plan, the Gravesham Landscape Character Assessment, and the Cluster Studies where relevant.

- **Policy CS18: Climate Change** states that all:

Flood Risk

With the exception of the previously developed sites along the Thames Riverside and those other regeneration sites which have already been evaluated in accordance with the sequential and exception tests at the application stage, development will be directed sequentially to those areas at least risk of flooding.

Proposals in areas at risk of flooding must be accompanied by a Flood Risk Assessment (in accordance with national policy and Environment Agency standing guidance as appropriate) and a Flood Risk Management Plan (if required) to demonstrate that they are adequately defended and safe over their lifetime. Planning permission will be refused for schemes which do not pass the sequential and exception tests.

The Council will prioritise the maintenance, improvement or replacement of flood defence infrastructure over other land uses where relevant. In addition to meeting their own flood defence and management needs, the Council will expect new development to take advantage of opportunities to reduce the causes and impacts of flooding from all sources where it is technically and financially feasible.

Water Quality

As part of its approach to climate change and environmental improvement, the Council will have regard to the delivery of the Water Framework Directive and associated Thames River Basin

Management Plan objectives to support water bodies being progressively improved to “good” status over the plan period.

Sustainable Drainage and Surface Water Run-Off

The Council will seek to minimise the impact of drainage from new development on waste water systems. In particular, the Council will:

- Require that surface water run-off from all new development has, as a minimum, no greater adverse impact than the existing use; and
- Require the use of Sustainable Drainage Systems on all developments where technically and financially feasible.

Water Demand Management

The Council will seek to manage the supply of water in the Borough and reduce the impact of new development on the supply of potable water as much as possible. In particular, the Council will:

- Require all new homes to be built to at least level 3/4 of the Code for Sustainable Homes in terms of water use (105 litres per person per day consumption). Where it can be demonstrated that a development is unable to meet these standards, or the additional standards set out below, permission will only be granted if provision is made for compensatory water savings elsewhere in the Borough;
- Seek 5% of homes on Key Sites to act as exemplars by meeting level 5/6 of the Code for Sustainable Homes in terms of water use (80 litres per person per day consumption);
- Require all non-residential developments of 1,000 sq m and above to meet the BREEAM “excellent” standards of water efficiency and include provision for the collection of rainwater; and
- Support proposals to retrofit existing residential properties in ways which reduce water consumption.

Carbon Reduction

The Council will seek to reduce the overall carbon footprint of the Borough. In particular, the Council will:

- In the context of national policy on the transition to zero carbon development via amendments to Part L of the Building Regulations, require proposals for development of the Key Sites throughout the Borough and other major development elsewhere in the Gravesend Town Centre Opportunity Area to consider the potential and include proposals for low carbon and renewable energy generation, including combined heat and power. Where choosing not

to do so, applicants must submit evidence which demonstrates that compliance is not technically or financially feasible or that improved fabric energy efficiency or an allowable solution results in improved carbon saving benefits;

- Support stand-alone decentralised, renewable or low carbon energy development where it is compatible with national policies for protecting the Green Belt and where it accords with policies in this plan, in particular those relating to Development and Design Principles, Transport, Green Infrastructure, and Heritage and the Historic Environment; and
- Support other proposals which lead to a reduction in carbon footprint including the retrofitting of existing homes and businesses, including local initiatives based on carbon off-setting via allowable solution.
- **Policy CS19: Development and Design Principles** states that new development will be visually attractive, fit for purpose and locally distinctive. It will conserve and enhance the character of the local built, historic and natural environment, integrate well with the surrounding local area and meet anti-crime standards. The design and construction of new development will incorporate sustainable construction standards and techniques, be adaptable to reflect changing lifestyles, and be resilient to the effects of climate change. This will be achieved through the criteria set out below:
 - Using the collaborative approach advocated in Building for Life 12 and in line with the guidance set out in Kent Design, the design, layout and form of new development will be derived from a robust analysis of local context and character and will make a positive contribution to the street scene, the quality of the public realm and the character of the area. Account will be taken of the scale, height, building lines, layout, materials and other architectural features of adjoining buildings. Account will also be taken of the wider site context, including strategic views, site topography, the significance of heritage assets and features of townscape and landscape value which contribute to local character and sense of place;
 - New development will encourage sustainable living and choice through a mix of compatible uses which are well connected to places that people want to use, including the public transport network, local services and community facilities; encourage sustainable travel; enhance Green Grid links and encourage healthier lifestyles;
 - New development will be located, designed and constructed to:
 - safeguard the amenity, including privacy, daylight and sunlight, of its occupants and those of neighbouring properties and land;
 - avoid adverse environmental impacts from pollution, including noise, air, odour and light pollution, and land contamination; and

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- not pose an unacceptable risk or harm to the water environment, including the quality and/or quantity of ground waters, surface waters, wetlands and coastal water systems;
 - The design and layout of new residential development, including conversions, will accord with the adopted Residential Layout Guidelines;
 - New development will be designed in an inclusive way to be accessible to all members of the community;
 - New development will provide appropriate levels of private and public amenity space;
 - New development will include details of appropriate hard and soft landscaping, public art, street furniture, lighting and signage and will ensure that public realm and open spaces are well planned, appropriately detailed and maintained so they endure;
 - Car parking will be well related to the development it serves;
 - New development will protect and, where opportunities arise, enhance biodiversity and the Borough's Green Infrastructure network. Support will be given to environmental enhancements where opportunities arise;
 - New development will be fit for purpose and adaptable to allow changes to be made to meet the needs of users;
 - The design and layout of new development will take advantage of opportunities to build in resilience to the effects of climate change. This will include protection against flood risk, where relevant, delivering carbon reduction, provision for low carbon and renewable energy, and minimising energy consumption and water use;
 - New development will incorporate appropriate facilities for the storage and recycling of waste; and
 - The layout of new development will create a safe and secure environment and provide surveillance to minimise opportunities for crime and vandalism.

Other Considerations

Declaration of a Climate Emergency (June 2019)

3.17 In June 2019, Gravesham Borough Council declared a Climate Emergency. In doing so, the Council pledged to take action to achieve carbon neutrality by 2030. The following motion called on the full Council to:

- Declare a climate emergency;

- Pledge to do what is within its powers and resources to make Gravesham Borough Council carbon neutral by 2030, taking into account both production and consumption emissions;
- Call on Westminster to provide the powers and resources to make the 2030 target possible;
- Continue to work with partners across the county and region to deliver this new goal through all relevant strategies;
- Investigate all possible sources of external funding and match-funding to support this commitment;
- Complete a Green audit of all council services to ensure that weight is given to the environmental and sustainability impact as well as cost;
- The Council will encourage plastic-free initiatives and support events intended to promote plastic reduction in the Borough; and
- Set up a working group to report back within six months with the actions the council will take to address this emergency.

Gravesham Borough Council Climate Change Strategy 2022 – 2030 (December 2022)

3.18 The Gravesham Borough Council Climate Change Strategy 2022 – 2030 sets out the Council's approach to taking action against its own emissions, as well as to supporting communities within the Borough to also reduce their emissions and carbon footprint.



3.19 The Strategy sets out the baseline emissions for Gravesham Borough, before going on to set out a number of strategic development and priorities. A number of areas for action are then identified, including the following:

- For Gravesham Borough Council – the Organisation:
 - Educate all council Members and officers on Climate Change so that they are able to have an awareness of the carbon dioxide costs and impacts of everyday activities, and the ability and motivation to reduce emissions, on an individual, community and organisational basis.
 - Develop and implement a programme of targeted carbon reduction projects on the remaining operational assets held by the council, focusing on energy source, energy use reduction and 'fabric-first' measures.
 - Design and implement a fleet replacement programme intended to deliver decarbonisation of the fleet by 2030, focusing on small and medium size petrol and diesel vehicles from 2022.

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- For Gravesham Borough Council – the Housing Provider:
 - Implement a GBC resident engagement strategy around Climate Change.
 - Ensure that all projects to deliver new council-owned housing target the achievement of net zero standards and include provision for electric vehicle charging.
 - Reduce the amount of waste generated by the service and tenants that is sent to landfill with the intention to increase recycling rates.
 - For Gravesham Borough Council – the Community Leader:
 - Work with partners to promote and deliver initiatives to enable local residents to improve the efficiency of their homes. Inform and support local residents to reduce their own energy usage and consider renewable energy sources.
 - Develop electric vehicle charging infrastructure across the borough, both for resident, business and general public use.
 - Continue to develop innovative and sustainable waste management solutions and opportunities for waste recycling and disposal.

3.20 The Strategy also sets out the actions to be taken by the Council with respect to engagement with the community and relevant partners, in addition to the approach that will be taken to work across the wider Kent area and Medway. It is noted within the Strategy that the Council will provide an Annual Report in December each year to report back to the community on progress that has taken place in the previous year on its Climate Change commitments; this will be published on the Council's website.

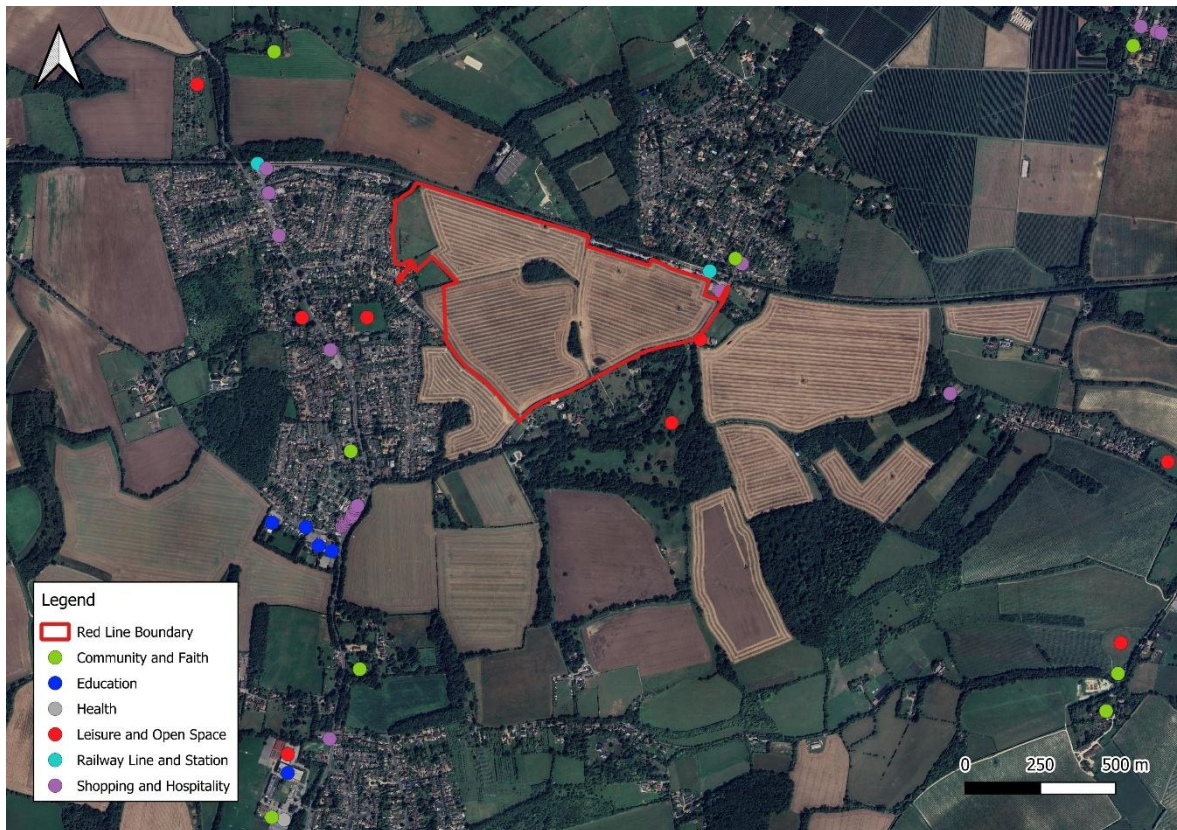
4. SUSTAINABILITY STATEMENT

- 4.1 The Sustainability & Energy Statement for the Proposed Development is divided into two main parts.
- 4.2 The sustainability strategy for the Proposed Development has been assessed in line with the guidance set out within the Gravesham Local Plan Core Strategy and the Kent Design Guide. This enables a holistic sustainability approach for the Proposed Development. The Gravesham Local Plan Core Strategy requires that all new development provides high quality and inclusive design, sustainability, layout and materials, and therefore represents best practice guidance to meet high standards of sustainable design and construction.
- 4.3 The carbon dioxide (CO₂) emissions reduction strategy for the proposed buildings to be delivered as part of the development is based on the energy hierarchy to provide a rigorous methodology, which maximises cost-effective opportunities for emissions reduction, as detailed in Section 5.
- 4.4 In line with the guidance detailed within the Gravesham Local Plan Core Strategy, as well as the Kent Design Guide, the sustainability features of the Proposed Development are outlined in this section. The principles set out within the Royal Institute of British Architects (RIBA) Sustainable Outcomes Guide have been used to inform this Sustainability and Energy Statement. By doing this, the use of this Sustainability and Energy Statement to guide the continued detailed design of the Proposed Development will aid in the achievement of a high level of sustainability, and will help to minimise the environmental impact of the Proposed Development, both during its construction and operation.

Making Effective Use of Land

- 4.5 The Site currently comprises open, undeveloped agricultural land. Figure 4.1 below shows the location of the Site with respect to its surroundings.

Figure 4.1 Location of the Proposed Development



- 4.6 As demonstrated in Figure 4.1 above, the Site is located to the east of the existing settlement of Hook Green and at the southwestern edge of Sole Street, with the northern boundary of the Site formed by the Medway railway line. The Site is located within proximity to a number of existing services, facilities and amenities, both within Hook Green to the west and Sole Street to the northeast, and a number of other settlements present within the surroundings, including Meopham and Cobham.
- 4.7 Sole Street railway station is located at the northeastern corner of the Site, whilst Meopham railway station is located approximately 600m to the west of the northwestern corner of the Site. These stations provide access from the area to a number of destinations within Kent, including Ramsgate, Dover and Gillingham, as well as to central London.
- 4.8 Despite the fact that the Site currently comprises arable land, it is considered that the Proposed Development makes effective use of land, as it will deliver new homes and land for educational uses, in addition to extensive areas of publicly accessible open space, within a highly sustainable location.

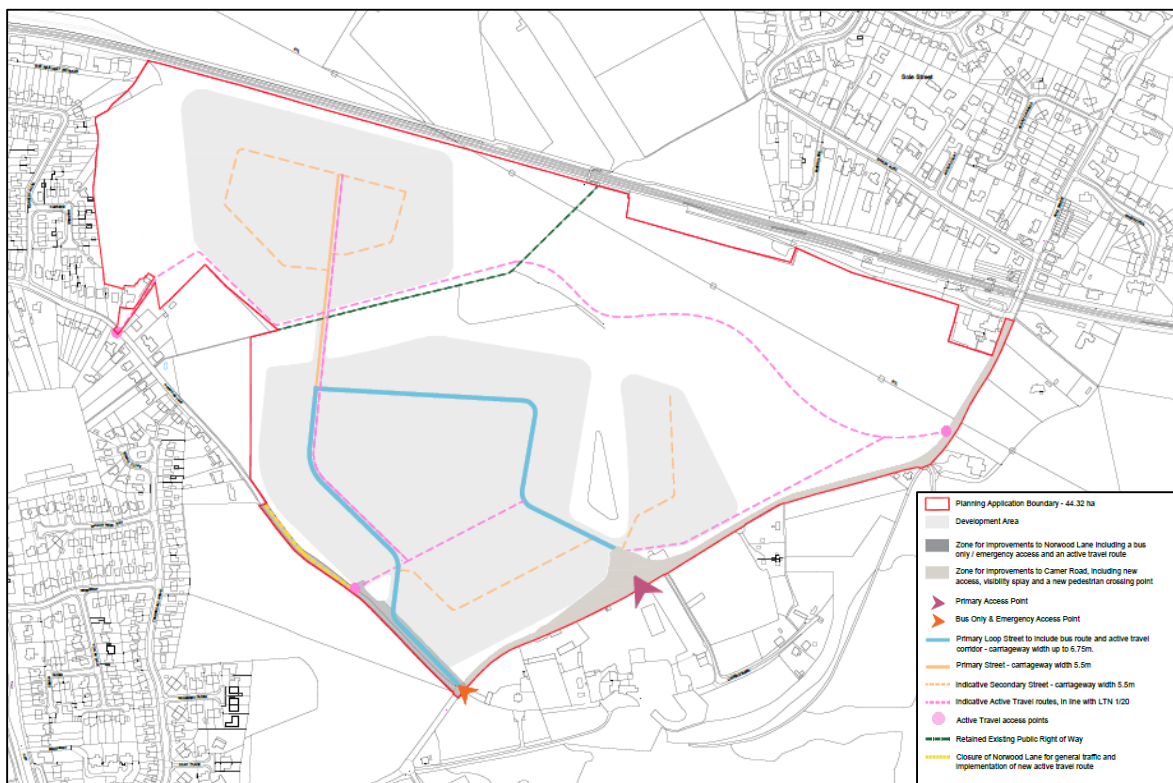
Accessibility and Sustainable Transport

- 4.9 Accessibility to public transport connections and active travel modes contributes to the sustainability of a site's location.

-
- 4.10 As detailed above, Sole Street Railway Station is located at the northeastern corner of the Site, whilst Meopham Railway Station is located approximately 600m to the west of the northwestern corner of the Site. These stations provide access to destinations including Ramsgate, Dover, Gillingham and London Victoria, via southeastern services.
- 4.11 The nearest bus stops are located on Camer Road, in proximity to Sole Street Railway Station to the northeast of the Site. These bus stops provide access to destinations including Rochester and Gravesend via the 311, 416 and 695 services. Additional bus stops are located approximately 1km to the west of the Site on Wrotham Road (A227). These stops provide access to the following services:
- Route 34, which runs on school days only, between Meopham and Wilmington.
 - Route 223, which runs on school days only, between Gravesend and Tonbridge.
 - Route 305, which runs twice per day on weekdays, between Vigo and Gravesend.
 - Route 306, which runs on school days only, between Vigo and Gravesend.
 - Route 308, which runs between Gravesend and Sevenoaks. Services are provided approximately every 90 minutes on weekdays and Saturdays.
 - Route 416, which runs between Meopham and Gravesend. Services are provided approximately every 90 minutes on weekdays, with three services provided on Saturdays.
 - Route 418R, which runs on school days only, between New Ash Green and Wrotham.
 - Route 418W, which runs on school days only, between New Ash Green and Wrotham School.
 - Route 695, which runs on school days only, between Istead Rise and Rochester.
 - Route M1, which runs on school days only, between Kings Farm and Meopham.
 - Route VIG01, which runs on school days only, between Vigo and Gravesend Grammar School.
- 4.12 Active travel has been prioritised in the design of the Proposed Development, with the aim of encouraging future residents and Site users to preferentially use sustainable modes of travel. The key components of movement and travel that have been embedded are as follows and summarised in Figure 4.2, below:
- Provision of a primary school, Local Centre and amenities as part of the Proposed Development, allowing for the internalisation of travel, and therefore reducing the need to travel outside of the Site;
-

- Introduction of a main active travel route that follows the proposed Primary Bus Loop and Primary Street, designed as a tree-lined corridor that supports wayfinding and legibility. From the primary loop, a network of pedestrian and cycle routes will extend into the Site, providing a safe and comfortable environment for walking and cycling;
- Incorporation of shared surface areas to prioritise pedestrian and cycle movements, and which encourage safe, low-speed movements of vehicles;
- Provision of a network of pedestrian and cycle links extending throughout the Site, offering direct connections to leisure routes within open spaces and improving access to green infrastructure; and
- Retention and enhancement of the existing Public Right of Way (PRoW) present within the Site, to integrate with the new movement framework.

Figure 4.2 Movement and Access Parameter Plan



4.13 Further measures to reduce the need to travel via private means reliant on the combustion of fossil fuels have been incorporated within the design of the Proposed Development, including:

- Design of the internal layout of the Proposed Development to accommodate bus movements, with the aspiration to loop existing services into the Site in the future, subject to discussions with bus operators. This would create sustainable connections between the Proposed Development and the wider area;

-
- Integration of high-quality broadband and communications infrastructure, which will enable access to employment, services and amenities without the need to travel;
 - Delivery of key facilities within the Proposed Development, such as a local centre, enabling future residents and Site users to meet their day-to-day needs within walking or cycling distance from their homes or places of employment;
 - Provision of employment opportunities within the Proposed Development, including within the local centre, presenting opportunities for future residents and those in the surrounding area; and
 - Provision of electric vehicle (EV) charging points and associated infrastructure for both the proposed dwellings and non-domestic buildings.

- 4.14 Through the incorporation of the measures above, a cohesive and extensive transport network that encourages the use of travel means other than private cars will be delivered. This will ensure cohesion between the Proposed Development and the existing communities in the wider Meopham area and beyond.

Reducing Flood Risk and Surface Water Run-off

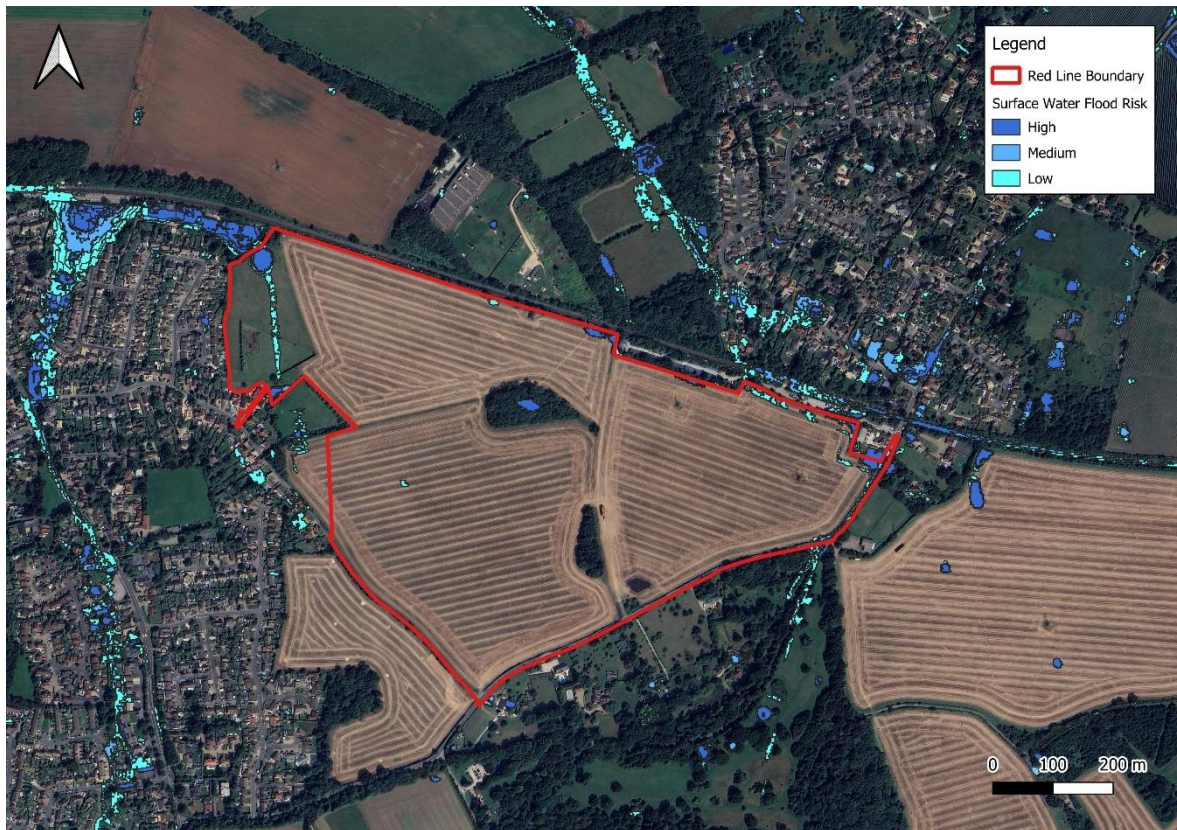
- 4.15 As detailed within the Flood Risk Assessment, prepared by GTA Civils and Transport, no watercourses are present within the vicinity of the Site. The catchment within which the Site is located ultimately drains to the River Thames at Ebbsfleet, however it is noted that the railway cutting present to the northeast of the Site has the potential to divert overland runoff eastwards towards the River Medway catchment. As a result, and as shown in Figure 4.3 below, the Site is located wholly within Flood Zone 1. This indicates that there is a less than 1 in 1,000 (0.1%) chance of flooding from rivers or the sea per year.

Figure 4.3 Flood Zones



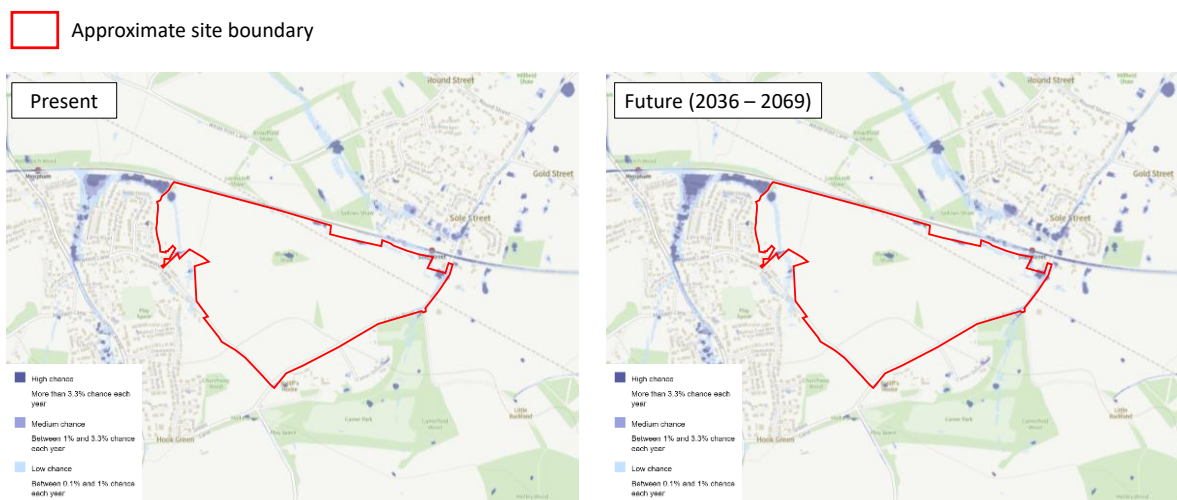
- 4.16 As shown in Figure 4.4 below, the vast majority of the Site is at very low risk of flooding from surface water sources. Small, isolated spots within the Site are shown to be at high (>3.3%) chance flooding from this source each year, whilst an area along the eastern boundary which is demonstrated to be at medium (1.0% to 3.3%) chance of flooding indicates the presence of a potential flow path along Camer Road towards Sole Street. An additional potential pathway, indicated by an area that is at low (0.1% to 1.0%) risk of flooding from surface water sources, is present in the western area of the Site, between Norwood Lane and the Railway Sidings.

Figure 4.4 Risk of Surface Water Flooding



- 4.17 Figure 4.5 shows the extent of surface water flooding within the site boundaries in the present day, and that projected in the future for the period 2040 to 2060. This indicates that the risk of surface water flooding within the Site will remain largely as per the present day scenario in the future.

Figure 4.5 Risk of Surface Water Flooding in the Present (left) and Future (right)



- 4.18 The built form of the Proposed Development will be located outside of the areas demonstrated to be at risk of surface water flooding. To ensure the risk of damage to properties associated with surface water flooding is sufficiently mitigated, it is proposed that the finish floor levels (FFLs) of the buildings

to be brought forward as part of the Proposed Development be set at a minimum of 150mm above the ground level.

4.19 To further ensure the risk of surface water flooding is reduced as far as possible, a Site-wide Surface Water Management System (SWMS) will be implemented. The aim of the SWMS is to manage surface water run-off from the Proposed Development, to therefore minimise the risk of flooding both on the Site, and in the surrounding area. Areas within the Proposed Development have been designated for the storage of surface water during extreme rainfall events. These areas form part of the wider SWMS, which will include sustainable urban drainage system (SuDS) features such as:

- Areas of permeable paving;
- Grassed swales with pocket wetlands; and
- Infiltration basins.

4.20 As detailed within the Flood Risk Assessment, the SWMS has been designed to capture rain falling as close to source as possible, up to and including a 1 in 100 year return period event including an allowance for climate change. It is intended that surface water generated on the Site in the post-development context infiltrate directly to the ground, which will ensure the existing greenfield runoff rate is maintained post-development. This will be achieved by slowing the flow of water across the Proposed Development, and by attenuating surface water runoff prior to its infiltration to the ground.

4.21 With respect to groundwater, information contained within the Flood Risk Assessment indicates that the underlying geology of the area within which the Site is located generally results in 'high' vulnerability to groundwater flooding, and 'medium – high' vulnerability where Head deposits are present. Groundwater monitoring undertaken at the Site indicated fairly constant groundwater levels over a four week period, with water recorded between 4.6 and 4.8m below ground level (bgl). However, mapping contained within the Gravesham Strategic Flood Risk Assessment (SFRA) indicates that the Site is remote from any area of groundwater flood risk, which is confined to the lower-lying areas in the north of the Borough. The Site's position with sloping topography at the head of the catchment dictates that the likelihood of significant groundwater emergence will be very low. With respect to potential sewer flooding, there are no public surface water sewers mapped in the rural part of Gravesham borough, although there are public foul sewer systems serving Hook Green and Meopham Station to the west of the Site. It is considered that the risk of flooding from this source is also likely to be low. Finally, the risk of flooding from reservoir sources has been considered, with EA mapping demonstrating that the Site is at low risk of flooding from this source.

4.22 Overall, it is considered that, through the incorporation of FFLs of sufficient levels, the integration of green/blue infrastructure, and the incorporation of the proposed SWMS, the risk of flooding both on the Site and in the surrounding area will be low. Future residents of and visitors to the Proposed Development will therefore be safe from the risk of flooding throughout its lifetime.

Reducing Water Consumption

- 4.23 The majority of England is under water stress, with more water often being consumed than is available during dry weather. As the population continues to grow, and with changes to the frequency of rainfall events projected as a result of climate change, this situation will be further exacerbated with even greater pressure exerted on the supply of potable water.
- 4.24 The Proposed Development will seek to limit detrimental impacts on current water abstractions and potable water supplies, through the incorporation of water efficient sanitation equipment throughout. For the proposed dwellings, internal water consumption will be restricted to a rate of no more than 105 litres per person per day, with the specifications outlined in Table 4.1, below, recommended for consideration at the detailed design stage.

Table 4.1 Proposed water use

Fitting	Consumption
Low volume dual flush toilet	6.0 litres (full) / 3.0 litres (part)
Wash hand basin tap	5.0 litres per minute
Kitchen sink tap	6.0 litres per minute
Bath (where fitted)	180.0 litres capacity (to overflow)
Shower	6.0 litres per minute
Washing machine	5.6 litres/kg dry load
Dishwasher	1.0 litres/place setting

- 4.25 Details of how the measures specified above would ensure that internal water consumption within the proposed dwellings does not exceed 105 litres per person per day are provided in Appendix A2, based on the water efficiency calculator for new dwellings provided in Appendix A of Part G of the Building Regulations. It should be noted that, whilst examples of fittings that may be specified as part of the proposed development are included within Appendix A2, the calculations undertaken here are indicative only, and the specification of internal sanitation fittings will be confirmed as part of a Reserved Matters application.
- 4.26 For the non-domestic component of the Proposed Development, it is intended that water efficient fittings, such as low volume dual flush toilets and taps with restricted flow rates, be provided. Additional measures, such as the inclusion of leak detection systems, may also be considered, to enable the achievement of reduced internal water consumption levels.
- 4.27 Reducing water usage contributes not only to benefits for the environment, but further economic benefits can be achieved when the properties are metered to track water consumption. Water meters shall be installed within all buildings to be delivered as part of the Proposed Development.

- 4.28 To aid in reducing water consumption for external usage, it is recommended that the incorporation of facilities for rainwater harvesting be provided. For the proposed dwellings, this may include the provision of external water butts to collect rainwater for use in private gardens. Similarly, non-domestic buildings may be provided with water harvesting facilities to aid in the collection of rainwater for external irrigation purposes.
- 4.29 To further aid in reducing demand for water within the external spaces of the Proposed Development, the incorporation of drought-resistant planting will be encouraged.

Embedding Circular Economy Principles to Select Materials and Reduce the Generation of Waste

- 4.30 Sustainable design and construction principles have been embedded within the design of the Proposed Development, as informed by planning requirements and industry best practice. This has included the consideration of circular economy principles (Figure 4.6), accounting for the potential effects of the Proposed Development with respect to the materials and construction methods employed, across its whole life cycle, from construction, through its operation and to its disassembly.

Figure 4.6 The Circular Economy



Source: European Parliament Research Service

- 4.31 A number of overarching circular economy objectives have been accounted for within the design of the Proposed Development. These objectives, which it is intended will be carried through the continued detailed design, construction, operation and disassembly of the Proposed Development, are summarised in Table 4.2, with further details provided below.

Table 4.2 Circular Economy Objectives

Principle	Commitments
Conserve resources, increase efficiency and source sustainably	• Minimise the quantities of materials used • Minimise the quantities of other resources used • Specify and source materials and other resources sustainably
Design to eliminate waste	• Design for longevity, adaptability or flexibility and reusability or recovery • Design out construction, demolition, excavation and operational waste arising
Manage waste sustainably and at the highest value	• Manage demolition waste • Manage excavation waste • Manage construction waste • Manage operational waste

Conserve Resources, Increase Efficiency and Source Sustainably

- 4.32 During the detailed design of the Proposed Development, lean design principles will be embedded to minimise the materials required. This may include the minimisation of the form factor of the buildings through the implementation of simple floor plans, and the employment of material palettes that reflect the local context.
- 4.33 Further to this, it is recommended that opportunities to employ modular design, pre-fabrication and Design for off-site Manufacturing and Assembly (DfMA) be explored prior to construction, to further reduce material consumption. The potential use of these methods of construction would aid in removing the need for bespoke construction elements, which typically require the consumption of additional materials.
- 4.34 As noted above, the employment of water efficient equipment will aid in reducing the consumption of potable water during the operation of the Proposed Development.
- 4.35 Furthermore, the measures set out within the Energy Strategy detailed in Section 5 below will ensure the energy demand of the Proposed Development is minimised. Through the employment of a fabric-first approach, and the integration of low carbon and renewable technologies, the Proposed

Development will be future-proofed to achieve net-zero carbon emissions in operation in the future, subject to the ongoing decarbonisation of the national grid.

- 4.36 Materials should be responsibly sourced by the main contractor and be specified to have a low embodied impact. Materials with a low embodied impact, as defined within the Building Research Establishment's (BRE) Green Guide to Specification, should be selected for use in the building design and construction.
- 4.37 The selection of materials is determined by a variety of factors, such as the architectural context, design rationale, embodied carbon and maintenance requirements. For the Proposed Development, consideration will be given to the lifecycle environmental performance with materials selected in consideration of the BRE's Green Guide to Specification, aiming for A- or B-rated materials wherever possible.
- 4.38 In addition, the use of locally sourced materials will be prioritised wherever possible to reduce the impacts associated with the transportation of materials. Using materials produced in the local area will also aid in developing the identity of the Proposed Development, and will aid in aligning it with the local character and context. For the Proposed Development, there will be a focus on sustainable design, with materials selected that are in keeping with the local vernacular and landscape character, aiming for locally sourced materials where possible.
- 4.39 During the detailed design of the building fabric, consideration will be given to minimising the environmental impact of materials, by selecting non-toxic and robust materials to ensure longevity and a minimal impact on the health of occupants.
- 4.40 Further to this, it is intended that timber be selected and purchased in consideration of sustainability certification. It is intended that all structural timber elements along with any timber used for temporary uses, such as scaffolding, will be sustainably sourced, e.g. from Forest Stewardship (FSC) and/or Programme for the Endorsement of Forest Certification (PEFC) sources.
- 4.41 In addition, it is intended that circular economy and sustainability principles will be carried through the construction phase of the Proposed Development. It should be noted that the details of how this will be implemented will be provided following further detailed design in liaison with the principal contractor.

Design to Eliminate Waste

- 4.42 The construction of the Proposed Development will be undertaken in phases, with the delivery of the Country Park and local facilities to occur early in the programme, to help establish a sense of place. This will be supported by opportunities for temporary or 'meanwhile' uses during early phases. This will ensure residents have access to the facilities they need as soon as they move in, whilst also

embedding long-term values and ensuring spaces are used to their maximum potential as soon as the Proposed Development becomes operational. Further to this, it is recommended that the detailed design of the buildings account for opportunities to facilitate their re-purposing for alternative uses through the provision of easily adaptable spaces.

- 4.43 Materials employed in the construction of the Proposed Development should be procured in consideration of their durability, such that the need for their replacement over the lifetime of the scheme may be minimised. The ease with which materials can be reused or recycled at the end of their useful life should also be taken into account, and the potential for materials to be reused within the local area at the end of the Proposed Development's life should be maximised. This should be supported by the embedding of design for disassembly principles within the design of buildings, which will aid in maintaining the value of materials.

Manage Waste Sustainably and at the Highest Value

- 4.44 During the construction of the Proposed Development, contractors will be encouraged to adopt sustainable waste management practices on-Site, by applying the waste hierarchy, shown in Figure 4.7 below, to ensure materials remain productive for as long as possible, with landfill disposal a last resort option.

Figure 4.7 The Waste Hierarchy



Source: European Commission Waste Framework Directive

- 4.45 All enabling and construction works required to facilitate the delivery of the Proposed Development will be undertaken in line with best practice. It is expected that a Site Waste Management Plan (SWMP) will be prepared and implemented by the principal contractor to ensure waste is handled in a responsible manner on-Site. It is recommended that, during the construction, demolition and

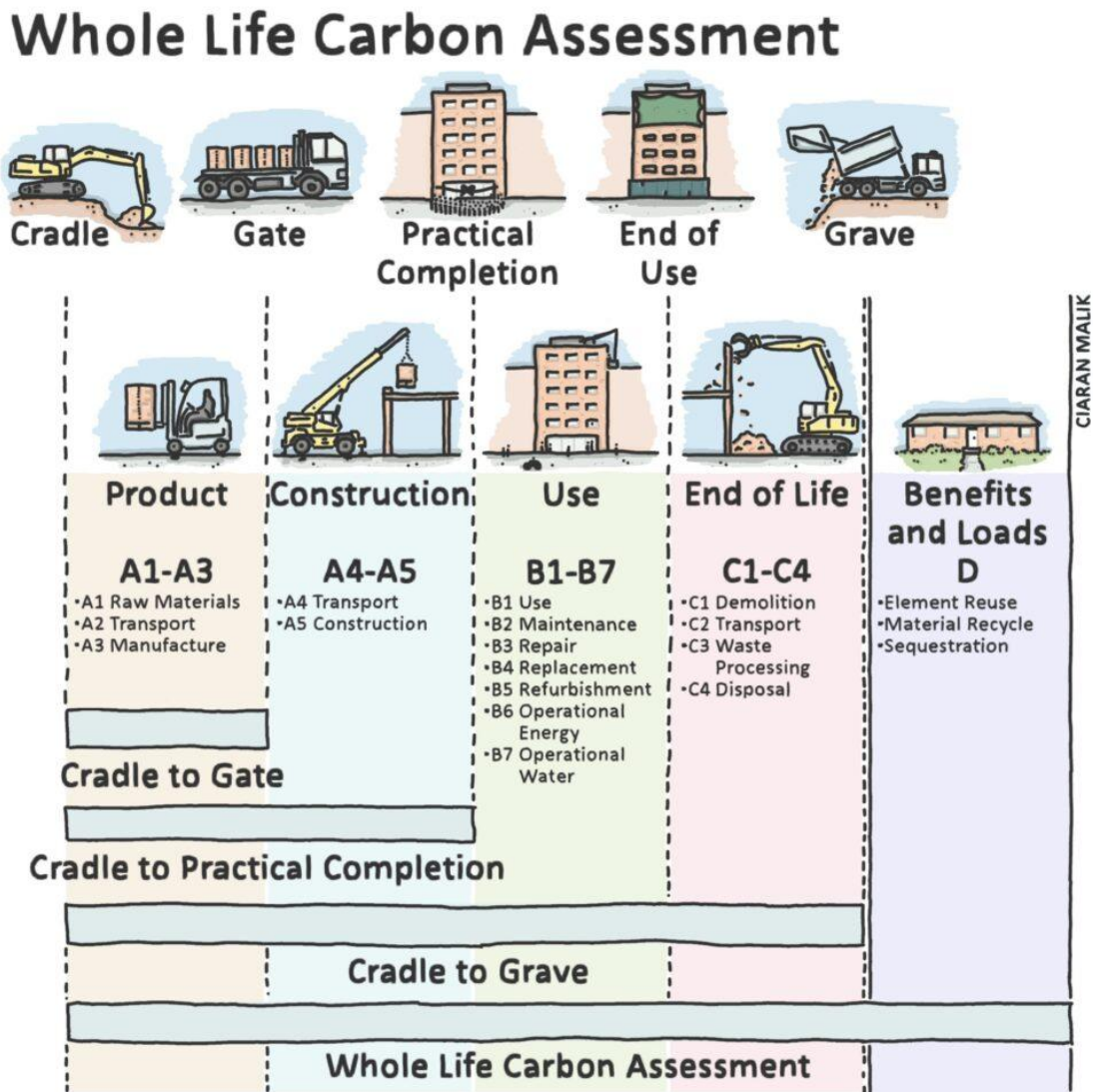
excavation works, a target be put in place to divert a minimum of 95% of waste from landfill. This is subject to confirmation following the appointment of the relevant contractor(s).

- 4.46 It is recommended that take-back schemes be implemented during construction, to aid in reducing packaging waste arising on the Site.
- 4.47 To encourage a greater proportion of the operational waste to be diverted from landfill, it is proposed to provide dedicated spaces of sufficient size and within convenient locations for each of the proposed domestic and non-domestic buildings. This will ensure opportunities for recycling are maximised. Currently, Gravesham Borough Council collect four different waste streams:
- Recyclable waste;
 - Food waste;
 - Garden waste; and
 - Non-recyclable waste.
- 4.48 All waste collection and storage facilities will be considerate of Building Regulations and Council requirements. Dedicated external waste storage areas for refuse and recycling will be allocated for the non-domestic buildings and each of the residential dwellings which will be delivered as part of the Proposed Development.
- 4.49 Further to this, it is recommended that community-led waste minimisation schemes be established during the operation of the Proposed Development. This may include the setting up of community repair services to prolong the lifespan of materials and items, or the facilitation of, for example, tool sharing services to maximise the usage of items.

Reducing Embodied Carbon

- 4.50 As shown in Figure 4.8 below, Whole Life-Cycle Carbon (WLC) carbon emissions are the carbon emissions resulting from materials, construction and use over a building's entire life, including demolition and disposal. With continued advancements in technology, the growing uptake of renewable technologies, and the enhancing of building fabric efficiencies, operational carbon emissions are continuing to contribute less and less to a building's WLC emissions. It is becoming increasingly important, therefore, to consider the embodied carbon emissions associated with our buildings.

Figure 4.8 The Waste Hierarchy



Source: BS EN 15978:2011

- 4.51 To ensure that the embodied carbon emissions associated with the Proposed Development are reduced as far as possible, it is recommended that a number of measures be embedded within the design. Where feasible and appropriate, materials should be procured in consideration of their embodied carbon emissions and environmental impacts. This may include the employment of locally sourced materials, to minimise the emissions associated with their transport, the use of biogenic materials, such as timber, and the incorporation of materials that have a high recycled content.
- 4.52 Lean design principles should also be embedded within the detailed design of the Proposed Development, which will aid in reducing the volumes of materials required and, therefore, the associated embodied carbon emissions.
- 4.53 Reducing the embodied carbon emissions associated with the maintenance and repair of the Proposed Development should also be considered during the detailed design stage. Measures to

minimise emissions arising from this source may include the incorporation of materials and systems with long design lifespans and robust materials, to reduce the frequency with which these systems and materials require replacement. The employment of demountable systems and those that can be easily disassembled will also aid in reducing embodied carbon emissions, as this will enable the partial replacement of elements, rather than entire systems, where feasible.

- 4.54 It is recommended that WLC Assessments be undertaken during the detailed design stages, with the assessments to be undertaken in line with the recommendations and guidance set out within the Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment (2023). It is also recommended that, where feasible and practicable, the Proposed Development seeks to align with the WLC benchmarks set out within RIBA's '2030 Climate Challenge'.
- 4.55 The undertaking of WLC Assessments throughout the detailed design stage of the Proposed Development will inform decision making related to the procurement of materials and the employment of alternative construction techniques.

Tackling Increased Temperatures and Drought

- 4.56 In order to protect the development against overheating in the future, a number of key design features should be taken into consideration during the detailed design of the buildings, to ensure they are resilient to increased temperatures, which may be experienced as a result of climate change. A summary of the recommended measures that should be considered for inclusion within the design to reduce overheating is provided below:

Minimisation of internal heat generation through energy efficient design

- Heat gain from lighting should be kept to a minimum through the installation of energy efficient lighting design solutions.
- The availability of natural light should be maximised by optimising the light transmittance of the glass elements of the building facades, to minimise reliance on artificial lighting.
- The employment of heating systems that utilise low temperature distribution means, which will lead to lower internal heat gains from distribution pipework.

Reduction of the amount of heat entering the buildings in the summer

- Building facades should be designed to incorporate a balanced proportion of glazing to mitigate direct solar heat gains whilst also optimising daylight penetration.
- The specification of glazing with a reduced g-value should be considered, to minimise the amount of solar heat transferred through the glazed elements of the facades.

-
- The incorporation of green and blue infrastructure throughout the Proposed Development will aid to mitigate the heat island effect, and it is recommended that the incorporation of external shades and street trees be considered.

Management of the heat within buildings through exposed thermal mass and high ceilings

- The form of the buildings should account for the inclusion of exposed thermal mass, which will enable buildings to absorb and release heat in response to internal conditions.
- Consideration should be given to the incorporation of green roof planting, where appropriate and feasible, which would include for a high degree of in-built thermal mass, aiding to mitigate heat gains and losses.
- Where appropriate, the detailed design of the buildings should include for high ceilings, which would facilitate passive stack ventilation, whereby warm air rises towards the ceiling, drawing cooler air in at the floor level.

Passive ventilation

- Openable windows should be provided on multiple aspects to provide a passive ventilation strategy for buildings that utilises crossflow ventilation. This may be supported through the delivery of buildings with a simple form.

Mechanical and active cooling

- In some cases, it may be necessary to incorporate mechanical ventilation systems within buildings. Where this is the case, it is recommended that systems that include for heat recovery and summer bypass modes be installed. This will ensure that air entering the buildings via the mechanical ventilation system will not be pre-warmed in the summer, as it would not pass through the heat exchanger when enabling the summer bypass mode. In addition, it is recommended that, where feasible, the systems be positioned such that they take in air from shaded areas. This would facilitate free cooling, whereby cooler air is taken in by the ventilation system.
- In some instances, it may be necessary to employ active cooling systems. Where this is required, highly efficient, all-electric systems that incorporate materials with a low global warming potential (GWP) should be specified. It is recommended that the need for active cooling within the buildings to be brought forward as part of the Proposed Development be minimised as far as possible through design interventions.

4.57 It is anticipated that detailed overheating assessments will be undertaken for the Proposed Development at the detailed design stage to ensure the potential risk of overheating is sufficiently mitigated. This will aid to inform any further mitigation measures that may be required to reduce this risk.

Nature Conservation and Ecology

- 4.58 The Ecology Chapter, prepared by Greenspace Ecological Solutions, of the Environmental Statement (ES) that accompanies this application, confirms that there are no statutory designated sites located within or immediately adjacent to the Site boundaries. The closest internationally designated sites are the Thames Estuary and Marshes Ramsar and Special Protection Area (SPA), which lie 6.2km and 7.4km, respectively, to the northeast of the Site, whilst the North Downs Woodlands Special Area of Conservation (SAC) is located approximately 2.6km to the southeast and the Peters Pit SAC is located approximately 7.5km to the southeast. The closest nationally designated sites are the North Kent Woods and Downs National Nature Reserve (NNR), located 1.2km to the southeast of the Site, the Shorne and Ashenbank Woods Site of Special Scientific Interest (SSSI), located 2.0km to the northeast, the Mucking Flats and Marshes SSSI, located 9.3km to the northeast, and the South Thames Estuary and Marshes SSSI, located 6.2km to the northeast. The nearest non-statutory designated site is the Nurstead and Cozendon Woods, Nash Street Local Wildlife Site (LWS), situated approximately 0.6km to the northwest. Numerous other non-statutory designated sites are present within 2km of the Site, including the Henley Wood and Pasture LWS, located approximately 0.7km to the southeast, Wrotham Roadside Nature Reserve (RNR), located approximately 0.8km to the northwest, and Longfield Road (East) NRN, located approximately 0.9km to southwest. During the operation of the Proposed Development, there is potential for contamination to occur at nearby designated sites. However, due to the distance of separation and lack of ecological connectivity, it is considered that the contamination of any designated sites from dust, runoff or on-off pollution events is unlikely. In addition, there is potential for the Proposed Development to result in increased recreational pressure on designated sites, due to the intended introduction of residential dwellings. However, recreational and disturbance effects on the designated sites present within the surrounds of the Proposed Development will be reduced through the creation and enhancement of habitats, particularly through the incorporation of a designated green space within the northeast of the Site. Further to this, it is intended that a designated dog park as well as footpaths, travel routes, and sports pitches, be brought forward as part of the Proposed Development, which will aid to further reduce the likelihood of new residents travelling further afield to designated sites.
- 4.59 The Ecology ES Chapter confirms that the following habitats are present at the Site in the existing case: arable field margins; cereal crops; modified grassland; bramble scrub; mixed scrub; native hedgerow; species-rich native hedgerow with trees; species-rich native hedgerow; non-native and ornamental hedgerow; rural trees; tall forbs; artificial unvegetated, unsealed surface; bare ground; vegetated garden; developed land; sealed surface; lowland mixed deciduous woodland; and line of trees. The majority of the habitats on the Site are considered to be of limited ecological importance, however both the bramble scrub and individual trees are considered to be of value at the site-level, whilst the hedgerows, lines of trees, and the lowland mixed deciduous woodland, which is noted to qualify as a Habitat of Principal Importance, are considered to be of value at the local level. Whilst the delivery of the Proposed Development would result in the loss of existing habitats at the Site, it is highlighted that the existing woodland is to be retained in its entirety, and that the vast majority of

the existing hedgerows and individual trees present on the Site would be retained as part of the Proposed Development. A long-term management plan, in the form of a Landscape and Ecology Management Plan (LEMP), will be put in place to ensure that the existing and proposed habitats are maintained to maximise their long-term biodiversity value, whilst managing potential conflicts with other objectives for landscape and visual and safety requirements. In particular, the LEMP will seek to maintain the beneficial management of areas of grassland, woodland, trees, hedgerows and scrub. To mitigate habitat losses, and to ensure a net gain in biodiversity is achieved in the post-development context, retained habitats will be protected and enhanced, with new areas of habitat to also be created as part of the proposed Landscape Strategy. This is to include the creation of new parcels of woodland, the planting of new trees and native hedgerow, as well as the creation of areas of mixed scrub.

- 4.60 The areas of cropland, hedgerows, scrub and arable field margins within the Site support a number of common, widespread bird species, in addition to offering habitat opportunities for skylark bird species. To ensure effects on breeding birds are mitigated during the construction of the Proposed Development, it is recommended that vegetation clearance or works be undertaken outside of the breeding bird season (March to August, inclusive). Where this is not possible, and the removal of bird nesting habitat required during the active nesting season, nesting bird checks should be undertaken by a suitably qualified ecologist to ensure no active bird nests are present. As detailed above, it is intended that new planting be delivered as part of the proposed Landscape Strategy. This will include a range of habitats that will benefit a number of breeding and foraging bird species. Further to this, a detailed skylark mitigation strategy will be implemented, including for the provision of compensatory habitat, which is to be delivered within the northeastern portion of the Proposed Development. This area will be created as species-rich grassland in order to provide a range of foraging and nesting opportunities for skylark. It is highlighted that fencing must be installed within this area between 1st April and 1st June, to prevent access by humans or animals, and to ensure skylark breeding success. It is noted that, should the installation of fencing have the potential to affect nesting bird habitat, this should be undertaken under a watching brief. Gated access may be provided outside of these times, with access to be restricted to mown paths.
- 4.61 The modified grassland, hedgerows, bramble scrub and arable field margins present within the Site are noted to provide opportunities for foraging and commuting bats, albeit these habitats are considered to be of 'Low' suitability. To ensure the Site's integrity for bats is maintained in the post-development context, the use of lighting will be avoided, where possible, within the Proposed Development. Where it is required, a sensitive lighting scheme will be implemented, following the requirements set out by the Bat Conservation Trust in their 2023 document 'Bats and Artificial Lighting at Night'. In addition, and as detailed above, a LEMP will be implemented, which will ensure retained and created habitats are managed to provide enhancements to foraging and commuting habitats for bats within the Site. It is also noted that bat boxes will be installed on suitable trees and integrated into the dwellings to be delivered as part of the Proposed Development, to provide

additional roosting opportunities for bats. Four of the trees that are required to be removed to facilitate the delivery of the Proposed Development have been assessed as potentially supporting roosting bats. To avoid the risk of harm to bats, the trees should be removed in adherence to a mitigation strategy, which includes the use of hand tools only to remove ivy, the felling of the trees outside of the winter hibernation and core maternity periods, and the felling of the trees in sections.

- 4.62 Habitats on the site are noted to be of local value to dormice, the presence of which was confirmed by surveys undertaken at the Site. A Natural England mitigation licence will therefore be required with respect to dormice, to prevent harm to this species during construction. It is noted that hedgerow cutting should be undertaken between November and March, and that stumps be removed during the dormouse active season (April to September). In order to enhance the retained habitats for dormice, it is recommended that a minimum of 10 dormouse boxes be installed on retained trees within the boundary hedgerows and the woodland to provide nesting opportunities. As noted above, areas of modified grassland, bramble scrub and hedgerows will be lost during the Proposed Development. To mitigate potential adverse impacts on reptile species, habitats, inclusive of grassland, hedgerows and scrub, will be created and enhanced as part of the Proposed Development. Further to this, it is recommended that a precautionary methods of works be implemented, including a sensitive timing and habitat manipulation strategy, to safeguard reptiles within the Site.
- 4.63 To ensure protected species are safeguarded during the operation of the Proposed Development, designated areas of green space will be managed to provide a high level of suitability. These areas are to be located away from the built form of the Proposed Development, to minimise disturbance impacts. Amenity areas, such as road verges and community gardens, located within the built form of the Proposed Development will be subject to more intensive management measures to make them less suitable for wildlife and to therefore encourage protected species to remain within the designated green spaces. Some more sensitive areas, such as woodland that supports badger setts, will be fenced off and designated as wildlife only areas. This will ensure that sensitive species such as bats, dormice and badgers, which may reside in these habitats, are less likely to be subject to disturbance. Signage to encourage responsible behaviour will also help to inform residents and visitors of the protected species likely to be present within the Site.
- 4.64 As shown in the Illustrative Landscape Strategy, prepared by Icen Projects, below, the Proposed Development will incorporate extensive areas of green infrastructure both throughout and across the Site. Retained habitats will be incorporated and enhanced within these areas of green infrastructure, through the implementation of measures such as the bolstering of existing hedgerows with species-rich native planting. Further to this, new species-rich habitats will be delivered, including marginal planting associated with the SWMS, as well as new grassland, tree, shrub and hedgerow planting. It is intended that the species mixes employed will prioritise the use of native and wildlife-beneficial species of local provenance. All retained and newly provided habitats will be subject to long-term

maintenance and management, in accordance with an ecological management plan that focusses on maximising biodiversity value.

Figure 4.9 Illustrative Landscape Strategy



- 4.65 Through the incorporation of the measures outlined above, it is expected that the delivery of the Proposed Development will result in the achievement of a significant net gain in biodiversity at the Site.

Air Pollution

- 4.66 The Environment Act 1995 requires all Local Authorities to review air quality within the districts. If it appears that any air quality 'Objective' prescribed in the regulations, and in the National Air Quality Strategy, is not likely to be achieved, then the local authority must designate the affected area as an Air Quality Management Area (AQMA).
- 4.67 As highlighted within the Air Quality ES Chapter, prepared by Entran, the Site is not located within or near to an AQMA. It is noted that the closest declared AQMA to the Site is the Gravesham A2 AQMA, located approximately 2.9km to the north.
- 4.68 In the existing case, the quality of the air in the vicinity of the Proposed Development is compliant with the relevant air quality limit values. Based on data recorded at automatic monitoring locations, the nitrogen dioxide (NO₂) and particulate matter (PM₁₀) concentrations at the Site are expected to meet relevant objectives. Similarly, diffusion tube monitoring in proximity to the Site indicates that

the 1-hour objective for NO₂ concentrations is being met. Furthermore, background mapping provided by DEFRA indicates that the estimated annual mean background concentrations of NO₂, PM₁₀ and PM_{2.5} are well below the annual mean objectives for each pollutant in the vicinity of the Site.

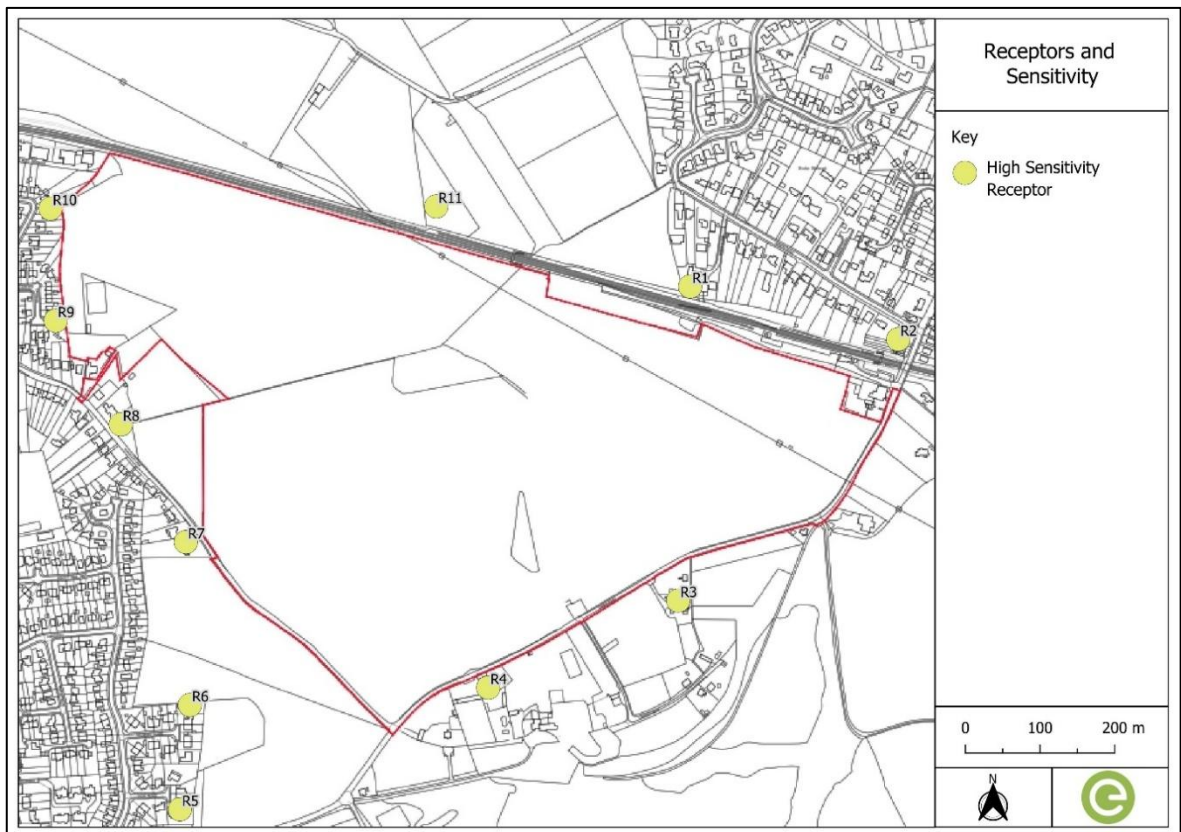
- 4.69 During the construction of the Proposed Development, there is potential that effects on sensitive receptors will arise as a result of the release of dust and particulate matter. In order to effectively mitigate these effects, a number of mitigation measures will be employed. These include, but are not limited to: the preparation and implementation of a Dust Management Plan (DMP); the erection of solid screens or barriers around dusty activities or the Site boundaries that are at least as high as any stockpiles of materials; the avoidance of the use of diesel- or petrol-powered generators, and the use of mains electricity or battery powered equipment, where practicable; and the exercising of good site management practices, including the undertaking of daily on-Site and off-Site inspections.
- 4.70 During the operation of the Proposed Development, there is potential for emissions to arise from increased levels of traffic. However, modelling undertaken as part of the Air Quality Chapter indicates that the projected change in pollutants at the Site and in the surrounding area when comparing scenarios with and without the Proposed Development is negligible. This includes a projected insignificant impact within respect to the deposition of nitrogen and airborne nitrous oxide (NO_x) concentrations within nearby ecological sites. In addition, it is expected that the levels of pollutants present within the Proposed Development during its operation will fall below the relevant thresholds. To ensure operational emissions are reduced as far as possible, it is recommended that the following measures be implemented:
- Provision of 1no. electric vehicle charging point per dwelling with dedicated parking, or 1no. charging point per 10 spaces (unallocated parking);
 - Integration of a bus route through the Site;
 - Preparation of a Travel Pack to promote alternative modes of transport to the private vehicle;
 - Provision of Travel Information Boards;
 - Undertaking of Travel Surveys to monitor travel behaviour;
 - Improvements to cycle paths to provide links to the wider cycle network;
 - Delivery of adequate and secure cycle storage; and
 - The preparation of a Travel Plan which includes for measures that seek to discourage the use of high emissions vehicles in favour of low emission fuels and technologies.

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- 4.71 The Air Quality Chapter concludes that through during the construction of the Proposed Development, good site practice and the implementation of suitable mitigation measures, the impact of dust and PM₁₀ releases may be effectively mitigated, and the resultant impacts are considered to be negligible. Similarly, it is expected that the operation of the Proposed Development will have a negligible impact with respect to local air quality, and future occupants will not be exposed to pollutant concentrations that exceed relevant objective levels.

Noise Pollution

- 4.72 As highlighted within the Noise and Vibration ES Chapter, prepared by Entran and demonstrated in Figure 4.14 below, noise levels at the Site and in the surrounding area are driven predominantly by road traffic sources, as well as the railway line that runs along the northern boundary of the Site. Specifically, road traffic-related noise affecting the Site arises from Camer Road, which forms the eastern and southeastern boundaries of the Site, in addition to Norwood Lane, which forms the southwestern boundary of the Site.
- 4.73 An assessment of the impact of the construction of the Proposed Development on noise levels in the vicinity of the Site has been undertaken as part of the Noise and Vibration Chapter. The assessment indicates that, for all receptors considered, the Proposed Development will result in a negligible impact with respect to both noise and vibration levels when accounting for the typical distances between the construction locations and the identified receptors. When accounting for the minimum distance between construction locations and identified receptors, the Proposed Development will result in a negligible impact with respect to both noise and vibration levels for the vast majority of receptors. The exceptions to this are the receptors labelled as R3, R4, R7 and R11 in Figure 4.10, below. For these receptors, in the absence of attenuation from pre-existing structures or site hoardings, continuous construction activities have the potential to result in 'minor' to 'moderate' impacts on noise sensitive receptors. These activities include enabling works, piling, sub-structure works, road and pavement works, and super-structure works.

Figure 4.10 Construction Noise Assessment Receptor Locations



4.74 To control the impact of noise during the construction of the Proposed Development, works will be carried out in accordance with best practicable means (BPM) as described in BS 5228, including, but not limited to, the following:

- Where possible, 'silenced' plant and equipment will be used;
- Where vehicles are standing for a significant period of time, engines will be switched off;
- Acoustic enclosures will be fitted where possible to suppress noisy equipment;
- Plant will operate at low speeds, where possible, and incorporate automatic low speed idling;
- Where possible, electrically driven equipment will be selected in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
- All plant will be properly maintained (greased, blown silencers replaced, saws kept sharpened. Teeth set and blades flat, worn bearings replaced etc);
- Consideration will be given to temporary screening or enclosures for static noisy plant to reduce noise emissions and plant should be certified to meet any relevant EC Directives;
- All contractors will be made familiar with the guidance in BS 5228 (Parts 1 & 2) which will form a pre-requisite of their appointment; and

-
- Early and good public relations with the adjacent tenants and occupants of buildings will also reduce the likelihood of complaints.
- 4.75 It is intended that the general measures set out above be incorporated within a Construction Environmental Management Plan (CEMP) and/or detailed in construction method statements. The implementation of these measures will aid to reduce the potential adverse impacts of construction-related noise on nearby sensitive receptors.
- 4.76 With respect to vibration impacts during the construction of the Proposed Development, this will be negligible for all receptors assessed when works are undertaken at a typical distance. Similarly, when considering the closest activities, there will be a negligible or minor effect on the majority of receptors. Receptors R3, R4 and R7 would potentially experience moderate effects with respect to vibration, however it is noted that these effects would be temporary. To ensure the effects of construction vibration are mitigated as far as possible, it is recommended that the BPMs set out above be put in place.
- 4.77 The future suitability of the Site for residential accommodation has also been considered as part of the Noise and Vibration Chapter. Noise emissions levels affecting the Proposed Development have been calculated using predictive noise modelling, with ambient noise levels calculated for both the day- and night-time periods. Noise contours have then been calculated using the outputs of the predictive noise modelling.
- 4.78 The noise contours calculated for the Site indicate that residential effects would be mostly minor at the proposed housing parcels, with some potential moderate effects at facades that overlook Camer Road. It is highlighted that the layout of the Proposed Development will provide screening to properties that are located beyond the perimeter of the Site, and that the effects presented in the Noise and Vibration Chapter are done so in advance of mitigation inherent within the layout of the Proposed Development. It is considered, therefore, that the noise levels within the Proposed Development will not be significant, even prior to the consideration of mitigation. Where significant effects may occur, it is recommended that suitable glazing and ventilation be employed in order to comply with the criteria set out within British Standard 8233, and relevant WHO guidelines. It is considered that, with incorporation of suitable mitigation choices, residential effects due to internal ambient noise levels would be negligible. With respect to external amenity areas, it is recommended that the buildings to be brought forward as part of the Proposed Development should be sited to screen gardens from adjacent sources of noise, and that gardens should not overlook roads, where possible. Suitable fencing should be employed, and where screening is required, it should be specified to ensure ambient noise is mitigated as far as practicable.
- 4.79 An assessment of the effects of the Proposed Development on noise levels in the surrounding area has also been undertaken with respect to changes in road traffic. Overall, the effects due to changes in road traffic noise will be negligible in both the short term and the long term. It is highlighted that,

when accounting for the intended reduction in speed limit following the delivery of the Proposed Development, there will be a minor beneficial long term effect with respect to road traffic noise generated on Camer Road.

Land Conditions and Stability

- 4.80 As detailed within the Phase I Desk Study & Site Reconnaissance Report, prepared by Leap Environmental, part of RSK, the ground conditions at the Site comprise Head deposits in the east and west of the Site, underlain by bedrock deposits of Thanet Sand Formation in the centre of the Site and Seaford Chalk Formation across the remainder of the Site. The Head deposits are classified as a Secondary Undifferentiated Aquifer, whilst the Seaford Chalk Formation is a Principle Aquifer, and the Thanet Sand Formation is classified as a Secondary A Aquifer. The Site is located within a groundwater Source Protection Zone (SPZ) 2 to the west, and an SPZ3 in the centre, north and south. An SPZ1 is also located approximately 650m to the northwest of the Site, and it is noted that the eastern side of the Site is not located within an SPZ. There are five active abstraction licences within 2km of the Site, the nearest of which is located approximately 1.4km to the southeast, and which is licenced for potable water supply. No surface water features are present within the Site, with the nearest feature being a pond located approximately 520m to the north. In addition, there are no discharge consents or pollutant releases noted within a 250m radius of the Site.
- 4.81 Based on the historical and current land use at the Site, the Phase I Desk Study & Site Reconnaissance Report, prepared by Leap Environmental identifies a number of potential sources of contamination on-Site, including: pesticides and heavy metals associated with the current agricultural use of the Site; heavy metals and polycyclic aromatic hydrocarbons (PAHs) associated with two former bonfire sites in the centre of the Site; numerous potential contaminants including asbestos, metals, PAHs, petroleum hydrocarbons and ground gases associated with the presence of Made Ground; and Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) and heavy metals associated with the waste exemption areas in the northern section of the Site. Additional potential sources of contamination are identified off-Site, including: heavy metals, inorganic compounds, acids/bases, petroleum hydrocarbons, polyaromatic hydrocarbons and organic solvents (VOCs) associated with the former Varnish Factory immediately to the north of the Site; contaminants associated with the presence of Made Ground and reworked ground immediately to the north of the Site; and ground gases, including methane, carbon dioxide and trace volatile organic compounds (VOCs) associated with a refuse depot, located approximately 300m to the west of the Site.
- 4.82 The preliminary risk assessment indicates that there is a low risk posed to future commercial workers, and a moderate/low risk to future residents, associated with potential contaminants in the ground. It is noted, however, that there is a low likelihood for high concentrations of contaminants to be present on-Site, and it is considered that the assessment of future on-Site receptors is protective of the surroundings off-Site residents and commercial workers. It is considered that there is a moderate/low risk to future residents associated with ground gases migrating on to the Site from the reworked

ground located beyond the northeastern Site boundary, and the former refuse depot located to the west of the Site. The risk of contamination to groundwater is considered to be moderate/low as, whilst the likelihood of contamination is considered to be low, the location of the Site within SPZs 2 and 3 would result in a medium severity were contamination to occur. The risk of contamination within the Kent Downs is considered to be very low in light of the separation of this designated site from the Site, and the lack of significant elevation change. Finally, it is considered that there is likely a very low potential risk to below ground infrastructure, such as concrete and plastic pipework, given the anticipated absence of significant area of Made Ground or contamination. It is highlighted, however, that intrusive investigation chemical analysis should be undertaken to confirm this risk.

- 4.83 A preliminary geotechnical risk assessment has also been undertaken. This indicates that the Seaford Chalk Formation present in the underlying bedrock may be susceptible to frost action. This has the potential to pose a significant risk of foundations and infrastructure. It is noted, however, that this risk is reduced in the areas of the Site within which the Seaford Chalk Formation is overlain by Head deposits, notably in the eastern and western parts of the Site. Further to this, it is noted that soluble rocks are present within the ground, and that numerous dissolution features have been recorded in the worked areas present off-Site. There is therefore potential for localised subsidence, and the presence of difficult ground conditions associated with ground dissolution and natural cavities within the underlying chalk should therefore be investigated.
- 4.84 Based on the findings of the Phase I Desk Study & Site Reconnaissance Report, it is recommended that intrusive works be undertaken to confirm the actual ground conditions at the Site, and to identify possible solution features. These works should include:
- Windowless sampling boreholes to allow for gas and groundwater monitoring;
 - Trial pitting for the inspection of ground conditions;
 - Geo-environmental laboratory testing to identify contamination sources in shallow soils;
 - Ground penetrating radar (GPR) testing to identify solution features, and the undertaking of Cone Penetration Testing (CPT) within areas of concern;
 - Deep boreholes to determine the depth of ground water and to investigate the potential for deep borehole soakaways to be employed; and
 - Geo-technical laboratory testing to inform foundation, road pavement and concrete design.

Light Pollution

- 4.85 As detailed within the Ecology ES Chapter, prepared by Greenspace Ecological Solutions, a sensitive lighting strategy should be employed during both the construction and operation of the

Proposed Development. This will enable the creation of dark corridors, and will aid in reducing potential adverse effects on nocturnal fauna.

- 4.86 The lighting scheme for the Proposed Development should follow the requirements of the Bat Conservation Trust's 'Bats and Artificial Lighting at Night' (2023), and should include, for example:
- Dark buffer zones that separate habitats or features from lighting;
 - Employment of part night-lighting, where appropriate;
 - Positioning and directing of luminaires away from ecological receptors;
 - Reduction of column heights as far as practicable, to reduce light spill;
 - Avoidance of white light, with warm colours used preferentially;
 - Use of vegetation, fencing and walls as light buffers; and
 - Implementation of motion sensors for security lighting.

Water Pollution

- 4.87 The implementation of the proposed SWMS, outlined within the Flood Risk Assessment prepared by GTA Civils and Transport, will include appropriate pollution control to minimise the risk of pollution entering the ground from surface water runoff from the Proposed Development. This is in compliance with the EA's Pollution Prevention Guidance.
- 4.88 An appropriate SuDS treatment train, consisting of a range of features including permeable paving, grassed swales, pocket wetlands and infiltration basins, will be implemented within the Proposed Development to treat surface water runoff before it is discharged directly to the ground via infiltration.
- 4.89 It is recommended that additional measures will also be adopted during construction to minimise the risk of ground and surface water pollution, including:
- Oil separators;
 - Clear marking and signage of drainage stems;
 - Full bunding of on-Site fuel or oil delivery areas;
 - Bunding of areas to be used for cleaning activities; and
 - Best practice measures, implemented as part of a CEMP, to mitigate the impacts of construction-related dust and emissions.

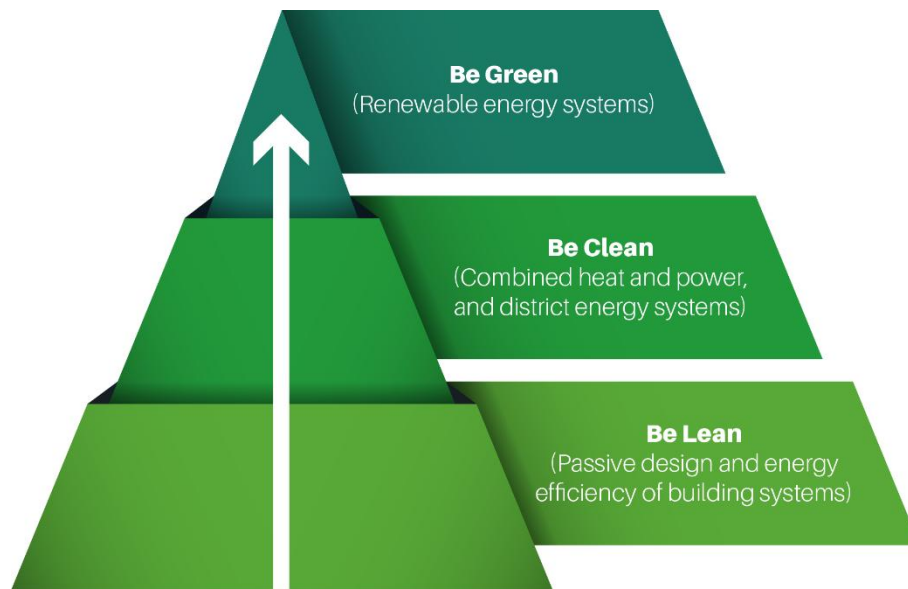
5. ENERGY STRATEGY

- 5.1 With reference to the policy requirements, guidance and industry best practice detailed in Section 3, a comprehensive energy and carbon dioxide (CO₂) emissions assessment has been carried out for the Proposed Development. The energy performance of the scheme has been analysed and evaluated against the most up-to-date iteration of Part L of the Building Regulations and pertinent Gravesham Borough Council policies.
- 5.2 It should be noted that, due to the outline nature of the application, there are no detailed designs currently available for the Proposed Development. Therefore, in order to maintain a degree of flexibility in complying with and exceeding the national standards set out in the Building Regulations on carbon and energy performance, as required by Gravesham Borough Council, the measures outlined within this Energy Strategy describe a potential means of achieving this. Therefore, the final specifications may be subject to change during subsequent design, with additional detail to be provided as part of Reserved Matters applications.

The Energy Hierarchy

- 5.3 The proposed strategy is based upon the principles of the Energy Hierarchy on the basis that it is preferable to reduce carbon dioxide emissions through reduced energy consumption above decarbonisation through alternative energy sources.
- 5.4 The tiers of the Energy Hierarchy are:
- Be Lean Use less energy
 - Be Clean Supply energy efficiently
 - Be Green Use renewable energy

Figure 5.1 The Energy Hierarchy



'Be Lean' (Use Less Energy)

- 5.5 Within the first stage of the Energy Hierarchy, it is proposed to incorporate high levels of passive and energy efficient design measures in order to reduce the Proposed Development's energy consumption and associated CO₂ emissions, utilising a 'fabric-first' approach to reduce energy demand.
- 5.6 Passive design utilises daylight, solar energy, shading and stack or wind driven ventilation to illuminate, heat, shade where necessary and ventilate/cool the building, thus requiring less (mechanical) energy to achieve the performance standards for health and wellbeing of the residents and future visitors to the Proposed Development.
- 5.7 Site characteristics relating to local climate, surroundings, scale and size of the development therefore passively influence the potential energy requirement and savings that can be achieved through the consideration of these aspects. The parameters that most influence the potential to utilise sunlight and solar gains are the orientation and layout of buildings, however these are typically driven by various factors other than energy efficiency or bioclimatic design considerations (e.g. aesthetics, function, etc.).
- 5.8 The Proposed Development will deliver residential dwellings, a primary school and a Local Centre. The building fabric specifications will therefore be driven by the energy demand profiles associated with residential dwellings, educational and Local Centre uses.
- 5.9 As demonstrated within Figure 2.2 above, the orientation of the dwellings and buildings will be dictated by the plot orientation in order to give the overall scheme a cohesive design approach. The

distances between buildings will be optimised to ensure sufficient access to natural daylight and passive solar gains, whilst the orientations of the buildings will be carefully considered to ensure an optimal solution is achieved with respect to the orientation of building elevations and roof areas within 30° of due south. Light and solar gain will also be influenced by the fenestration and the selection of glazing with a high degree of light transmittance.

- 5.10 The u-values outlined in Table 5.1 below are proposed as an indicative guide for the domestic building elements and will be further evaluated during detailed design, to best minimise heat loss or gain, depending on the time of year. At this stage it is recommended that the Proposed Development seek to align with the requirements of the Future Homes Standard which, as the table below demonstrates, will ensure the performance of the building fabric will comply with the Building Regulations requirements for domestic uses.

Table 5.1 Proposed Domestic Building Fabric U-values

Building Fabric Element	Part L1:2021 backstop U-values (W/m ² K)	Recommended U-values (W/m ² K)
Ground floor	0.18	0.13
External wall	0.26	0.18
Roof	0.16	0.11
Windows	1.60 (including frame)	1.20 (including frame)
Doors	1.60	1.00

- 5.11 Similarly, the u-values outlined in Table 5.2 below are proposed as an indicative guide for the non-domestic building elements and will be further evaluated during detailed design. At this stage, it is recommended that the Proposed Development align with the requirements of the Future Buildings Standard which, as the table below demonstrates, will ensure the performance of the building fabric will comply with the Building Regulations requirements for non-domestic uses.

Table 5.2 Proposed Non-Domestic Building Fabric U-values

Building Fabric Element	Part L1:2021 backstop U-values (W/m ² K)	Recommended U-values (W/m ² K)
Ground floor	0.18	0.13

Building Fabric Element	Part L1:2021 backstop U-values (W/m ² K)	Recommended U-values (W/m ² K)
External wall	0.26	0.18
Roof	0.16	0.11
Windows	1.60 (including frame)	1.20 (including frame)
Doors	1.60	1.00

- 5.12 Subject to confirmation, it is proposed that glazing will be double or triple glazed. Although this has yet to be formally specified, it is expected that thermally efficient glazing will be employed, with g-values specified in consideration of overheating risks, and light transmission optimised to improve natural daylight penetration.
- 5.13 High levels of air tightness should be targeted, meaning that air infiltration between the internal and the external environment will be largely controlled, and space heating/cooling demand further reduced.
- 5.14 The other significant means of heat loss from dwellings is due to thermal (or cold) bridging. This is typically a construction detail which has higher thermal conductivity than the surrounding materials, creating a path of least resistance for heat transfer. Thermal bridges result in an overall reduction in thermal resistance of the building elements. Thermal bridges will be designed out where possible to minimise unwanted heat loss.
- 5.15 High efficiency plant, equipment and controls are proposed to limit the energy consumed in order to provide the required level of indoor environmental performance and control. Performance efficiency values have been specified in line with the requirements of the Building Regulations in order to minimise carbon dioxide emissions as far as possible through the 'Be Lean' stage.
- Low energy LED lighting will be installed throughout the residential units and non-domestic spaces. Where appropriate and practicable, the employment of daylight dimming and presence detection controls will also be considered, to further reduce operational lighting energy consumption.
 - In order to remove the need for fossil fuel combustion on-site, it is intended that space and water heating will be provided by electric-only systems for all dwellings, and for all non-domestic spaces where feasible and practicable.

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- Where appropriate, all buildings will be provided with opening windows to enable a natural ventilation strategy, and cross ventilation will be used where feasible. This will provide fresh air to habitable and occupiable spaces, without increasing the risk of overheating. It is noted that there may be requirements for the provision of mechanical ventilation systems, particularly within the non-domestic spaces. Where practicable, it is recommended that, where such systems are required, the use of mechanical ventilation with heat recovery (MVHR) be prioritised, and that systems be specified in consideration of their specific fan power (SFP), to ensure compliance with Part L of the Building Regulations, and to reduce energy consumption.
 - Should cooling be required for the non-domestic spaces, it is recommended that highly efficient, electric systems be incorporated, such as variable refrigerant flow (VRF) systems, or similar. Where required, these systems should be specified in consideration of operational efficiency, and the potential environmental impacts of any refrigerants that may be employed.
 - Energy management systems, such as smart meters, will be installed in all dwellings to enable future residents, tenants and building managers to monitor energy usage, and therefore aid in reducing energy consumption. This will also ensure that charging for energy is linked to usage.
 - All future residents will be provided with a Home User Guide, to ensure all plant and equipment provided is used correctly and to enable efficiency of use to be maximised. Similar information will be provided to tenants and managers of the nondomestic spaces.
 - Suitable heating controls and building management systems will be employed within all dwellings and non-domestic spaces to enable the efficient use of energy.
 - It is recommended that the incorporation of Waste Water Heat Recovery (WWHR) technology within the Proposed Development also be considered, to extract heat from the water used within the buildings, such as in baths or showers. This will aid in pre-heating incoming mains water, thus reducing the energy required to heat domestic hot water. It is recommended that the incorporation of this technology be considered during the continued detailed design of the Proposed Development.

‘Be Clean’ (Supply Energy Efficiently)

- 5.16 The potential for the Proposed Development to incorporate a low carbon heating system has been reviewed for the scheme.
- 5.17 Local heat and power sources minimise distribution losses and achieve greater efficiencies when compared to a separate energy system. This in turn reduces the Site-wide energy consumption and associated carbon dioxide emissions.

- 5.18 The potential integration of a district heating network (DHN) or a conventional gas-fired combined heat and power (CHP) plant to provide low carbon heat and power on-Site has been evaluated for the development, in compliance with industry best practice and appropriate planning policies.

District Heating Feasibility

- 5.19 The feasibility of a DHN is heavily dependent on a location's heat demand. In turn, heat demand in the locality is dependent on building usage and the surrounding area heat demand density. The establishment of a new DHN is capital intensive and, to ensure economic viability, requires areas of high thermal demand density in order to minimise losses and associated costs. A threshold thermal density value of 50 kWh/m² is typically required to ensure viability, as is a location in proximity to an anchor heat load, such as a hospital.
- 5.20 Figure 5.2 below displays the development Site within its proposed surroundings. From this, it can be concluded that the Site itself is undeveloped, with low-density residential settlements to the west and northeast. The surrounding area is therefore likely to be characterised by a low heat demand, and it is considered that no anchor heat load is present within the surroundings of the Site.

Figure 5.2 Site and Surroundings



- 5.21 There are no existing or proposed district heating networks within close proximity to the Site. In addition, due to the relatively low density of the development, and the cost of the infrastructure

required to connect a peri-urban location to a district heat network, it is not deemed cost effective to establish a district heat network on the Site as part of the Proposed Development.

- 5.22 At this stage, it is recommended that the Proposed Development deliver buildings that are designed to comply with the Future Homes and Buildings Standards, which will reduce the energy demand of the buildings. It is anticipated, therefore, that the thermal demand density of the Proposed Development will be far less than the threshold value stated above. Further to this, densities well in excess of 100 dwellings per hectare are typically required at a minimum to ensure the efficient operation of a DHN. As demonstrated in Figure 2.2 above, the Proposed Development will not seek to deliver densities required to support the efficient operation of a DHN.
- 5.23 Therefore, based on the low density of the Proposed Development, the costs associated with the establishment of a DHN in a peri-urban location, and the fact that there are no existing or proposed DHNs within close proximity to the Site, it is not considered to be feasible to incorporate a DHN as part of the Proposed Development.

Combined Heat and Power Feasibility

- 5.24 Based on the anticipated timescale of the Proposed Development, the intended phasing of its construction, and the predicted trajectory of the national electricity grid decarbonisation, the establishment of a CHP network powered by fossil fuels is not considered to be a carbon efficient approach.
- 5.25 It is considered that projected changes to the carbon content of electricity and gas will result in technologies that have lower operational emissions than CHP, and which are able to optimise local energy sources, being the preferred option for serving the heating demands of the built environment. These technologies are likely to be able to offset more carbon emissions than traditional, gas-engine CHP systems.
- 5.26 The incorporation of a gas-fired CHP network will lock the development into relatively carbon intensive gas-fired heating and hot water technology, and will not facilitate the transition to less carbon intensive solutions.

'Be Green' (Utilise Renewable and Low Carbon Technologies)

- 5.27 The Proposed Development has given consideration to renewable and low carbon energy technologies that may be applicable to deliver the required level of carbon dioxide savings over the Part L:2021 baseline, and the likely local effects on the environment.

5.28 In determining the appropriate renewable and low carbon energy technology for the Site, a number of factors including carbon dioxide savings, Site constraints, and potential visual impacts have been considered. Further details of each technology and its associated assessment in relation to the development are provided below.

- **Biomass** – This technology is not considered a practical solution for reducing carbon dioxide emissions, in the view of storage space requirements for combustible material, and the transport related carbon emissions which are not normally accounted for within energy modelling. Furthermore, high nitrous oxide (NO_x) and particulate matter (PM_x) emissions are associated with the use of biomass fuel, and as the Proposed Development is located within close proximity to a residential area, and will introduce new residents, the permitted emissions will be restricted. It is noted that alternative technologies, such as ceramic filters or bag filters, have the potential to significantly reduce the emissions associated with the use of biomass fuels, and this may therefore be explored as the design of the Proposed Development continues to progress.
- **Air Source Heat Pumps (ASHP)** – Given the Site location and the lack of local existing or proposed heat networks, the use of air source heat pump (ASHP) technology is considered appropriate to serve the space and heating demands of the proposed dwellings, as well as the non-domestic spaces. Some ASHP systems can also be reversed to provide cooling, and these types of system may therefore also be appropriate to serve the cooling demands of the non-domestic spaces, where required. ASHPs do not produce emissions at the point of use, and do not impact on air quality within their locality. In addition, the carbon emissions associated with this type of system would align with the existing and projected decarbonisation of the grid, aiding the future achievement of net zero carbon emissions in operation, subject to the ongoing decarbonisation of the grid. This technology is therefore considered appropriate for the Proposed Development, and should the intention be to incorporate ASHPs, details of their integration would be provided as part of a Reserved Matters Application. It is noted that, should this type of system be employed to deliver space heating, low temperature systems, such as underfloor heating or low temperature radiators, would be recommended. Furthermore, should this technology be incorporated within the Proposed Development, it is recommended that acoustic measures to limit the noise generated by the outside unit of any ASHP systems employed during operation are considered.
- **Ground Source Heat Pumps (GSHP)** – As detailed above for air source heat pump (ASHP) technology, the location of the Site means that the incorporation of ground source heat pump (GSHP) may also be appropriate to serve the space and water heating demands of the Proposed Development. Ground temperatures are typically stable throughout the year, and GSHPs are therefore able to provide a consistent level of performance throughout the year. It is highlighted, however, that there are uncertainties concerning the thermal properties of the ground, and that ground investigation and borehole drilling has the potential to be cost prohibitive, with the potential that a suitable energy source is not present. Furthermore, there is potential that the carbon dioxide and energy cost savings rising from the use of GSHP systems may not be

significant when compared to that of ASHP systems, particularly as high-grade heat is required to generate domestic hot water. It is also noted that GSHP systems are typically around twice as expensive as ASHP technology, which may therefore make the use of this technology economically unviable. Notwithstanding, the use of GSHP technology is potentially appropriate and feasible within the Proposed Development, and the potential use of systems of this type will continue to be considered as the detailed design of the Proposed Development progresses.

- **Photovoltaics (PV)** – This technology is considered to be appropriate for the Proposed Development, in light of the potential to deliver a proposed layout that includes for dwellings and non-domestic buildings with areas of unobstructed south-east to south-west facing roof space. This technology may therefore be employed to generate renewable energy on-Site, with the potential excess power to be exported to the grid or harnessed using battery storage. The use of this technology, which typically has minimal maintenance requirements, should therefore be considered during the detailed design stage to contribute to the Proposed Development's compliance with and exceedance of Part L:2021 of the Building Regulations. As such, it is recommended that the incorporation of PV technology continues to be explored through the detailed design stage and, should this technology be incorporated, details of the PV systems to be employed be provided as part of a Reserved Matters application. The potential integration of this technology should also inform the orientations of the proposed buildings, with the aim of maximising the areas of unshaded roof space that faces within 30° of due south.
- **Solar Thermal Hot Water (STHW)** – This technology may also be considered appropriate for the Proposed Development, in light of the potential to deliver dwellings and non-domestic buildings with areas of unobstructed southeast to south-west facing roof space. The incorporation of this technology can contribute to the meeting of a building's domestic hot water demand, and this technology can be employed effectively alongside a range of heating systems. It is noted that the incorporation of this technology would need to account for the requirements of other technologies that may be employed, such as heat pump or PV systems. In addition to this, the potential for hot water demand to fall outside the energy generating period for STHW systems should be accounted for, as this may result in a reduced ability for this technology to significantly reduce carbon dioxide emissions during operation. The potential incorporation of this technology within the Proposed Development will continue to be explored throughout the detailed design stage, and should this technology be included for, details of the systems will be provided as part of a Reserved Matters Application.
- **Wind Turbines** – Wind turbines may be employed to harness the kinetic energy of wind to generate electricity on-Site. The employment of this technology should account for the need for a steady source of wind that does not have an uneven direction. This technology is typically incorporated at the roof level of buildings that are significantly higher than their immediate surroundings, or within an open area, to ensure disruption to prevailing winds is minimised. The potential to incorporate this type of technology within the Proposed Development will continue to

be considered as the detailed design progresses. Should this technology be considered feasible and appropriate, details will be submitted as part of a Reserved Matters Application.

- 5.29 The incorporation of all-electric, low-carbon and renewable technologies will aid the achievement of the net-zero carbon emissions in operation in the future, which is in line with the aspirations of the Proposed Development, subject to the ongoing decarbonisation of the national grid. This is also in alignment with the commitments of Gravesham Borough Council, particularly in light of the declaration of a Climate Emergency in 2019 made by the Council.

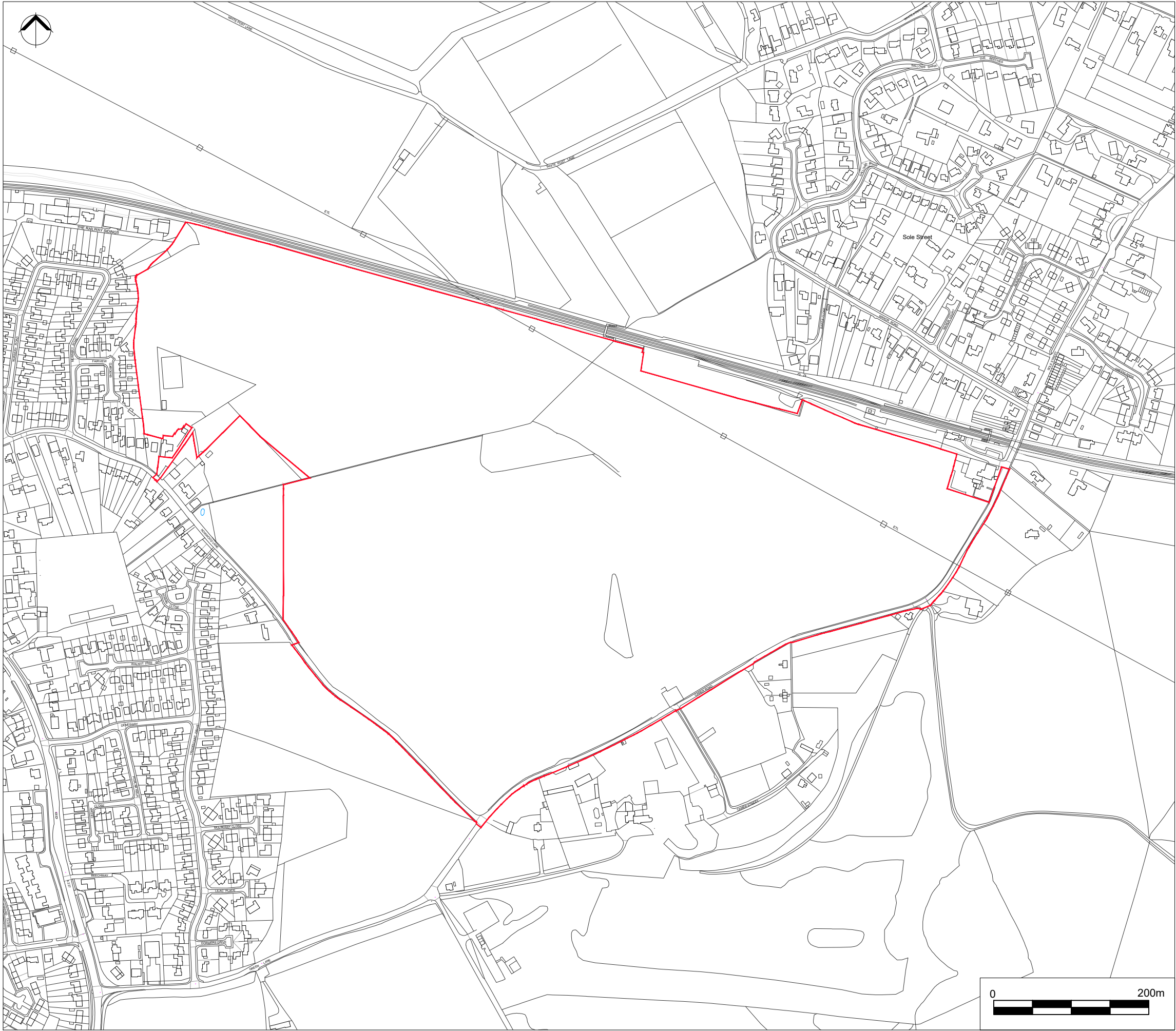
6. SUMMARY

- 6.1 This Sustainability & Energy Statement provides an overview as to how the development of Land North of Camer Road, Meopham contributes to sustainable development in the context of the strategic, design and construction considerations.
- 6.2 Consideration has been given to the Kent Design Guide and the Gravesham Local Plan Core Strategy in the formulation of this strategy, aiming to minimise the environmental impact of the Proposed Development during construction and operation, and ensure the Proposed Development is constructed to rigorous sustainability standards.
- 6.3 By designing to rigorous energy standards, employing electric-only systems, and integrating renewable energy technologies, the application will respond directly to the Climate Emergency declared by Gravesham Borough Council in June 2019. These measures combine to provide a significant carbon dioxide emissions savings compared to the Part L:2021 baseline, aiming to significantly exceed the requirements of Gravesham Borough Council.
- 6.4 Sections 4 and 5 of this statement demonstrate that the siting and design of the Proposed Development support relevant policies relating to sustainable development. This shows that the Proposed Development will:
- make efficient use of land;
 - promote the use of sustainable and active modes of transport;
 - reduce the risk of flooding on-Site and in the surrounding area;
 - minimise internal water consumption to 105 litres per person per day;
 - embed circular economy principles to minimise waste, and incorporate low-impact materials, according to the BRE Green Guide to Specification;
 - seek to minimise embodied carbon emissions;
 - mitigate the risk of overheating;
 - incorporate measures to improve Site biodiversity, including biodiverse planting;
 - provide access to extensive areas of green and open space, as well as allotments and recreation facilities;
 - ensure air, noise, ground, light and water pollution are minimised as far as possible;

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- minimise energy demand through the specification of low u-values, high levels of air tightness, and the minimisation of thermal bridging to reduce heat loss;
 - deliver fossil fuel-free dwellings, utilising electric-only systems to serve the space and water heating demands;
 - deliver fossil-fuel free non-domestic buildings, where appropriate and feasible, utilising electric-only systems to serve the space and water heating demands and, where necessary and appropriate, the space cooling demands; and
 - achieve a significant reduction in carbon dioxide emissions, following the Energy Hierarchy methodology, with the aim of achieving net-zero carbon emissions in the future, subject to the ongoing decarbonisation of the national electricity grid.

6.5 Overall, the proposals for the Proposed Development are in line with the principles of sustainable development as well as the policy requirements of the NPPF, and Gravesham Borough Council and will provide a development that promotes these principles in operation.

A1. SITE PLAN



 Planning Application Boundary - 44.32 ha

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DA VINCI HOUSE
44 SAFFRON HILL
LONDON
EC1N 8FH



T 020 3640 8508
mail@iceniprojects.com

CLIENT
McManus Family

PROJECT
Land between Meopham and Sole Street

TITLE
Planning Application Boundary

DRAWN BY	CHECKED BY
MA	MP

SCALE @ A3	DATE
1:5000	22.09.2025

PROJECT NO.	DRAWING NO.	REV.
1000487	DL00	D

Iceni Projects accept no responsibility for any unauthorised amendments to this drawing. Only figured dimensions are to be worked to.

A2. WATER USAGE CALCULATOR

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
WC (single flush)	Flush Volume (litres)		4.42	0.00	0
WC (dual flush)	Full flush Volume (litres)	6	1.46	0.00	8.76
	Part flush Volume (litres)	3	2.96	0.00	8.88
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	5.00	1.58	1.58	9.48
Bath (where shower also present)	Capacity to overflow(litres)	180.00	0.11	0.00	19.80
Shower (where bath also present)	Flow Rate(litres / minute)	6.00	4.37	0.00	26.22
Bath Only	Capacity to overflow(litres)		0.50	0.00	0
Shower Only	Flow Rate (litres/minute)		5.60	0.00	0
Kitchen/Utility room sink taps	Flow rate (litres/minute)	6.00	0.44	10.36	13.00
Washing Machine	(Litres/kg dry load)	5.63	2.1	0.00	11.82
Dishwasher	(Litres/place setting)	0.98	3.6	0.00	3.53
Waste disposal unit	(Litres/use)	☐ Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	Total Calculated use (litres/person/day) = SUM(column 4)			101.49
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			92.36
	(10)	External water use			5.0
	(11)	Total water consumption (Building Regulation 17.K) = (9)+(10)(litres/person/day)			97.4

Installation Type	Make/Model (mandatory)	Litres/Person/Day
WC (dual flush)	Grohe Concealed Cistern	17.64
Taps	Vecta+ Tap and Mixer	9.48
Baths (shower(s) present)	Ideal Standard	19.80
Showers (bath(s) present)	Dene Eco Cool Touch Bar Mixer Shower	26.22
Kitchen Taps	Reginox Rellini	13.00
Washing Machines	Samsung WW90T684DLH	11.82
Dishwasher	Samsung 2021 Series 11	3.53



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A3. GENERAL NOTES

- A3.1 The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Iceni Projects Ltd for inaccuracies in the data supplied by any other party.
- A3.2 The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.
- A3.3 No site visits have been carried out, unless otherwise specified.
- A3.4 This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in guidance may necessitate a re-interpretation of the report in whole or in part after its original submission.
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