Reigate & Banstead Borough Council Climate Change and Sustainable Construction SPD

Sustainable Development Guide

Adopted 16 September 2021

Reigate & Banstead
BOROUGH COUNCIL
Banstead I Horley I Redhill I Reigate

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Accessibility

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1. Introduction

The aim of this document

1.1. The aim of this supplementary planning document (SPD) is to support development, including residential and business, to be accountable to the challenges of mitigating and adapting to climate change, and to address other sustainability issues, some of which overlap and provide additional gains. It provides guidance and advice but is relatively high-level and acknowledges the fast pace of change in this arena, and that technologies and policies may change during the lifetime of the document.

Background

Climate Change

1.2. Since 2001, UK summer temperatures have been among the hottest since records began. According to the UK Committee on Climate Change, much of the change globally is attributable to human activity[1], particularly with regard to increasing greenhouse gas emissions (especially carbon), a view shared by the Intergovernmental Panel on Climate Change (IPCC). Climate Change is therefore a priority in international and national policy.

1.3. The likely effects of climate change for the UK include hotter, drier summers, with increased potential for heatwaves[2] and drought conditions[3], with the built and natural environment potentially becoming increasingly uncomfortable; and milder winters[4] with more frequent and/or heavy rainfall episodes that could increase run-off from built-up areas, and put additional pressure on flood plains[5]. An increased risk to urban areas was set out in the IPPC fifth assessment report[6].

1.4. The Climate Change Act 2008[7]established a target for a reduction in the UK's greenhouse gas emissions of at least 80 per cent by 2050, over 1990 levels, which has subsequently been revised to a 100% reduction[89]. Reigate & Banstead Borough Council (RBBC) has also established this as its vision for reductions[10].

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1 https://www.theccc.org.uk/the-science-of-climate-change/climate-variations-natural-and-human-factors/

2 Heatwaves are likely for every summer by the middle of the century (London Environment Plan, 2018)

3 https://www.theguardian.com/environment/2020/mar/25/parts-of-england-could-run-out-of-water-unless-urgent-action-taken-report

4 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/758983/Climate_change_impacts_and_adaptation.pdf

5 https://www.gov.uk/government/news/climate-change-means-more-frequent-flooding-warns-environment-agency

6 IPPC Assessment Report 5

7 Legislation.gov.uk

8 In 2019

9 https://www.legislation.gov.uk/ukdsi/2019/9780111187654/pdfs/ukdsi_9780111187654_en.pdf

10 Corporate Plan 2025

1.5. It is therefore important that new development is designed to reduce the type of energy consumption that leads to carbon (and other greenhouse gas) emissions, and to be adaptable to climate changes.

Other sustainability challenges

1.6. Alongside climate change are other environmental sustainability issues, including: energy and water supply; waste; pollution; healthy living environments; and biodiversity. These are all becoming increasingly high profile in wider policy and legislation.

1.7. This document focuses primarily on climate change mitigation and adaptation, but other sustainability issues are addressed, in particular where there are synergies that can be achieved through approaches to the design of the built environment, contributing to the objective of creating sustainable environments, reducing greenhouse gas emissions, and creating an environment adapted for future needs.

What is the purpose of this SPD?

1.8. Planning policy provides an important mechanism for contributing to environmental sustainability in the built and natural environment[11], including to reduce carbon emissions and address how the environment should be developed to allow for adaptation to a changing climate (also referred to as resilience).

1.9. The function of this SPD is to support and supplement the borough's Local Plan policies[12], and national planning policy. The relevant Local Plan policies are highlighted in Chapter 2 and published in full in Appendix 3. These policies should always be considered in conjunction with this SPD, alongside the Surrey Waste Local Plan. This SPD:

- Identifies design and energy-saving/efficiency measures that can result in a development minimising greenhouse gas emissions and energy use and waste, and creating places that are amenable to biodiversity and adaptable to a changing climate (including through the integration of green infrastructure);
- Provides guidance on renewable and low-carbon energy solutions, for reduced reliance on fossil fuels and finite energy sources, and for efficient use of national grid energy;
- Considers potential solutions to water shortages and efficiencies requirements;
- Addresses the materials and methods used in construction; and
- Provides clear guidance for anyone applying for planning permission, or wishing to comment upon a planning application, as well as providing a consistent approach to assessing planning applications.

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[11] National planning policy (NPPF, paragraph 7) sets out that the purpose of the planning system is to contribute to the achievement of sustainable development and its relationship with the 17 United Nations Global Goals for Sustainable Development.

[12] The Reigate & Banstead Local Plan includes the Core Strategy (adopted July 2014 and reviewed July 2019) and the Development Management Plan (DMP) (adopted September 2019).

Who is this SPD for?

1.10. This guidance document is for anyone involved in the development process, including landowners, developers/agents, designers, and householders considering any kind of schemes/development, including home conversions/extensions; town/parish councils and other interested parties commenting on proposals; and development management officers (DM) assessing applications. It is also a reference for anyone considering applying for permission for wind/solar energy (or other renewables/low-carbon) farms/stations.

1.11. Nonetheless, this guidance is not intended to be prescriptive and cannot substitute for the use of qualified architects, landscape architects, planners and environmental specialists where necessary.

Status

1.12. This SPD has been prepared in accordance with the Town and Country Planning (Local Development) (England) Regulations 2012 and has undergone consultation with local groups and national organisations, in accordance with the Council's Statement of Community Involvement (SCI). It has also been subject to Habitat Regulation Assessment (HRA), Strategic Environmental Assessment screening, and an Equalities Impact Assessment. The information contained within this SPD can be a material consideration in the determination of planning decisions. The role of this SPD is defined in Figure 1 below.

Figure 1: Role of the Climate Change and Sustainable Construction SPD

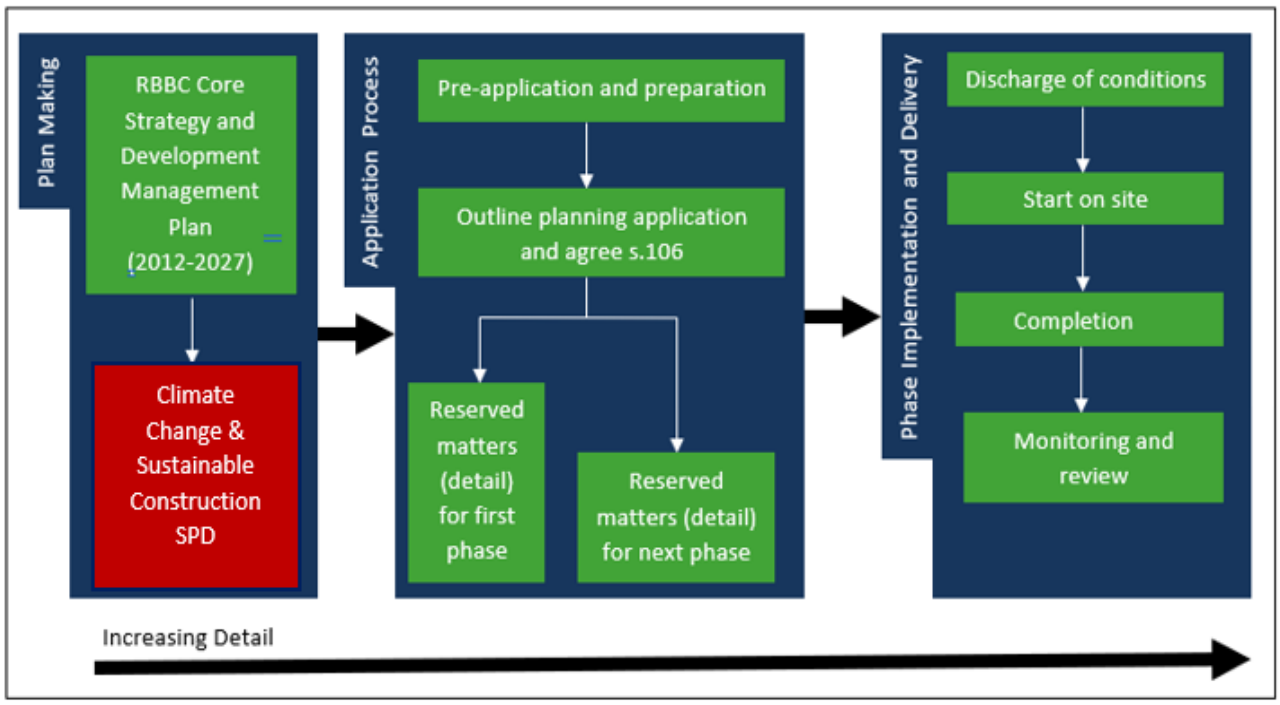
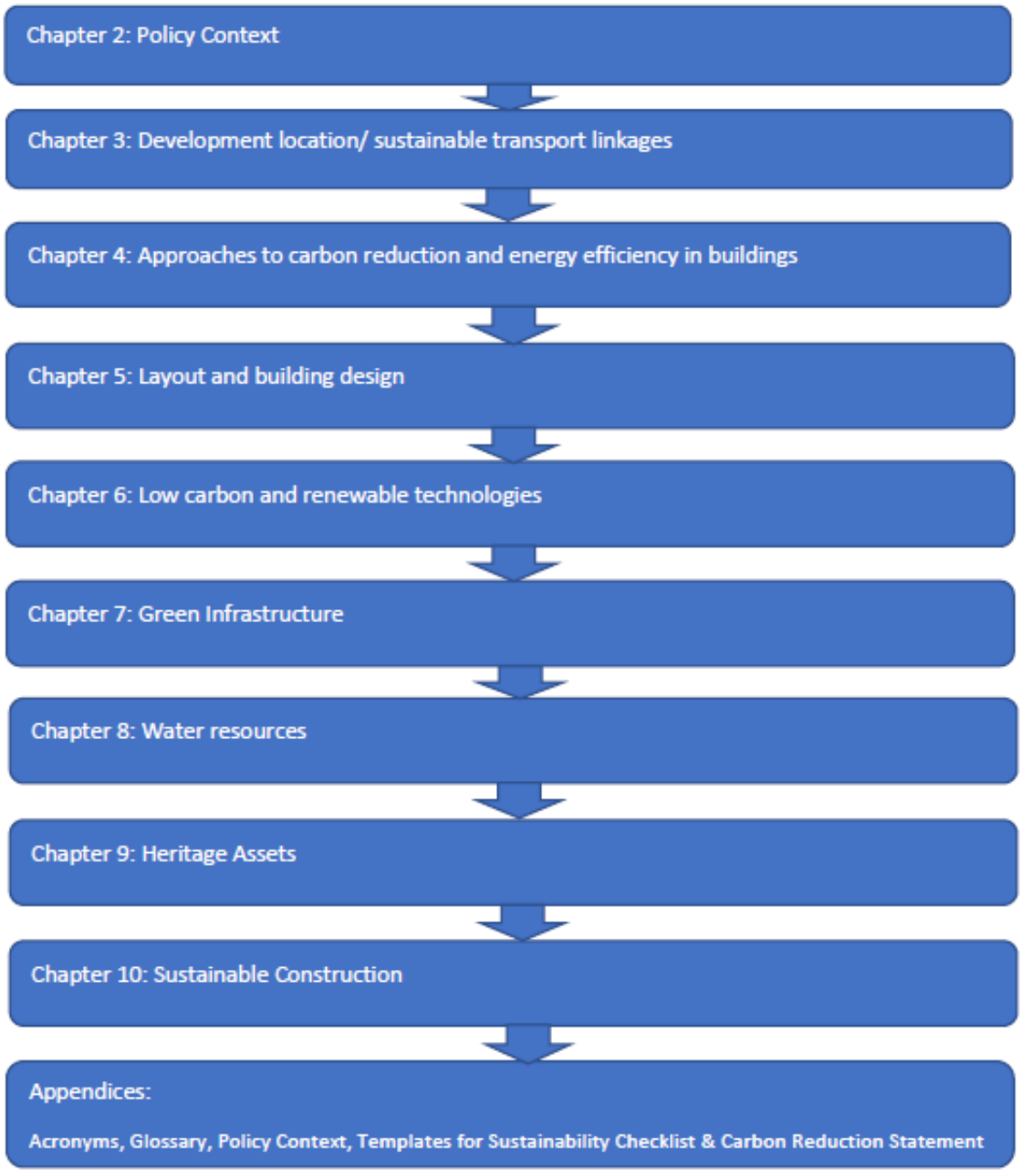


Figure 2: Structure of the SPD



Planning applications, sustainability checklist, and templates

1.13. Each of the following chapters sets out information to be taken into consideration when submitting a planning application (at the end of the chapters). This may include the submission of a carbon reduction statement (template attached at Appendix 3), or a Construction Management Statement, and reference should also be made to the Sustainability Checklist at the end of the document (Appendix 2).

Sustainability Checklist

1.14. This checklist will be included on the Council's planning applications Validation List, which helps to ensure that all relevant information has been submitted with a planning application,

to reduce delays. It has been designed to assist applicants to review their approaches to sustainability in the design of proposals for the re/development. Applicants are expected to work through this during the preparation of the planning application, starting from the pre-app consultation and engagement with planning officers (Appendix 5).

Carbon Reduction Statement

1.15. For major developments (i.e. more than 10 new homes or 1,000sqm of non-domestic floorspace), developers are expected to include a Carbon Reduction Statement. It is in two parts, the first of which assesses the carbon emissions for each unit in the scheme, and the second is an accompanying statement where the applicant should define the proposed carbon-reduction solutions for the development. This will also be included on the Validation Checklist, for major developments (Appendix 4).

Construction Management Statements

1.16. DMP policy DES8 (Construction Management) considers that a Construction Management Statement may be required for some developments to address various impacts in relation to water, waste, noise and vibration, dust, emissions and odours, ground contamination and soil pollution, wildlife and features and heritage/archaeology. This should be discussed with planning officers at the pre-application stage.

2. Policy Context

2.1. This chapter sets out the planning and wider policy context regarding: the mitigation of the causes of climate change; adaptation requirements; and broader sustainability issues.

National Context

Legislation

2.2. Under the UK Climate Change Act 2008 and subsequent Government updates to the targets in 2019[13] the UK must reduce greenhouse gas emissions by 100 per cent by the year 2050 (over a baseline of 1990).

2.3. A Green Future: Our 25 Year Plan to Improve the Environment (2018)[14] sets out the Government's approach to tackling climate change and protecting and improving international biodiversity, following agreement to deliver the UN Sustainable Development Goals (Agenda 2030). Local Plan policy regarding the mitigation of, and adaptation to, climate change is a legal requirement set out in the Planning and Compulsory Purchase Act 2004 – Section 19 (1A)[15].

National Planning Context

2.4. Local plan policy (including the policies in the Local Plan and in this SPD) conforms to the National Planning Policy Framework (NPPF) (2021) and is guided by national Planning Practice Guidance (PPG).

2.5. The NPPF highlights the UK's commitment to the United Nations 17 Goals for Sustainable Development[16] and requires climate change mitigation and adaptation to underpin plan-making and decision-taking, within land-use planning. It makes clear the need for planning to facilitate a move towards mitigation of climate change[17], including through support for renewable/ low carbon energy and infrastructure, and through the shaping of places to support reduced carbon emissions[18]. National planning policy also sets adapting to climate change as a key objective of planning[19], and contains policy on prudent use of natural resources, including minimisation of waste, and reduced pollution, as well as water supply, and green infrastructure and how this relates to sustainability.

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[13] https://www.legislation.gov.uk/ukdsi/2019/9780111187654/pdfs/ukdsiem_9780111187654_en.pdf

[14] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

[15] https://www.legislation.gov.uk/ukpga/2004/5/contents

[16] Paragraph 7
[17] Paragraphs 8c, 153, and 154
[18] Paragraph 153
[19] Paragraphs 8 and 154

2.6. The Planning Practice Guidance considers that planning has an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable, to secure the UK's energy supply.

Aerodrome Safeguarding

2.7. Aerodrome safeguarding is embedded into the Town & Country Planning process by way of ODPM/DfT Circular 01/2003 'Safeguarding of Aerodromes, Technical Sites & Military Explosives Storage Areas: The Town & Country Planning (Safeguarded Aerodromes, Technical Sites & Military Explosives Storage Areas) Direction 2002'.

Building Regulations consultation 2021

2.8. As part of the government's commitment to achieve net zero carbon by 2050, in January 2021 the government consulted on revisions to Part L of the building regulations. Part L sets the standards for energy efficiency in new development. The proposals include a significant uplift in the required standards above the 2013 standards on which the Local Plan policies are based.

Local Plan

2.9. The guidance set out within this SPD is tied to the policies within the Reigate & Banstead Local Plan, which includes the Local Plan Core Strategy 2014 (Reviewed 2019) and the Development Management Plan 2019 (DMP). Figure 3 below sets out the relationship between the Local Plan's vision and objectives, and its and policies. The policies are included in full in Appendix 3.

2.10. The Core Strategy sets the broad direction for development in the borough and, notably, policy CS11 requires that non-residential development of new or replacement buildings or extensions must meet a minimum standard of BREEAM[20] 'very good', taking account of viability[21].

[20] BREEAM (Building Research Establishment Environmental Assessment Method) is a sustainability assessment method that is used for masterplan projects, infrastructure and buildings.

[21] Point 1b/1.

Figure 3: Local Plan vision, objectives and policies

The Council's Vision 'Reigate & Banstead will be one of the most desirable and attractive areas in the region. It be a place where; '... the environment, and green space, is maintained and enhanced for the future....'.	
Core Strategy Objectives	**DMP Objectives**
SO1 **To ensure that future development addresses the economic and social needs of the borough without compromising its environmental resources.** **(policy CS10)**	**SC6** **Require new developments to provide adequate parking, whilst recognising the need to encourage sustainable transport choices, particularly in the most accessible locations.** **(policies TAP1 & TAP2)**
SO6 **To maintain and enhance the borough's valued landscapes, historic, built and natural environment including habitats and species and heritage assets.** **(policy CS4)**	**SC8** **Encourage new development to incorporate passive and active energy efficiency measures and climate change resilience measures and where appropriate incorporate renewable energy technologies. (policies CCF1 & CCF2)**
SO9 **To ensure that design of new development makes best use of the site, integrates effectively with its setting, promotes local distinctiveness, maximises accessibility and minimises the opportunity for crime.** **(policies CS4 & CS10)**	**SC9** **Direct development away from areas at risk of flooding, and ensure all developments are safe from flood risk and do not increase flood risk elsewhere or result in a reduction in water quality.** **(policy CCF2)**

SO10 **To require that developments conserve natural resources, minimise greenhouse gas emissions and help reduce waste, and are adaptable to climate change (including the risk from flooding.** **(policies CS10 & CS11)**	**SC10** **Ensure new development protects, and enhances wherever possible, the borough's landscapes and biodiversity interest features, providing the highest degree of protection to internationally and nationally designated areas.** **(policy NHE4)**
SO14 **To tackle congestion, pollution and greenhouse gas emissions of private car use by promoting sustainable modes of transport to promote healthier lifestyles. (policies CS06, CS10 & CS17)**	**SC13** **Conserve and enhance heritage assets across the borough, supporting their continuing viable use and cultural benefits.** **(policy NHE9)**

2.11. The DMP sets out more detailed policies, the key policy being CCF1 (Climate Change Mitigation) which requires that new developments must achieve at least a 19 per cent improvement on the Dwelling Emission Rate (DER) (for residential developments) over the Target Emission Rate (TER), as per L1A of the 2013 building regulations. For non-residential developments over 1,000 sqm floorspace, 10% of expected energy usage should be from renewable or low-carbon generation, unless it can be shown not to be viable.

Other relevant local policy documents

Reigate & Banstead Environmental Sustainability Strategy (June 2020)

2.12. This strategy recognises the important role the planning system can play to meet sustainability objectives, including achieving net zero carbon emissions by 2050. It builds upon Reigate & Banstead's 2025 Corporate Plan commitment to be proactive on tackling climate change and reducing the borough's environmental impact.

2.13. The strategy's primary concern is to embed sustainability principles within the Council's practices, particularly where the Council has responsibilities. The strategy supports the introduction of SPDs and/or Planning Position Statements to provide further guidance to developers on topics including energy and carbon reduction. The strategy also seeks the introduction of templates to standardise the information received in relation to energy and sustainability for use by planning applicants for inclusion in the planning validation checklist[22].

[22] https://www.reigate-banstead.gov.uk/downloads/file/6410/environmental_sustainability_strategy_2020 Chapter 6

Local Distinctiveness Design Guide (2021)

2.14. This guide should be referred to for all design considerations, including sustainability. It sets out key elements of the local built environment character and design requirements.

Surrey County Council (SCC) plans and guidance

Climate Change Strategy (2019)

2.15. Developed from SCC's commitment to support the Government's zero-carbon target, this strategy sets out the County's, Boroughs' and Districts' collective approach to tackling climate change. It identifies a range of ambitions and sets targets for these. A number of these ambitions are pertinent to new development, including areas noted below.

2.16. **Transport:** There is an ambition to deliver/promote an integrated, accessible, transport system across the county, including active travel (walking or cycling), thereby reducing car journeys and improving local air quality for improved health and wellbeing of residents.[23]The requirements of this SPD are in concurrence with and should help to achieve this aim.

2.17. **Housing and Planning:** There is an ambition to support the creation of low carbon, healthy homes for residents that reduce emissions, have lower running costs, and improve the wellbeing of the community.[24] The requirements of this SPD are in concurrence with and should help to achieve this aim.

2.18. **Buildings and Infrastructure:** There is an ambition to pursue lower operational energy use and increased supply of renewable energy to SCC's buildings.[25] This SPD takes a similar approach, for new developments.

2.19. **Waste, Resources and Circular Economy:** There is an ambition to create a system centred on circular economy principles that seeks to prioritise the reduction of waste creation and encourage innovative approaches to waste reutilisation and recycling with throwing away becoming a last resort. This SPD also seeks to support this aim.

The Surrey Waste Local Plan (SWLP) 2019-2033 (2020)

2.20. This provides the spatial and management policies for waste and recycling to 2033 across Surrey. SWLP Policy 4 (Sustainable construction and waste in new development) is particularly relevant as it seeks to: minimise waste during construction, maximising opportunities for the re-use and recycling of construction, demolition and excavation residues; and to promote integrated storage for waste recycling.

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[23] The aim is for a 60% emissions reduction in the transport sector by 2035 against BAU as a minimum.
[24] The aim to achieve a 66% emissions reduction in the domestic housing sector by 2035 against BAU as a minimum.
[25] The target is for a 61% emissions reduction across commercial and public buildings sector by 2035 against BAU as a minimum.

The Surrey Minerals Plan (SMP) (2011)

2.21. The Surrey Minerals Plan consists of three documents: the Surrey Minerals Plan Core Strategy Development Plan Document 2011; the Surrey Minerals Plan Primary Aggregates Development Plan Document 2011; and the Surrey Minerals Plan Aggregates Recycling Joint Development Plan Document 2011. Objective 1 of the Core Strategy seeks to reduce demand for minerals by increasing the supply of recycled and secondary aggregates, and encouraging the sustainable use and recycling of minerals and the use of substitute materials in construction. The Plan also includes requirements for mitigation measures for adaption to climate change including flood and ecological considerations

Surrey SuDS (Sustainable Drainage Systems) design guidance (2019)

2.22. Surrey County Council is the lead local flood authority (LLFA) for Reigate & Banstead borough, and is the risk management authority for local flood risk defined as flooding from surface water, groundwater and ordinary watercourses. SuDS are required on all major planning applications, and under Ministerial Statement HCWS161 and The Town and Country Planning (Development Management Procedure) (England) Order 2015, the LLFA are a statutory consultee for surface water for all major planning applications (10 or more properties or >1000m2 or >1ha). A Surface Water Drainage Strategy should also be submitted to support all major planning applications.

2.23. Surrey's guidance includes design criteria for different surface water discharge, and management options, as well as the use of planning conditions. SuDS is considered in Chapter 8 below, but reference should be made to SCC's own guidance.

2.24. The Surface Water Drainage Strategy can either form part of the site's Flood Risk Assessment or a separate document.

Conclusion

2.25. This chapter draws together a range of existing national, county and local policies which relate to climate change adaptation and mitigation, and sustainable construction. It sets out good practice guidelines and advice to assist the delivery of development schemes which meet national and local policies. This will also contribute to both national, county and council targets for climate change, through the part that development can play in meeting high standards for design and construction[26].

[26] Core Strategy paragraph 7.2.2

Further Information

National Planning Policy Framework 2021

Planning Practice Guidance

Building Regulations

Reigate & Banstead Core Strategy 2014

Reigate & Banstead Development Management Plan 2019

Reigate & Banstead Environmental Sustainability Strategy 2020

Reigate & Banstead Local Character and Distinctiveness Design Guide Supplementary Planning Document 2021

Surrey's Climate Change Strategy

Surrey Waste Local Plan 2020

Surrey Minerals Plan Core Strategy Development Plan Document 2011

Surrey Minerals Plan Primary Aggregates Development Plan Document 2011

Surrey Minerals Plan Aggregates Recycling Joint Development Plan Document 2011

Surrey County Council SuDs Design Guidance 2019

3. Development Location and Sustainable Transport Linkages

3.1. The selection of location for a new development is an important element in the sustainability of that development depending on its use – in particular the opportunity to minimise the need to travel using a vehicle[27]. The approach to this is largely set out as part of the Local Plan strategy, in the Core Strategy and Development Management Plan (DMP) and is not addressed through this SPD.

3.2. However, it is important to consider the linkages between a development and adjoining areas, and how these can be enhanced to facilitate active travel and reduce car use[28] to create places that are sustainable - reducing greenhouse gas and other harmful emissions - and adaptable to climate change[29]. This chapter sets out measures that can be considered for achieving this aim but is limited to the design of developments for transport. Local Plan policies CS17 and TAP1 set out requirements for Transport Assessments (TA) and travel plans where necessary (for developments likely to generate significant movement), and CS17 (1b) includes requirements for contributions to local public transport facilities where necessary.

Relevant local plan policy links

3.3. The relevant Local Plan policy links for this chapter are: CS10; CS17; DES1; DES7 (re: access); and NHE4. DMP Policy TAP1 requires that all developments provide electrical vehicle charging points (point 1.f).

Accessibility to local services and public transport (larger developments)

3.4 All developments should be designed with residents' or users' access to other facilities and services - and to wider public transport services - in mind[30], facilitating walking and cycling, or reduce the length of vehicle trips – thereby cutting greenhouse and other polluting emissions and need for energy supplies. This can also contribute to the wider sustainability objectives of providing opportunities for healthy lifestyles, and opportunities for those without access to cars. Accessible places is included as one of the ten characteristics of a well-designed place in the National Design Guide. Options for travel for those without cars should always be considered.

3.5 For residential developments this should include access to schools, local retail and community services, and public transport/cycle route links to wider facilities, and for employment sites, access to public transport/cycle route links to surrounding areas should be designed into the scheme. Where travel plans are required this can include provision such as mini-bus links to stations.

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[27] as set out in local plan policies CS10 and CS17
[28] As required by TAP1: *Access, parking and servicing*
[29] The importance of 'the potential for servicing sites through sustainable transport solutions' in regard to reducing vehicle emissions, is noted in the NPPG, Paragraph 007, ID: 9-007-20140306
[30] As required by CS17, DES1, and TAP1

Site permeability (larger developments)

3.6 Pedestrian and cycle – and public transport - access through and beyond larger sites should be planned at the outset as part of the design of the development. The site's permeability[31] should not only facilitate access for residents/users of the site, but also other pedestrians and cyclists where the site is large enough to block routes – or could enable access that was not previously available, to improve the wider network.[32] (See also paragraphs 6.16/6.18 of the Council's Local Character and Distinctiveness Design Guide SPD.)

Facilitating active travel options

3.7 Providing for 'active' travel, such as walking and cycling, can include provision of dedicated pedestrian and cycle routes through sites or contributions to/connections with other routes. It should also include secure parking for bicycles and/or shower/storage facilities, and the design of streets to make walking or cycling more safe or convivial.[33]

Dedicated pedestrian and cycle routes

3.8 For larger sites, safe pedestrian and cycle routes through the development – and connecting to wider networks – should be incorporated. This should include connections to green infrastructure leisure networks[34], or routes enabling access to schools (for residential developments), service centres, or wider public transport.[35]

3.9 Pedestrian routes in particular need to be as direct as possible – and the provision of a dedicated route should be included where the design of a development means that the roads take circuitous routes.

3.10 Routes provided should be convenient, safe, and legible, for all ages and abilities to use, with appropriate signage, lighting and overlooking. They should also be convivial, where possible, with the provision of seating for pedestrians, and planting.

3.11 Pedestrian and cycle routes should also avoid areas of potential flooding within sites and provide shelter from the sun and rain (for climate adaptation[36]).

Street design (large sites)

3.12 The design of roads within larger sites should be approached with regard to how pedestrians and cyclists can use them safely and conveniently, alongside consideration of the design and character of the area (for which the Council's Local Distinctiveness Design Guidance SPD should be consulted). This is particularly important in respect of clear and safe routes to schools and local services and should address the need for crossings points (pelican crossings for areas likely to be busier, and centre refuges). It should also consider

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31 Required as per policy TAP1 (e).
32 Block designs are sometimes useful with this in mind, enabling access for any additional public transport services.
33 As required by policies CS10, CS17 and TAP1.
34 As per policy NHE4
35 As required by policies TAP1, CS10 and CS17
36 Regarding policy CS10, point 9

the design of junctions of residential streets with main roads, avoiding large visibility splays that make crossing the ends of roads difficult for pedestrians, both in terms of vehicle speeds and increased crossing widths; it is sometimes also possible to include raised level crossings across these.

3.13 Reference should also be made to the Council's Local Character and Distinctiveness Design Guidance at paragraph 6.4 in regard to the creation of places that offer a safe environment for walking and cycling, including through the design of buildings to provide active frontages, where appropriate, and to provide natural surveillance. Unnecessary street furniture and signage clutter should be avoided.

3.14 20mph zones may be suitable for some residential development, or even Home Zones where vehicle access would be limited and safe spaces for children to play outside would be created. In suitable residential developments, sensitive parking designs can be used to slow traffic speeds and provide aesthetic appeal, for example through the use of planter schemes. This needs to be carefully balanced against potential air quality issues which can result from lower vehicle speeds or additional waiting and circulating.

Bicycle parking, and storage

3.15 Adequate parking for bicycles should be provided for users/residents and visitors to developments, depending upon their size and function, and this should be secure, preferably covered, and sensitively screened, for example through the use of planting schemes[37]. Requirements for cycle parking are set out in DMP policy TAP1, Annex 4, and the emerging Local Character and Distinctiveness Design Guide SPD.

Electric vehicle charging points

3.16 Electric vehicles have the benefit of eliminating emissions of particles and NO_2 from exhaust pipes (though particles are still generated from the use of the tyres) and reducing greenhouse gases where the source of electricity is decarbonised. The UK Government has announced[38] a ban on the sale of new petrol and diesel cars and vans from 2030[39], with hybrid vehicles allowed to be sold until 2035.

3.17 This provides impetus for the Council to ensure provision of electrical vehicle charging points at all new developments attracting car travel in line with national planning policy[40] and as required by DMP policy TAP1 (1.f). The Council's own Environmental Sustainability Strategy contains a priority to move towards the use of electrical vehicles[41].

3.18 Charging points should be located in safe, accessible and convenient locations, and developments should provide the advance provision of cabling and ducting in line with

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37 See the Council's Local Distinctiveness Design Guide SPD, paragraph 6.49.
38 18 November 2020
39 https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030
40 National Planning Policy Framework 2018, paragraph 110
41 Chapter 3: Energy and Carbon

national planning policy. There may also be a need for increased power supplies to the area.

3.19 There are different types of charging points and the most appropriate designs will need to be assessed for the sites and types of development in question. For residential developments this is a 'Type 2' socket, which we will also require to be used for commercial sites, unless the need for faster charging can be shown. Where practicable in the residential setting the charge point design should also allow for vehicle to grid (V2G) operation.

3.20 The design of charging points should be as discrete as possible, avoiding obtrusiveness and clutter, and any illumination should be designed to avoid light-pollution effects.

Reduced travel through internet connections

3.21 Use of technology can greatly help reduce the need to travel. This has been highlighted during the Covid 19 pandemic as many switched to using conference call technologies to communicate. This greatly helped to reduce climate change emissions.

Planning Applications

Sustainability Checklist

3.22 Developers and designers should comply with the points set out in the sustainability checklist where appropriate (Appendix 5).

Conditions

3.23 Conditions may be applied to permissions in regard to: design and implementation of dedicated pedestrian and cycle routes, or financial contribution to wider routes in localities; the provision of sustainable transport linkages where employment development is not close to facilities or public transport; implementation of travel plans as required; and the provision of electrical vehicle charging infrastructure.

Transport Assessments and Statement

3.24 For developments likely to generate a large amount of travel by car, transport assessment and/or statements are a requirement of DMP policy TAP1. If sustainable transport enhancements, such as travel plans, smart travel, or design implementations can be calculated to reduce carbon reductions from transport, this should be set out in the carbon reduction statement.

Further guidance and tools

Department for Transport Manual for Streets 2007

Reigate & Banstead Development Management Plan Annex 4: Parking Standards 2019

Reigate & Banstead Local Character and Distinctiveness Design Guide 2021

Reigate & Banstead Green Infrastructure Strategy 2017

Surrey Transport Plan (LTP3) 2017

Surrey County Council Reigate & Banstead Major Transport Schemes 2019

4. Carbon reduction – Energy Hierarchy and Carbon Reduction Statements

Introduction

4.1 This chapter introduces the concept of a hierarchical approach to energy reduction and carbon emissions, and the requirement for Carbon Reduction Statements to accompany planning applications. Subsequent chapters go on to explain how carbon can be reduced in new development by following the energy hierarchy approach and the measures needed to support this aim.

Relevant local plan policies

4.2 Policy CCF1 requires that new residential development achieves not less than a 19% improvement in the Dwelling Emission Rate (DER) over the Target Emission Rate (TER) as defined in Part L1A of the 2013 Building Regulations. This is equivalent to a 44% reduction compared with the Building Regulations 2006 baseline. The TER is expressed as the mass of CO_2 emissions emitted in kilogrammes per square metre of floor area per year.

The Energy Hierarchy

4.3 One way to approach the use of energy and reducing carbon emissions associated with new development is through using the concept of an 'Energy Hierarchy'. This starts with the premise of needing to use less energy, then considers how energy can be supplied and used more efficiently, and then, where possible and preferable, supplied from renewable sources. This approach is followed through in the following chapters of this SPD.

Reduced energy needs and passive/active design

4.4 Development should reduce needs for energy through fabric and servicing improvements, and measures to achieve this should include 'passive' design approaches such as optimizing the orientation of the building, natural ventilation and lighting, thermal mass and solar shading, and 'active' design measures, including low efficacy lighting and efficient mechanical ventilation with heat recovery. These measures are primarily set out in chapter 5 but are also addressed in Chapter 7 on green infrastructure (through planting for insulation and shading).

Energy efficiencies

4.5 Once the demand for energy has been minimised, the heating and cooling energy demands for the development should be assessed in regard to the energy requirements of surrounding land uses, as efficiencies between uses in proximity may be achievable. This also applies to land uses within larger developments. Measures to consider may include a

connection to district heating networks or onsite combined heat and power (CHP) systems. This is covered in Chapter 6.

Renewable energy supplies

4.6 The second part of Chapter 6 considers opportunities for producing, storing and using renewable energy on-site.

Planning Applications

Carbon Reduction Statement

4.7 To ensure that the most suitable means to reduce energy needs and carbon emissions are being integrated into a new development, applicants will be required to prepare a **Carbon Reduction Statement** to demonstrate how the proposal will meet or improve on the TER (as per the requirement of DMP Policy CCF1).

4.8 As part of the statement the applicant will be required to demonstrate that the proposal will be following the energy hierarchy to minimise carbon emissions. Suggestions on how to reduce carbon emissions in developments are included in the following chapters, which should be considered in the preparation of a Carbon Reduction Statement (Appendix 4).

4.9 A condition will be attached to a planning permission requiring the monitoring of the carbon savings of the scheme for five years from completion. This is to compare anticipated and actual carbon emission reductions.

Further information

The UK's draft Integrated National Energy and Climate Plan (NECP) 2019

5. Layout and Building Design (for reduced energy needs)

Passive Design

5.1 Planning can be a powerful mechanism for reducing the energy requirements and related emissions associated with a development, through influencing factors such as the orientation of buildings and the layout of sites[42]. Development can be configured to achieve maximum benefit from natural resources, such as daylight, solar energy, and cooling breezes, simply through the layout/arrangement of buildings on a site; and this achieves a 'win-win' solution to sustainable development[43]. It can also create healthier living environments, for example, through maximising access to daylight within rooms, and reducing the need for air-conditioning – and associated noise. Other measures include insulation. This is known as passive design.

5.2 Similarly, the glazing or paint colour of a building can significantly reduce its carbon footprint, reducing or eliminating energy needs, and ensuring a high quality of insultation will achieve immediate reductions in the need for energy.

5.3 Furthermore, passive design can help with adaptation to climate change; buildings can be designed to utilise natural features of the environment, including the weather, to assist with cooling or heating, and to be resilient to more extreme weather conditions.

5.4 To assist in the preparation of a Carbon Reduction Statement to accompany a planning application, this chapter covers: overall site layout/design; building orientation; Thermal Mass; ventilation; airtightness; and solar gain and overheating. The statement should include a discussion on the proposed solutions and reasoning as to why the chosen approach is being proposed over other options.

Relevant local plan policy links

CS10, CCF1, DES1

Site layout and design

5.5 For larger sites, the layout of buildings and facilities can affect the amount of natural or shared heat and light available for energy efficiencies, and this is best considered at the design stage alongside and in balance with other design considerations, such as local distinctiveness, and the aesthetic quality of the development.

5.6 Where possible, taller buildings should be placed towards the northern section of a site to reduce the effect of shadowing across the site – but this should not be done in a regimented or artificial manner and should be applied where it will provide overall benefits. Similarly,

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[42] National Planning Policy Framework, paragraphs 150 and 153 – and 131 re innovation
[43] National Planning Practice Guidance, paragraph 004/ Reference ID: 6-004-20140612

parking facilities such as garages can usefully be placed towards the north of buildings for similar reasons, provided they don't harm the amenities of neighbouring sites and land uses. However, parking-dominated frontages should be avoided. (Please see page 53 of the Council's Local Distinctiveness and Design Guide SPD 2020 regarding the design of parking.)

5.7 The spacing of buildings on sites should also be considered to strike a balance between gaining an optimum level of natural heat and light, including also considering efficiencies of reduced loss of heat through compact development, whilst avoiding contributing to the Urban Heat Island Effect in locations where this might be an issue.[44]

5.8 Where the topography of a site allows, the best use should be made of opportunities for building into slopes or into the ground, where this can offer thermal buffering and the exploitation of ground heat.[45]This can also offer protection to buildings from harsher weather conditions, allowing for adaptation to climate changes.

5.9 However, as sites are configured to allow for optimum benefit from the sun's power and for adapting to climate change, the siting of solar panels and arrays on buildings in the vicinity of the site also need to be taken into account (in the same way as neighbouring amenities) and this may therefore inhibit the preferred choice of design/layout for the new development. Nonetheless, passive gains for a new development at the expense of the ability of established sites to run sustainably will not be acceptable, and this will need to be factored into the calculations for designs.

Building orientation

5.9 On all development sites, but particularly larger sites, developers will be expected to demonstrate that consideration has been made as to how buildings are arranged for maximum natural energy and cooling, as well as associated health benefits.

Residential development

5.10 In residential developments where there is a north-south axis, the orientation of the buildings as shown in Figure 4 will maximise heating in the morning and evening when it is most needed. This layout also helps to reduce overshadowing between buildings due to the angle of the sun's path. Habitable rooms, including living rooms and bedrooms, would best be located on the west elevation to maximise the heating and lighting effects from solar gain later in the day.

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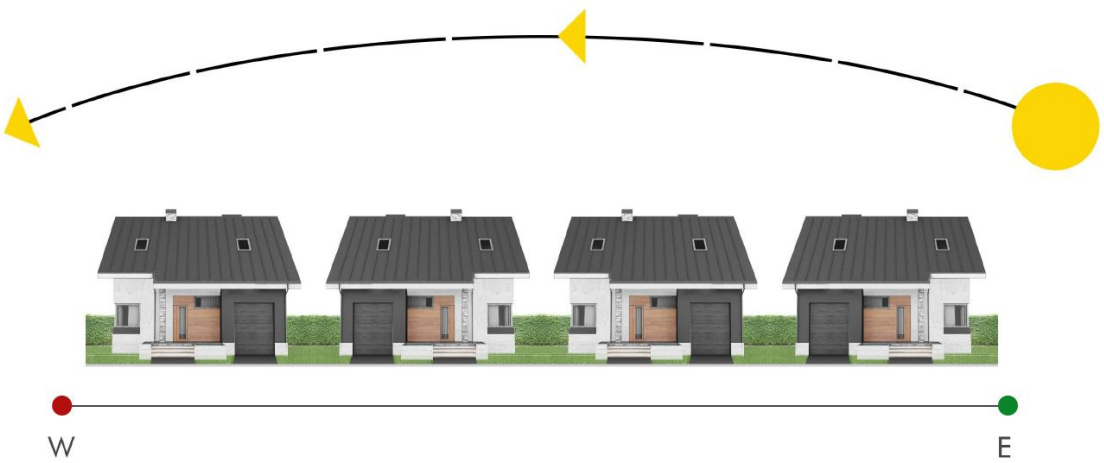
44 In line with the principles of policies CS10/CCF1.

45 In line with policy CS10 re maximising energy-efficiency, and CCF1.

Figure 4: Orientating dwellings on a north-south axis

5.11 On sites with an east-west axis, the orientation of dwellings as shown in Figure 5 will maximise solar gain on the south elevation. With such a site orientation, habitable rooms are best located on the south elevation with kitchens and bathrooms located on the north side. Such orientation will maximise heating from the sun in the winter, but this would need to be balanced with the risks of overheating in the summer when shading may be required either from trees or other forms of planting (see Chapter 7 on green infrastructure), or from louvres.

Figure 5: Orientating dwellings on an east-west axis

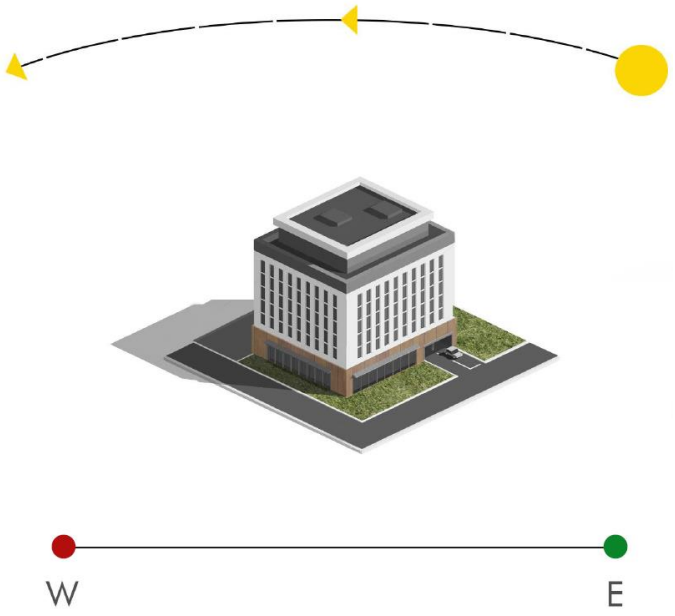


Non-residential development

5.12 In the case of commercial properties an understanding of how and when the building is used can result in a different optimum orientation. In the case of commercial buildings, heat generally builds up during the day as a result of computers and other electrical equipment being used. To help reduce solar gain an east-west axis is preferable, with glazing on the

north elevation to maximise light and prevent excessive heat gain, which can still be an issue in winter.

Figure 6: Orientating a non-residential development



Thermal Mass

5.13 A further key consideration with passive design is Thermal Mass; the choice of building materials will have an important bearing on how temperatures are moderated in a building. High thermal mass materials absorb heat during the day and release it during the night, helping to regulate the temperature within the building. Materials that have a high thermal mass include brick and block with plaster finishes, whereas timber framed buildings have a lower thermal mass (though this can be weighed against the benefits of lighter insulated materials and modern constructions methods in reduced embodiment of carbon, and it is for the developers to determine the merits of each for energy efficiency and reduced carbon emissions). Choice of materials will depend upon the scheme, but the embodied carbon will need to be considered.

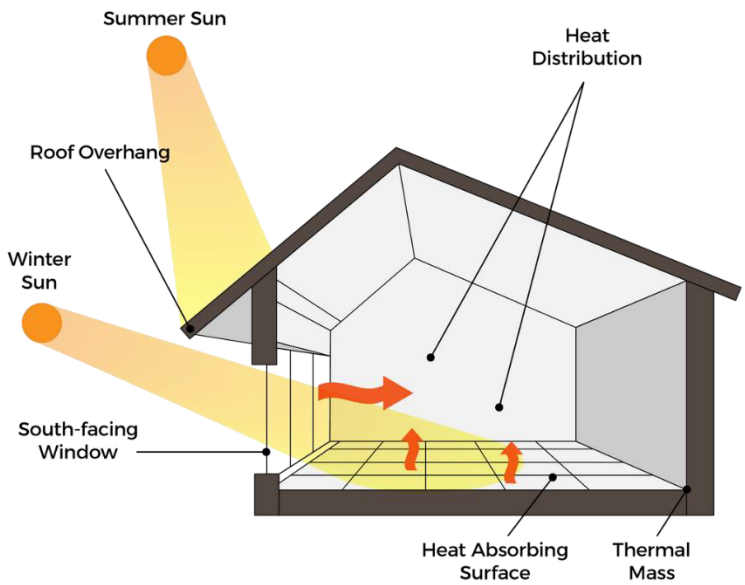
5.14 Thermal mass is a passive design feature, not a method of insulation. It can reduce the cooling load of a building in summer and the heating load in winter, therefore reducing carbon emissions.

5.15 In the summer, thermal mass helps prevent buildings from overheating by absorbing heat from the sun and from the building's occupiers, rather than heating the building's interior. In an office building, for example, the peak internal temperature is usually in the afternoon, particularly in the summer when the building is occupied and heat is being generated from the occupants, computers, and lighting. At night when the building is vacated, the heat diminishes, external temperatures fall, and heat is released from the thermal mass of the building. This absorption of heat by the building's fabric and its release at night will help reduce the need for air conditioning, reducing energy consumption and carbon emissions.

5.16 In the winter, as in the summer, during the day the building absorbs heat but at night the thermal mass prevents the building from getting cold. This reduces the amount of energy needed to heat the building the following day to bring the building up to an appropriate temperature, thereby minimising carbon emissions and saving energy.

5.17 Figure 7 illustrates how a dwelling can be designed to maximise the benefits of thermal mass all year round.

Figure 7: Maximising the benefits of thermal mass



Source: http://www.dkcontractors.biz/uploads/1/3/2/8/13288406/passive-solar-design_orig.png

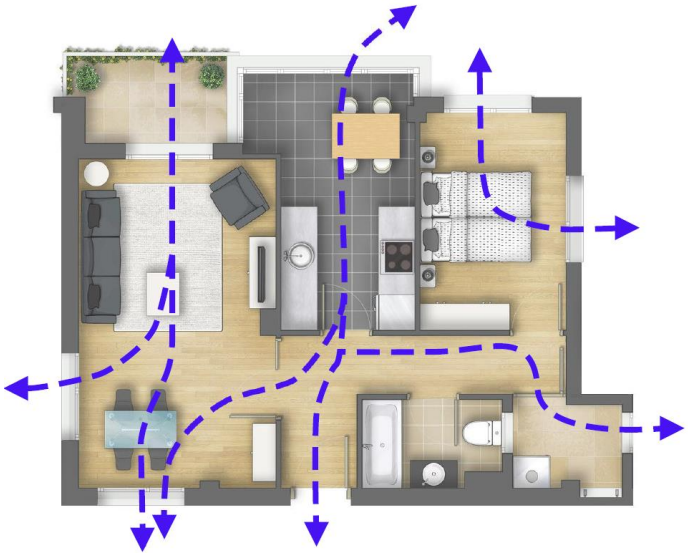
Natural ventilation

5.18 Natural ventilation is the supply and removal of air through a building using natural means. This can reduce the need to mechanically ventilate a building and therefore reduces energy consumption. However, such ventilation is variable as it is dependent on the speed and/or temperature of the wind. There are two types of natural ventilation: wind driven and passive stack.

Wind driven ventilation

5.19 Wind driven ventilation utilises pressure differences that occur when air flows over a building. The appropriate placement of ventilation openings will draw air through the building openings thereby providing natural ventilation (Figure 8 below).

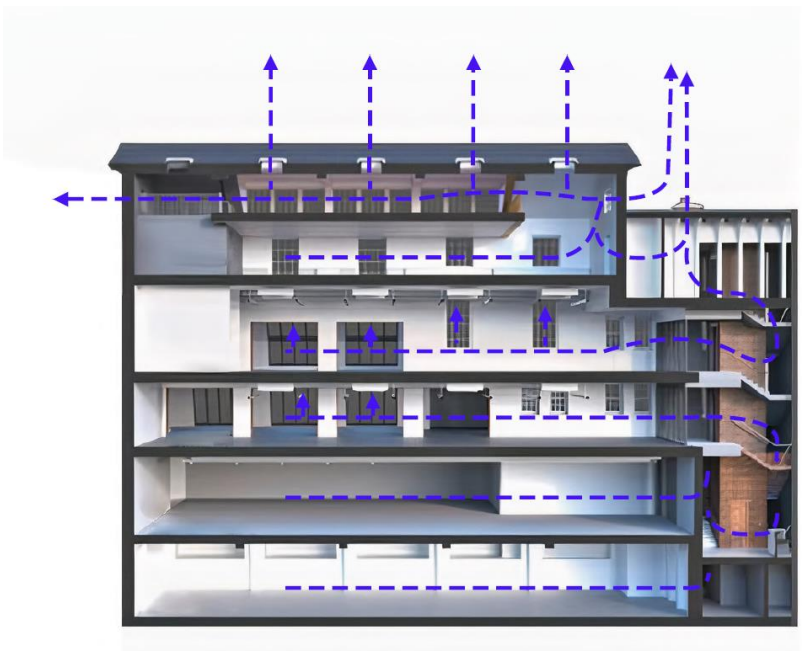
Figure 8: Wind driven ventilation



Passive stack ventilation

5.20 Passive stack ventilation is driven by differences in internal and external temperatures and is achieved by placing ventilation openings at different heights. It is based on the 'stack' effect whereby warm air naturally rises and is replaced with cooler air entering at a lower level. In order to make a passive stack approach work, vents should be placed in rooms which require fresh air to replace moisture-laden or odorous air. Ducts draw the warm air up and out of the building, and ventilation openings (such as trickle vents in winter or open windows in summer) draw in fresh air from 'dry' rooms. Figure 9 illustrates this approach.

Figure 9: Passive stack ventilation



Insulation

5.21 Around half of the heat lost in a typical home is through the walls and roof spaces. Increasing insulation levels significantly beyond current building regulations requirements is the cheapest and most effective method of reducing CO2 emissions, and energy needs. It requires minimal maintenance and should last the life of the building. It reduces heat losses and gains through the fabric of the building and minimises the costs of heating and cooling systems. Buildings are kept warmer in the winter and cooler in the summer. Insulation measures include:

- Loft insulation;
- Tanks and pipe insulation;
- Cavity wall insulation;
- Solid wall insulation;
- Floor insulation;
- Draught proofing; and
- Double and triple glazing.

5.22 However, as with all measures, this should be weighed against other design considerations. In particular, the use of solid wall insulation should be avoided where this can affect the appearance of traditional brickwork and tile-hangings[46].

5.23 Thermal insulation is measured using 'U values'. The U value is a measure of how readily heat will flow through the structure. The lower the U value, the less heat is transferred through the fabric of the building. An increased thickness of insulating materials will increase energy efficiency and reduce the U value. More information on home insulation can be found at the Energy Saving Trust.

Airtightness

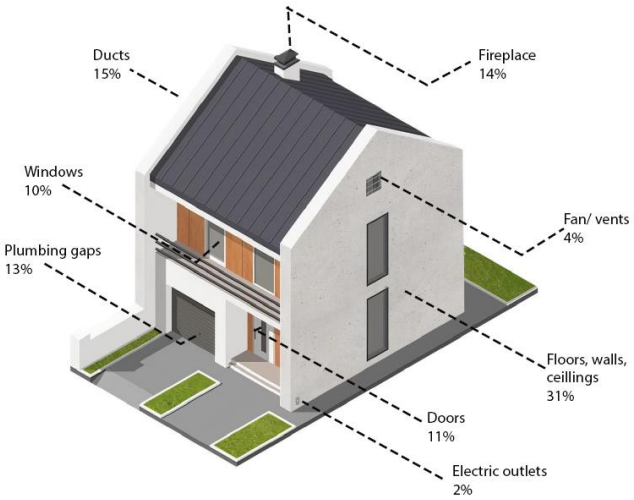
5.24 Significant reductions in heat loss can also be achieved by reducing air infiltration through the building fabric and making the building air-tight. Air leakage occurs in several places, particularly draughty windows and doors and joints between ceilings and walls. This can be reduced through careful construction practices, to ensure gaps in the fabric are minimised (see Figure 10). Measures include:

- Ensuring gaps around window and door frames are properly sealed;
- Draught-stripping external windows and doors (other than bathrooms unless other ventilation measures are included);
- Using controlled ventilation in kitchens (with draught-stripping);
- Sealing holes around services passing through the external walls including water pipes, gas pipes, boiler flues and electrical cables;

[46] Internal dry-lining has been shown to work well within the borough in these instances.

- Choosing airtight light fittings, or sealing gaps around light fittings and ceiling pull cords;
- Sealing the joint between the ceiling and the external wall; and
- Sealing the joint between the dry-lining and the skirting board.

Figure 10: Air leakage in a house



Solar Gain and Overheating

5.25 Whilst reducing energy needs – and associated carbon emissions - through retaining as much heat as possible is important, this does nonetheless need to be balanced against the issue of overheating, which in the built environment is also a growing issue; twenty per cent of homes in England already experience overheating in the summer months[47], and with temperatures rising, this should be addressed in advance through appropriate measures. The UK's Climate Change Risk Assessment identifies high temperatures and the threat this poses to health, wellbeing and productivity as one of the six priority risk areas for action.

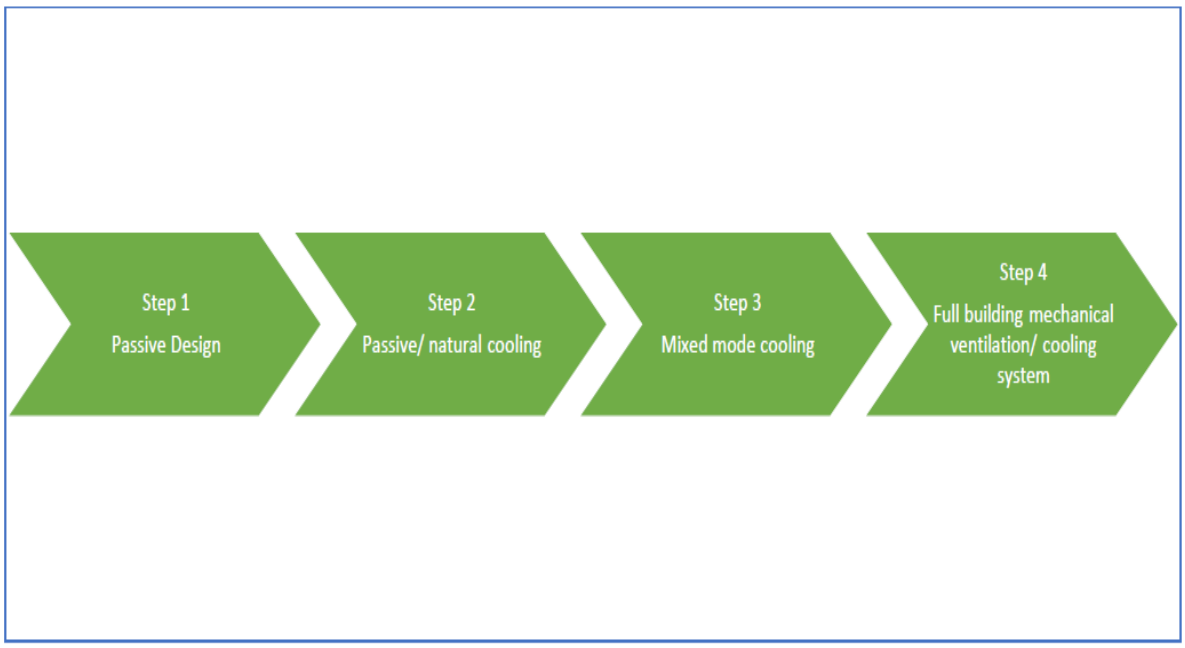
5.26 Properties at a higher risk of overheating include:

- Flats with south and west facing facades due to excess solar gain;
- Top floor flats with heat gain through the walls and roof;
- Single aspect flats (no cross-ventilation allowance);
- Properties with district heating or similar, where excess internal gains arise from poorly placed or poorly insulated pipe work;
- Buildings with heat recovery systems that have no summer bypass mode; and
- Buildings with poorly designed thermal mass coupled with insufficient secure ventilation to enable night purge of heat to take place.

[47] https://www.zerocarbonhub.org/sites/default/files/resources/reports/OverheatingTheBigPicture-ExecSummary-Screen.pdf

5.27 Air conditioning is commonly used to address overheating, but this is energy intensive with high associated levels of carbon emissions. It also places a cost on future occupiers in terms of both energy bills and maintenance costs. Therefore, the Council's preferred approach to overheating is that the design of developments should follow a 'cooling hierarchy' (see Figure 11 below), subject to taking a balanced approach to this and other design considerations.

Figure 11: Cooling Hierarchy (adapted from Islington Borough Council 2012)[48]



5.28 The cooling hierarchy is as follows:

- **Passive Design**. Minimise internal heat generation through energy efficient design and reduction of the amount of heat entering the building in the summer and shoulder months through consideration of orientation, overhangs and shading, albedo, fenestration, insulation, and green roofs (see Chapter 7). Where heat is to be managed within the building through external mass and high ceilings, provision must be made for secure night-time ventilation to enable night purge to take place.

- **Passive/natural cooling**. Use of outside air, where possible pre-cooled by soft landscaping, a green roof (see Chapter 7) or by passing it underground to ventilate and cool a building without the use of a powered system. This includes maximising cross ventilation, passive stack and wind driven ventilation and enabling night purge ventilation. Single aspect dwellings should be avoided for all schemes as effective ventilation can be difficult or impossible to achieve. Windows and/or ventilation panels should be designed to allow effective and secure ventilation.

[48] London Borough of Islington 2012 Low Energy Cooling Good Practice Guide 5

- **Mixed Mode Cooling**. Use of local mechanical ventilation/cooling to supplement the above measures (in order of preference):
    i. Low energy mechanical cooling (e.g. fan powered ventilation with/without evaporative cooling or ground coupled cooling).
    ii. Air conditioning – last resort as these systems are energy intensive.

- **Full building mechanical ventilation/cooling system**. Use only the lowest carbon/energy options once all other elements of the cooling hierarchy have been utilised.

Glare

5.29 In addition to solar gain, it is also important to consider the potential effects of glare at the design stage. As with overheating this can be addressed through effective layout and design and the inclusion of effective solutions such as low eaves-height blinds; brise soleil screening; external shuttering; lighter colour palettes; and the use of photochromic/ thermochromic glass, to be selected with consideration of other design matters, such as local distinctiveness and character.

Planning Applications

5.30 The supporting Carbon Reduction Statement should show consideration of passive design within the proposed scheme. It should incorporate a discussion on how the orientation, shading, ventilation and potential overheating have been considered within the scheme, and the benefits of the proposed approach when compared with other solutions, and it should include consideration of the development's effects upon neighbouring sites regarding minimising the detraction of sunlight from existing solar panels. It will also be necessary to submit evidence of how these measures have been considered within the scheme as part of the Sustainability Checklist submission (required as part of the application's validation).

5.31 **Thermal modelling**
Completing the Good Homes Alliance (GHA) Early Stage Overheating Risk Tool will help inform the initial design and any pre-application discussions with the Council. For major applications it is recommend that the proposed development undergoes thermal modelling, with buildings designed to meet CIBSE's latest overheating standards. For housing led schemes this should refer to the guidance in CIBSE TM59. For other uses, CIBSE TM52 guidance should be applied. Consideration should be given to future climate scenarios. Where officers have concerns about potential overheating, a planning condition may be used to secure overheating analysis for a sample of units on the site.

5.32 **Post occupancy monitoring condition**
To ensure that new developments are meeting their modelling findings a specific condition will be included with the planning permission requiring annual monitoring for 5 years following construction (by the developer, and reported to the Council), of the

development's overheating performance to assess how the scheme is meeting the agreed evidence.

Further guidance and tools

Good Homes Alliance, 2019 Tool and guidance for identifying and mitigating early stage overheating risk in new homes

Islington Borough Council, 2012 Low Energy Cooling. Good Practice Guide 5

CIBSE, 2013 TM52: The Limits of Thermal Comfort: Avoiding Overheating in European Buildings

CIBSE, 2017 TM59: Design Methodology for the Assessment of Overheating in Homes

6. Renewable and/or low-carbon, and local, power and heating

6.1 To help meet national and international[49] targets for reducing emissions of greenhouse gases, including carbon, and to ensure constant energy supplies, there is a need to further reduce or eliminate the burning of fossil fuels, such as gas, for power and heat[50], and this chapter provides advice on how this can be achieved in new developments. The use of gas to heat homes will be phased out in coming years (by 2025[51]), providing essential impetus to plan for suitable alternatives in new development.

6.2 The technologies set out in the following chapter present a variety of approaches to contributing to a reduction in the use of fossil fuels for energy. The first section looks at systems of heating and power that aim to harness the residual energy from other processes, thus creating efficiencies in the existing use of energy – whether fossil fuels or renewables. This includes systems such as Combined Heat and Power (CHP) systems, district heating, and thermal storage. The second part considers the use of renewable technologies such as solar and wind power, and measures such as heat pumps or solar for direct heating.

6.3 There is also a need to reduce energy wastage through grid-transmission, which can be achieved through greater use of locally-generated power – and all of the systems set out in this chapter can contribute to this objective. This chapter also touches upon requirements for those considering setting up renewables technology farms or stations.

6.4 It is, however, worth noting that over the past ten years these technologies have continued to evolve into more efficient and robust systems. Furthermore, with growing competition, prices of the improving products have continued to fall in real terms and the onsite delivery know-how and skillset continues to grow year on year. Since the 2013 Building Regulation amendments, there is even more impetus to ensure that developments are low carbon, a requirement that is going to continue to intensify.

Relevant local plan policy links

6.5 These policies, contained in full in Appendix 3, support the use of low-carbon and renewable sources for heat and power. CS10 (point 7) seeks the re-use of natural resources, maximising energy efficiency, and adopting renewable and low carbon technologies. CS11 (point 2) encourages developments to connect to existing district heating and combined heat and power networks. This is developed further in CCF1 and extends to on site micro-generation as well as supporting low carbon technologies and renewables.

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49 The UN Paris Agreement 2016

50 Targets have been largely met so far by changes to national electricity generation, according to the UK's Climate Change Committee.

51 https://www.bbc.co.uk/news/science-environment-47559920

Efficient use of residual energy technologies

6.6 The middle tier of the Energy Hierarchy encourages the use of technologies that are able to make use of locally-available energy that would otherwise have been wasted, to produce heat and energy, thereby to reducing the overall level of carbon emissions. These technologies produce some carbon emissions but at lower rate than traditional means such as existing domestic gas or oil fuelled central heating boilers or the use of large grid based systems which lose in the region of 26 terawatts per hour in the transmission process[52].

6.7 These types of energy sources include: connections to district heat and cooling systems or combined heat and power systems (CHP), micro-combined heat and power systems (MCHP) (set out below), some forms of thermal storage systems (see paragraph 6.48 below), and waste-management to create renewable energy, such as anaerobic digestion. However, it should be noted that new developments should be aiming to reduce carbon emissions to zero where possible, for example through the use of renewable technologies such as heat pumps.

District Heat and Cooling Systems

6.8 District heat and cooling systems are well-established, using excess heat from existing industrial processes or heat produced by traditional boilers or incinerators, to heat a neighbourhood. Heat is transmitted through a network of pipes from the source to individual buildings. Figure 12 pictured below is a ground-breaking example from Odense, Denmark, where the surplus heat from a social media data centre is fed back into the city's district heating system[53]. Currently there are some 17,000 such networks in the UK[54].

6.9 At present there are very few such networks in Reigate and Banstead, however, but the Council would be supportive of partners developing appropriate schemes. Such a system would reduce energy use and emissions for heating, which is currently around half of all energy produced in the UK.

Figure 12: District Heating in Denmark

source: https://foresightdk.com/the-path-to-emissions-free-district-heating-in-denmark/

52 https://www.statista.com/statistics/322834/transmission-distribution-and-other-losses-of-the-public-electricity-distribution-system-in-the-united-kingdom-uk/

53 https://uk.ramboll.com/projects/rdk/unprecedented-data-centre-surplus-heat-recovery

54 https://www.theade.co.uk/assets/docs/resources/Heat%20Networks%20in%20the%20UK_v5%20web%20single%20pages.pdf

Combined Heat and Power (CHP)

6.10 CHP is a highly efficient process (over 80 per cent) that captures and utilizes the heat that is a by-product of the electricity generation process and would otherwise be wasted, reducing the need for additional fuel to be burnt. By generating heat and power simultaneously, CHP can reduce carbon emissions by up to 30% compared to the separate means of conventional generation via a power station and then a boiler. The heat generated during this process is supplied to an appropriately matched heat demand whose needs would otherwise be met by a conventional boiler.

Figure 13: CHP Unit

Source: https://www.newenco.co.uk/combined-heat-power/benefits-of-chp

6.11 For many larger developments, CHP is the measure that offers the most significant single opportunity to reduce energy costs and improve environmental performance, reducing carbon emissions by around 30% typically. Furthermore, transmission and distribution losses are reduced and there is increased fuel supply security. Therefore, the Government supports the development of CHP and has set up a free service, CHP Focus, providing the necessary information and online tools to assist developers, including a Site Assessment Tool, the UK CHP Development Map, and a CHP Scheme Database. Details where to find these are contained at the end of this chapter.

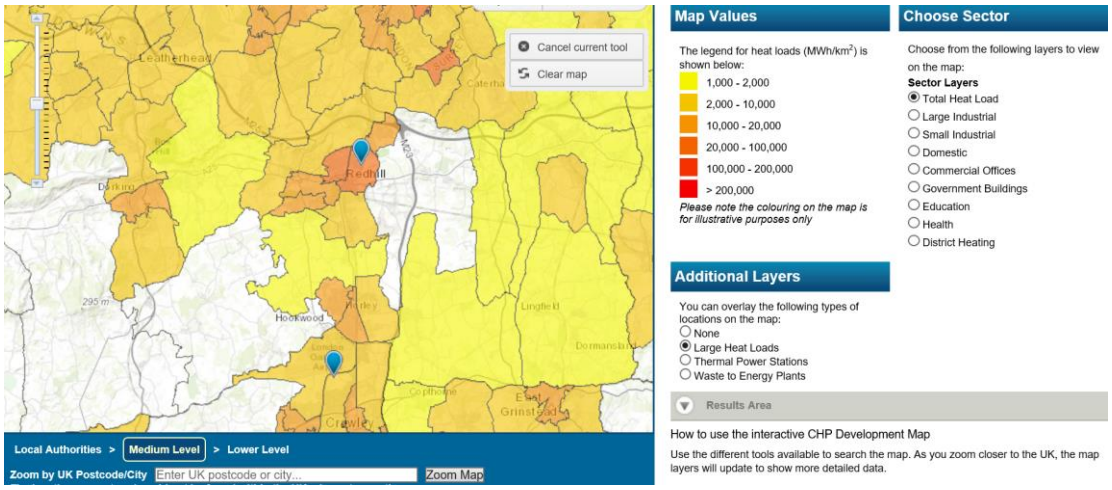
6.12 The UK CHP Development Map provides a useful starting point for developing CHP, and shows that at present Redhill represents the most promising location for CHP technology within Reigate & Banstead borough, as there is potentially a large available heat load to support such a system, so this approach could therefore be considered for developments in and around Redhill.

6.13 However, CHP does have some challenges with regard to the location of the facility and the associated flue, and impacts upon air quality, noise and visual amenities, all of which need to be carefully considered when using this technology; for example schemes using CHP will be unlikely to be given permission in areas – or where it could affect areas – already affected by poor air quality issues, such as Air Quality Management Areas (AQMA), and aerodrome safeguarding requirements need to be taken account of regarding the height of the flue and vicinity of an aerodrome such as Gatwick (in regard to impacts on navigational aids/instrument flight procedures, emissions, or protected surfaces infringement). Additional

information about this can be found at https://www.aoa.org.uk/policy-campaigns/operations-safety/ .

6.14 CHP plants need permanent availability of access, and there are also issues surrounding developing and connecting to the network and setting aside paths for future expansion - including ducting to accommodate future upgrades, which need to be considered early in the design of the scheme.

Figure 14: UK CHP Development Map



Source: https://chptools.decc.gov.uk/developmentmap

Micro-CHP (Micro Combined Heat and Power)

6.15 Micro-CHP boilers are designed to generate all the heating and hot water and a significant percentage of the electricity needed by a typical home**.** Such technology can significantly reduce carbon emissions. They also benefit from increased efficiency as they generate electricity directly on site, therefore avoiding the transmission losses that occur when power is taken from the grid.

Figure 15: Micro-CHP domestic boiler

Source: https://www.conservatoryhub.com

6.16 Micro CHP is generally considered permitted development where the works are internal. There are design requirements in conservation areas which are outlined below.

Renewable energy and heating sources

6.17 Renewable energy is energy 'generated from natural resources such as the sun, wind, and water, using technology which ensures that the energy stores are naturally replenished'[55]. Low-carbon energy technologies do not always draw upon renewable sources, but can aid the demand for energy and reduce carbon emissions. 10% of expected energy usage should be from renewable or low-carbon generation, unless it can be shown not to be viable.

6.18 A sample of renewable technology options for heating and power are set out below, that are currently considered effective in Reigate & Banstead borough.

6.19 It will be necessary to carefully consider appropriate technologies and systems to compliment the development. Whilst each have benefits regarding sustainability, there are also limitations for each, as set out in the descriptions below. Specialist advice should be sought to design the most effective solution for the development.

Renewable electricity sources

Solar energy/Photovoltaics (PV)

6.20 Solar panels or tiles can be used to capture energy from the sun to be converted to electricity for the home[56]. Photovoltaics consist of cells grouped together in 'modules'. PV cells work when light is shining onto them, so whilst direct sunlight can generate a greater level of electricity, electricity is still generated in cloudy conditions (though not at night-time).

Figure 16: Solar Panel Installation

Source: https://www.savingenergyuk.co.uk

6.21 Solar energy is a highly sustainable renewable resource with no associated carbon emissions or air pollutants. It should therefore definitely be considered for inclusion on new housing developments, though mains or other forms of renewable electricity may need to be used to supplement this at night. Where there is space, it may be possible to store the

[55] Energy Savings Trust

[56] This works through the displacement of electrons from semi-conductive materials, which creates an electrical flow in DC which is then run through a converter to produce AC electricity for the home. (Energy Savings Trust, website)

energy generated in specially designed batteries (see below). However, all utilisation of PV in development/conversion schemes should take full account of the need to ensure that visual amenity and aesthetics are not compromised, and that the quality of local buildings/environments and their distinctive characters and settings are not diminished. (Please see the Council's Local Character and Distinctiveness Design Guide 2020, para 6.48.)

6.22 The location, design, orientation, and overshadowing of buildings is a factor in the effectiveness of solar energy generation. For the best results, roofs should face south and have a pitch of 30 to 40 degrees[57]. North-facing roofs are not recommended. The amount of surface available for capturing sunlight will also be a consideration. The Energy Savings Trust suggests that to generate between 20 and 45 per cent of a typical home's electricity needs, a surface area of 10 to 20 m^2 should suffice.

6.23 Solar cells have flexibility as modules can come as groupings, known as arrays, all of which can be designed in different shapes and sizes. In addition to being installed as panels on roofs, they can also be integrated into tiles, replacing conventional roof tiles[58], or for a fitting to a ground space, all of which may be a useful for historic/listed buildings or buildings in sensitive areas. However, because tiles are more expensive than panels, they are normally used for aesthetic reasons.

6.24 The Council's Local Character and Distinctiveness Design Guidance SPD 2020 contains information that should be followed on how to minimise the visual impacts of PV. In particular, PV should be carefully considered in terms of its visual impacts where it can be seen on street frontages. Modules can also be sited effectively on out-buildings or in garden arrays, and use can be made of crown-roofs and 'hidden valleys'. The Council also requires a block design, not stepped designs of tiles, carefully integrated into roofs.

6.25 Careful consideration also needs to be made of the cell colour. At present many of the PV units are black/dark grey, and black is required in Reigate & Banstead borough. However, many houses in Reigate & Banstead borough have a Surrey vernacular which includes red tiled roofs. There are some red tiled alternatives available, and this issue is particularly pertinent in conservation areas and with listed buildings. However, this may not be suitable where the local vernacular 'plain' tiles are in situ.

6.26 Please note: plans for installation of solar panels/arrays in the vicinity of any aerodrome, in particular Gatwick Airport, and on flight-paths, should be mindful of potential impacts upon the navigational aids, or the attraction of birds, and may therefore require consultation with the Airport, or bird-proofing measures.

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[57] Energy Savings Trust

[58] These are more expensive than solar panels, typically about twice the cost (Energy Savings Trust).

Figure 17: Red backed solar panels

Source: https://gallerykitchendesign.co.uk

Bio-solar/Smart Green Infrastructure

6.26 The efficiency of solar panels can be enhanced when combined with the provision of green/living roofs (see Chapter 7 for more on green roofs in general)[59] Evapotranspiration from a green roof can keep PV panels closer to an optimum temperature of around 25 degrees C[60], and the greenery can also keep dust and air-pollution at bay, so that dust levels affecting the panels would be lower than on a bare roof in the same location[61]. However, in the south of the borough, around the Gatwick flightpath, such roofs need to be mindfully designed/planted to avoid attracting the sorts of birds likely to be involved in bird-strike on planes using the airport. These tend to be larger birds not attracted to green roofs; nonetheless, in some cases, green roofs may not be an option on air safety grounds.

Figure 18: Solar panels on a green roof

Source: https://livingroofs.org/introduction-types-green-roof/biosolar-green-roofs-solar-green-roofs/

[59] Chemisana & Lamnatou 2014; Tomazin 2016 - Natural England/RSPB – Climate Change Adaptation Manual (NE751, Edition 2) (2020) – Evidence to support nature conservation in a changing climate

[60] Information from Turfonline/Treeliving/Livingroofs.org

[61] Green Roof Technology 2015

Wind turbines

6.27 Wind turbines harness energy from the wind which can be converted into electricity for homes and businesses. Historically this has been very popular in Reigate & Banstead, for example wind power has been harnessed on Wray Common.

Figure 19: Wray Common Mill, Reigate

6.28 Wind energy is a very sustainable renewable resource with no associated carbon emissions or air pollutants. There are two types of wind turbine – those that are free-standing on a pole located in an exposed position (Figure 20), and smaller ones mounted onto a building (Figure 21). The amount of electricity generated is dependent on the strength of the wind, and the size of the wind turbine; wind speed inconsistencies can create problems, and realistically the best locations are often on hill ridges where the winds are more constant. Electricity generated in this way can be stored in specially designed storage systems such as batteries (see below), for use when there is less wind.

Figure 20: Free standing wind turbine

Source: Ecopowershop.com

Figure 21: Mounted wind turbine

Source: Thegreenage.co.uk

6.29 Nonetheless there are a number of important planning issues that will need to be considered, including the impacts of noise and vibration and visual impacts on neighbouring properties, Conservation Areas, the setting of listed buildings, Areas of Outstanding Natural Beauty, and wildlife. The location and size of wind turbines will also need to be controlled where they could affect air traffic control radar systems, Instrument Flight Procedures (IFP)), or protected surfaces in the vicinity of aerodromes, in particular Gatwick airport. Therefore, if planning to install a wind turbine, it is advisable to speak with the Duty Planning Officer first.

Renewable heating technologies

Air-source heat pumps (ASHP)

6.30 Air-source heat pumps can heat a home and the water supply through extracting heat from the air outside of the building and compressing it within a pump, heating fluid, which can then be transferred to heat the home and/or the water circuits. These are air-to-air, and air-to-water types of pumps respectively. They can function in sub-zero temperatures[62] which makes the technology a largely non-seasonal and reliable option for renewable energy. ASHPs still require electricity from another source to run on, but the heat generated outweighs the electricity requirements (in terms of sustainability). The use of ASHPs helps reduce carbon emissions.

Figure 22: Air Source Heat Pump

Source: https://www.cse.org.uk/advice/renewable-energy/air-source-heat-pumps

[62] The Energy Savings Trust note that this is possible down to temperatures of -15 degrees C.

6.31 ASHPs also have the benefit of often being easier to install than other forms of renewable technology. However, compared to gas or oil boilers there is not the same level or consistency of heat. ASHPs deliver heat at lower temperatures over longer periods than gas/oil boilers. They are therefore potentially more efficient with good insultation, larger radiators, and/or underfloor heating systems[63]. ASHP systems typically work with thermal stores systems, allowing stored heat to be used rather than turning the pump on and off when demand is lower.

6.32 Nonetheless ASHPs are not typically able to provide hot water at a temperature high enough to kill bacteria such as Legionella, and additional power supplies would be needed to ensure water was heated high enough for this purpose (to 60 degrees C).

6.33 Other issues to consider will be the design of the building and surrounding area, a suitable outside wall/ground space needed with sufficient air circulation space around it. Sunny walls are ideal[64]. In planning terms consideration should also be made of the impacts of noise and vibration associated with the device on neighbouring properties.

Ground-source heat pumps (GSHP)

6.34 Ground-source heat pumps extract heat from within the ground via buried pipes (ground loops) and can heat a home and the water supply. This works through circulating a water/antifreeze mixture through the pipes, which absorbs ground heat – at a low temperature - which is passed through a compressor, which raises the temperature, allowing this to heat the hot water supply and heating. Cooled water then re-enters the circuit and starts the process again.

6.35 This source of heat can be utilised year-round, as sub-surface ground temperature stays fairly constant[65]. However, the amount of heat that can be generated is dependent on the length of the loops installed, which is dependent on the ground space available.

Figure 23: Installation of Ground Source heating coils

Source: https://www.homebuilding.co.uk/advice/ground-source-heat-pumps

63 The Energy Savings Trust
64 The Energy Savings Trust
65 The Energy Savings Trust

6.36 GSHP loops are laid horizontally in a trench – about a metre below the ground surface[66] – where there is sufficient outdoor space to allow this, or heat can be extracted from the ground much further down via boreholes drilled to perhaps 90-160 metres deep[67]. Pumps can be installed without the need for planning permission. However, it is advisable to check with the duty planning officer, and conservation officer, regarding ecological and conservation requirements (and a discussion with a tree officer may also be identified as necessary). Requirements may include ecology studies, possibly including water temperatures (where there is water); consideration of water source protection areas; arboriculture assessments and impacts on protected or other trees; tree roots impacts studies; and archaeological investigations.

6.37 GSHPs require electricity from another source to run on, but the heat generated outweighs the electricity requirements. There is still a saving in terms of renewables, and GSHPs reduce carbon emissions. GSHP systems can typically work well with thermal stores systems, allowing stored heat to be used rather than turning the pump on and off when demand is lower.

6.38 GSHPs are a useful renewable energy resource that can work in tandem with the provision of green infrastructure and open space (utilising heat from the ground in these spaces). They can also be laid for several properties and therefore with fewer boreholes, and to provide the ready infrastructure for new properties. However, like other forms of renewable technology, they will require regular testing and maintenance to ensure effective operation. The same also applies regarding the need for larger radiators or underfloor heating systems.

Water-source heat pumps

6.39 Similarly to ground-source heat pumps, water-source heat pumps use pipes to extract heat, in this case from water sources: either groundwater aquifers (using open-loop boreholes), or lakes/rivers (surface water-source heat pumps). They run efficiently (four times more so than ground-source heat pumps), without carbon emissions, or other air pollution[68]. The same also applies regarding the need for larger radiators or underfloor heating systems.

6.40 As would be expected this sort of heat pump is limited to developments sited close to a water-body, or with the ability to establish access to ground-water aquifers, and reference should be made to the Code of Practice for Water Source Heat Pumps – Code of Practice for the UK[69], or the Code of Practice for Groundwater Source Heat Pumps[70]. Developments including balancing ponds could usefully make use of this technology also.

Solar water heating/Solar thermal systems

6.41 Solar water heating, also called solar thermal systems, makes use of the sun's heat to directly heat water for hot water and heating in people's homes. This works through the

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66 The Energy Savings Trust
67 The Energy Savings Trust
68 Ground-source Heat Pump Association
69 Published by CIBSE, GSHPA, and HPA
70 Published by CIBSE, GSHPA, and HPA

installation of heat-capturing tiles (called collectors) onto roofs or walls, which then heat water in a cylinder.

6.42 Solar energy is a very sustainable renewable resource with no associated carbon emissions or air pollutants and should therefore be considered for inclusion on new developments. The system of heating water works year-round, though a conventional boiler may still be required with this system for providing enough hot water in the winter months, or for making water hot enough.

6.43 However a solar water thermal store can allow excess heat gathered on a warm day to be used for other purposes, such as general heating, creating greater efficiencies.

6.44 There are two types of solar water-heating panels – glass tubes attached to the roof tiles (evacuated tubes), and flat plate collectors, which can be attached onto or integrated into the roof. Tiles and panels can be attached to roofs or other spaces such as walls, and typically five square metres of panels is needed for the average size home, located on a non-northerly aspect. Space would also need to be made available for a thermal stores tank if this was to be incorporated into the system for greater efficiency and flexibility.

Figure 24: Solar Water heating

Source: https://www.cleanenergyauthority.com

6.45 Such units generally do not require planning permission unless they're in a conservation or sensitive area, such as AONB[71], or on or near a listed building, though the same design considerations apply as for PV as set out at paragraphs 6.21-6.25 above.

Storing excess heat and energy

6.46 An important consideration is not wasting the heat and energy generated from the various processes described above. Thermal stores and batteries enable any excess heat or energy generated from low-carbon and renewable systems to be utilised at a time that is convenient.

[71] Area of Outstanding Natural Beauty

6.47 Some systems for energy storage have ‘smart’ options, allowing for tracking of energy-use online and decisions regarding optimum times for charging the system or drawing power from it.

Thermal stores (Heat storage)

6.48 Thermal stores consist of a very well insulated water container which can store the heat produced from the technology described above for many hours. They also have at least one heat-exchanger fitted. Typically, these containers can vary in size from between 120 litres to 500 litres capacity[72]. Thermal stores can also utilise ‘phase-change’ materials technology. To accommodate such a system, adequate space will be required.

6.49 The Energy Savings Trust notes[73] that the full benefit of thermal stores is derived from a design which allows a variety of inputs and outputs (e.g. for heating or hot water, etc), and thermal stores are noted[74] as working particularly effectively to enhance the efficacy of solar water heating and heat pumps. SMART systems will prioritise the use between the renewable source and the thermal storage to ensure the most effective distribution of the energy available.

Batteries and Inverters

6.50 An alternative to thermal stores is the use of deep cycle batteries which can store power from a variety of electricity-generating systems so that it is available when needed. However, inverters may also be needed alongside batteries for running many standard AC appliances, and for battery charging.

Offsetting

6.51 Where site constraints limit the ability to meet the carbon reduction target for a scheme, any short fall must be provided off-site or through a cash-in-lieu contribution, possibly for off-site renewables where these are not possible on-site, through a green tariff. The council may agree with a developer for the developer to directly off-set any shortfall in carbon dioxide reductions from a development by installing carbon dioxide saving measures off-site, e.g. photovoltaic panels on a local public building.

Energy from Biomass Combustion

6.52 Burning logs, chips, or pellets can be a more sustainable option than burning coal, oil or gas[75] with regard to carbon emissions, but there are concerns regarding the effects of biomass on air-quality, and therefore this should only be considered in areas of low population density. (NB Parts of the borough are in Air Quality Management Areas[76] and it

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72 The Energy Savings Trust
73 The Energy Savings Trust
74 https://energysavingtrust.org.uk/advice/biomass/
75 Energy Savings Trust

76 https://www.reigate-banstead.gov.uk/info/20333/air_quality/542/air_quality_reviews

is possible that biomass could be banned outright in the future). Further guidance on Smoke Control Areas and Smokeless Fuels can be found at: www.reigate-banstead.gov.uk/info/20333/air_quality/542/air_quality_reviews .

6.53 It is important that the biomass is sourced locally, so that carbon reductions are not lost through the transport of this fuel. Log-burning boilers are larger than standard boilers, so additional room would need to be provided for this, and for adequate storage space for the delivery and storage of the fuel. Additionally, the homes would need to be designed with flues/chimneys, and fire safety standards applied.

6.54 A biomass system based on wood-burning (e.g. log-boilers) is more effective when accompanied by a thermal storing system (see below), given the need to burn batches of logs at high efficiency levels rather than in small quantities throughout the day[77], allowing some of the excess heat generated at maximum output to be stored for when it is needed. So additional room for thermal stores tanks may also need to be considered on the site. In addition, consideration should be given to the ease of use of systems for residents.

6.55 For a development of groups of houses, or for larger buildings, wood chips can be used provided the proposal can meet the environmental requirements. This should be detailed in the Energy Statement accompanying a planning application.

Planning Applications

6.56 The following section sets out considerations for planning applications in regard to specific types of technology. However all choices regarding renewable, energy-efficient, or low-carbon technologies – whether stand-alone or in combination – should have considered the suitability of location, space, orientation, shadowing and other pertinent environmental factors related to the site and development in question, and this includes aesthetic issues, and historic considerations where this is relevant.

6.57 **Micro CHP** - Planning permission would not be required for any internal components of the system, and fitting an external flue onto a house will normally be permitted development, providing the conditions outlined below are met:

- Flues are less than 1m above the highest part of the roof (excluding any existing chimneys);
- In a conservation area the flue should not be fitted on the principal or side elevation that fronts a highway, and all impacts on the conservation area should be considered and minimised, including through the use of black paint; and
- If the building is listed or in a conservation area, it is always advisable to check with the Reigate & Banstead Conservation Officer before a flue is fitted as other consents may be required.

[77] Energy Savings Trust

6.58 **Larger CHP -** Installing a larger CHP installation in non-domestic buildings e.g. office development or supermarket, will require planning consent, unless contained within an existing site building. This means that issues such as access, visual impact, noise, construction activity etc. will all need to be addressed in the planning application.

6.59 Applicants proposing to use CHP will be asked to: use low-carbon emission units and provide sufficient information to justify its use (compared with other greener technologies in accordance with the energy hierarchy); and ensure that the carbon and air quality impact is minimised, including the selection of a low emission unit and use of abatement technology. Emissions testing will be conditioned to demonstrate that the installed system meets emission limits prior to occupation.

6.60 **Communal Heat and CHP Networks** - Where a communal Heat or CHP network is proposed this should be supplied by a single energy centre where all energy generating equipment is located. A single energy centre will facilitate the simplest connection (whether immediately, or at a later date) to an area wide network as well as reduce maintenance and operating costs.

6.61 Such a proposal will require a supporting **Carbon Reduction Statement** and must demonstrate that enough space has been allocated for a sufficiently large energy centre that will allow for its connection to an area-wide heat network, including for phased schemes. This must be clearly shown on the plan drawings of the development and the floor area in square metres should be confirmed in writing. A floor plan showing the layout of the plant in the energy centre should also be provided to demonstrate that sufficient space has been allowed for the specified equipment and, where applicable, additional equipment to be installed in the future.

6.62 Applicants will be required to calculate the design heat loss of their proposed system and include them within the energy calculations. These should be based on the pipe length of the total network (both buried and block pipework), design temperatures (including any design summertime temperature reduction) and the level of insulation proposed. Full details should be provided in the energy assessment. A calculation for the resulting system distribution loss factor should be provided as part of the submission.

6.63 **Large Scale CHP Plants** - Large scale commercial CHP plants may also require authorisation from the Environment Agency regarding emissions and wastes; in particular, such facilities installed within urban areas will need to demonstrate that they are not causing breaches of air quality standards and targets. Large facilities may also require approval from other regulatory bodies regarding their use of gas as a fuel.

6.64 The installation of any new heating appliance or flue, will be subject to Building Regulations.

6.65 **Solar Panels and PV cells** - The installation of solar panels and equipment on residential buildings and land may be 'permitted development' with no need to apply for planning permission. However, this is subject to limits and conditions that are set out above, and you

are advised to contact the duty planning officer. Need for permission may apply where the area is under an ‘article 4’ directive or is a Conservation Area.

6.66 Solar equipment mounted on a house or block of flats or on a building within the curtilage of a house or block of flats must observe the following requirements:

- Equipment on a building should be sited, so far as is practicable, to minimise the effect on the external appearance of the building and the amenity of the area;
- Panels should not be installed above the highest part of the roof (excluding the chimney) and should project no more than 200mm from the roof slope or wall surface;
- The panels must not be installed on a building that is within the grounds of a listed building or on a site designated as a scheduled monument;
- For buildings in a conservation area, or protected area, panels must not be fitted to a wall which fronts a highway; and
- Equipment no longer needed should be removed as soon as reasonably practicable.

Note - Leaseholders may need to obtain permission from their landlord, freeholder or management company.

6.67 **Stand-alone arrays** - In addition to the conditions identified in para 6.59, small scale stand-alone solar arrays can benefit from permitted development rights. These limits include:

- Only the first stand-alone solar installation will be permitted development; further installations will require planning permission;
- No part of the installation should be higher than four metres;
- The installation should be at least 5m from the boundary of the property;
- The size of the array should be no more than 9 sqm, or 3m wide by 3m deep;
- Panels should not be installed within boundary of a listed building or a scheduled monument; and
- If the property is in a conservation area, or in a protected site, no part of the solar installation should be nearer to any highway bounding the house than the part of the house that is nearest to that highway.

6.68 Where the solar installation forms part of a planning application, the Carbon Reduction Statement should be completed. In addition, the council will require an analysis of the shadow effect on the proposed installation, to demonstrate the optimum performance that could be expected from PV panels, as even if a small part of a PV panel is shaded, the output will be significantly reduced.

6.69 **Air Source Heat Pumps** - The installation, alteration or replacement of an air source heat pumps on a house or block of flats, or within the curtilage (garden or grounds) of a house or block of flats, including on a building within that curtilage are permitted development provided the following requirements are met. For the permitted development right to apply to a block of flats, all units must consist wholly of flats and should not contain commercial or other types of premises. These requirements are set out in the Town and Country Planning (General Permitted Development) (England) Order 2015 Schedule 2 Part 14 Class G.

6.70 To implement such rights all the following should be met:

- Development is permitted only if the air source heat pump installation complies with the Microgeneration Certification Scheme Planning Standards (MCS 020) or equivalent standards;
- The volume of the air source heat pump's outdoor compressor unit (including housing) must not exceed 0.6 cubic metres for permitted development - a larger unit and housing will require a separate planning permission;
- Only the first installation of an air source heat pump would be permitted development, and only if there is no existing wind turbine on a building or within the curtilage of that property;
- Additional wind turbines or air source heat pumps at the same property would require an application for planning permission;
- All parts of the air source heat pump must be at least one metre from the property boundary;
- Installations on pitched roofs are not permitted development - if installed on a flat roof all parts of the air source heat pump must be at least one metre from the external edge of that roof;
- Permitted development rights do not apply for installations within the curtilage of a Listed Building or within a site designated as a Scheduled Monument;
- On land within a Conservation Area or protected area the air source heat pump must not be installed on a wall or roof which fronts a highway or be nearer to any highway which bounds the property than any part of the building; and
- On land that is not within a Conservation Area, the air source heat pump must not be installed on a wall if that wall fronts a highway and any part of that wall is above the level of the ground floor.

6.71 In addition, the following conditions must also be met:

- The air source heat pump apparatus be removed where practicable when it is no longer needed for microgeneration; and
- Sited, so far as is practicable, to minimise its effect on the external appearance of the building and its effect on the amenity of the area.

6.72 Where there are uncertainties as to the scheme meeting these requirements it is advisable to speak with the duty planning officer.

6.73 **Ground/Water Source Heat Pumps** - The installation of a ground source heat pump or a water source heat pump on domestic premises is usually considered to be permitted development, not needing an application for planning permission. If you live in a listed building or a conservation area you should contact the Conservation Officer. Design considerations are set out above.

6.74 **Wind Turbines** - As noted above, all applications for wind turbines should be mindful of the noise and vibration effects upon settings and wildlife, and of aerodrome planning requirements[78].

6.75 **Batteries storage** - In planning terms thermal storage and deep cycle batteries will help make the system more effective and thereby reduce carbon emissions. This should be reflected in the energy statement to support a planning application and the Carbon Reduction Statement. For most uses of these technologies, the storage capacity will be contained within an existing building or plant room and as such will not require specific planning permission.

6.76 **Non-Permitted Development Schemes** - Where there is a planning application for a scheme the Carbon Reduction Statement will need to be completed. For commercial type uses the scheme should achieve BREEAM very good in accordance with CS11. 10% of expected energy usage should be from renewable or low-carbon generation.

6.77 **Biomass** – please consider all notes set out above in regard to planning applications, including requirements for the Carbon Reduction Statement and a completed Sustainability Checklist.

Further guidance and tools

BREEAM

Code of Practice for Groundwater Source Heat Pumps

Code of Practice for Water Source Heat Pumps – Code of Practice for the UK

Department of Energy and Climate Change 2008 Part 1 Combined Heat and Power Project Development

Department of Energy and Climate Change 2008 Part 2 Combined Heat and Power (CHP) Technology

Department of Energy and Climate Change 2008 Part 3: A guide to environmental aspect of CHP

Department of Energy and Climate Change 2008 Part 4: A Guide to CHP Operations and maintenance

Department of Energy and Climate Change 2008 Part 5: A guide to CHP Finance

[78] https://www.aoa.org.uk/policy-campaigns/operations-safety/

Department for Business, Energy and Industrial Strategy 2020 Part 6: Additional Guidance for renewable CHP

Micro Generation Certification Scheme

Rising to the Climate Crisis – A guide for local authorities on planning for Climate Change (TCPA/RTPI, Dec 2018

7. Green Infrastructure and ecology for reduced energy needs and efficiencies, and climate adaptation

7.1 Green Infrastructure (GI)[79] including 'blue' infrastructure (ponds and rivers) is an important part of providing sustainable developments. It provides a broad range of benefits over time to occupiers/users (including exercise and access to nature for mental health[80] and biodiversity), and it can assist in mitigating climate change – for example through carbon capture - and adapting to changes in weather, as well as well as helping to improve air quality. The careful integration of GI into new development is key priority 4 of the Council's Green Infrastructure Strategy and Action Plan. However, green infrastructure may itself be susceptible to climate change and should be considered early in the design stage. Surrey County Council's Tree Strategy 2020 places particular emphasis on the importance of effective planting, care and maintenance.

7.2 Mitigation of, and adaptation to, climate change using green infrastructure can be achieved through: shading and shielding from the elements; insulation; assisting with rain-water run-off; and providing refuge from heat. This can also assist wildlife through provision of enhanced habitats in the context of a changing climate, some of which need boosting, such as those assisting pollinating creatures.

Relevant local plan policy links

NHE4; DES1; CS10; DES9

7.3 Policy NHE4: Green and blue infrastructure requires access to and provision of green infrastructure and open space where possible, including landscaping and planting. DES1 (Design of new development) sets out that landscaping should be designed to mitigate the effects of development, which would therefore include carbon emissions. Open space provision within developments is set out in DMP policy OSR2, and Outdoor sport and recreation requirements in OSE3. The Council's Green Infrastructure Strategy[81] provides further direction with elements related to climate change considered below.

Greening for carbon capture and cleaner air (sequestration)

7.4 Green infrastructure can assist in the reduction of carbon emitted through developments and associated infrastructure such as roads (from vehicles), through its ability to 'capture' residual atmospheric CO^2, via leaves. Trees are able to absorb carbon dioxide from the air and store it within the wood of the tree[82]. This process also allows for the capture of other harmful air pollutants, such as particles, creating healthier environments for residents/users of the development and beyond.

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[79] The National Planning Policy Framework (NPPF) defines green infrastructure as 'a network of multi-functional greenspace, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities.'

[80] https://warwick.ac.uk/newsandevents/pressreleases/green_space_is

[81] Reigate and Banstead Green Infrastructure Strategy (August 2017)

[82] Leeds University study I Tree Leeds – Putting a value on the city's trees and green spaces (part of Leeds4Trees joint project)

7.5 Carbon capture (and capture of other harmful pollutants) can be achieved through providing any planting – in open spaces, streets, or attached to walls and roofs[83] - that can capture particles and carbon and should be included within landscaping schemes for larger developments. Hedgerows, and also wetlands, where appropriate, have been shown to be very effective in some cases for absorbing carbon.

7.6 Large, mature trees are one of the most successful for carbon capture[84], so existing trees should be preserved in developments and landscaping designs, wherever possible. (Additionally, the canopies should be maintained and not excessively pruned during the tree's lifetime, to allow for the most beneficial effects, in capturing greenhouse gases and particles.) Any development proposal that sets out the need to remove a mature tree will need to include that tree's carbon removal loss in the Carbon Reduction Statement, and make provision to counter this elsewhere. (The amount of carbon stored away by a tree can be calculated through the tree's dimensions, and carbon calculators exist to establish how much the tree's contribution to carbon removal is.) Evergreen trees will also be helpful as part of planting and landscaping plans, to help with this process during the winter months.

7.7 Tree planting is particularly beneficial close to busy roads for capturing particles and carbon. Development of new roads, or on busy roads, should include planting for health benefits where this is safe to do so. This must always be approved by Surrey County Council as the Highways Authority. Only suitable approved species should be used.

7.8 It will be important to ensure that planting is included in the most appropriate places in terms of soil types and water supply; large trees can need a large water supply to flourish, and also possibly particular types of uncompacted or aerated soil. The inclusion of local and native species is also important – and also the appropriate mix of tree species[85] - and applicants should refer to the Tree Officer as necessary. Additionally, the trees will need maintenance to ensure that carbon is not release back into the air, for example through decay or burning[86].

7.9 Species of trees that can be considered for this purpose include London Plane and Oak trees.

Cooling/shading - greenspace and tree canopy

7.10 The required provision of open space[87] within new developments should carefully address the need for adaptation to hotter temperatures[88]. This can be done through the cooling effects of green infrastructure via evapotranspiration, which absorbs and reduces the energy of heat as water evaporates from leaves and grass[89].

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83 Though structural and insurance considerations need to be taken into account with these.
84 Leeds University study I Tree Leeds – Putting a value on the city's trees and green spaces (part of Leeds4Trees joint project)
85 Surrey's New Tree Strategy (2020), pg 19 *The right tree, in the right place*
86 Surrey's New Tree Strategy (2020)
87 DMP policies OSR2/3
88 A requirement of policy CS10
89 NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)

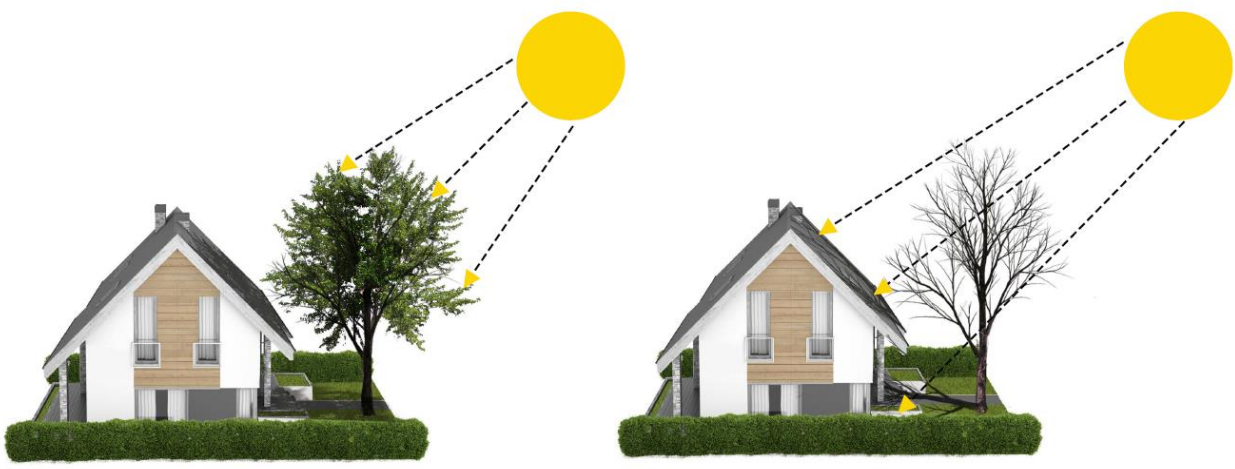
7.11 Trees and shrubs should be a focus for landscaping designs, and adequate greenspace and greening will be required as part of denser urban developments, where the cooling effects will be most needed as temperatures rise[90]. Water features (blue infrastructure) can also enhance these cooling greenspace features[91], as well as providing calming and relaxing places for people, as building development becomes denser.

7.12 Designs for required green spaces within/associated with new developments, and the developments' landscaping schemes, will also need to have considered how even small spaces can provide shading for people and animals, to ensure that the environment is shaped for the future to be suitable for different weather patterns[92]; shading in green space should be a focus of landscaping designs, according to the Natural England adaptation manual. Alongside provision for people and domestic animals such as dogs/cats, designs should usefully provide vegetation or other structures that could be used by wildlife such as small creatures or birds.

7.13 Trees should be considered for landscaping designs to provide shading for people and wildlife, and species with a denser foliage, or which provide a dappled shade, should be considered[93], such as London Plane, Field Maple, or Oak. Strategically placed trees within developments should also be considered for providing shade on routes and on green corridors, in public spaces, or in streets, and especially for areas with large expanses of hard surfacing, such as car parks. (Refer to paragraph 7.8). A detailed list of suitable native trees is included in the Council's Local Character and Distinctiveness Design Guide SPD.

7.14 Deciduous trees are particularly effective at providing shade in the summer but allow light through during the winter to warm the building.

Figure 25: Benefits of deciduous trees and development



Deciduous trees provide shade in the summer.

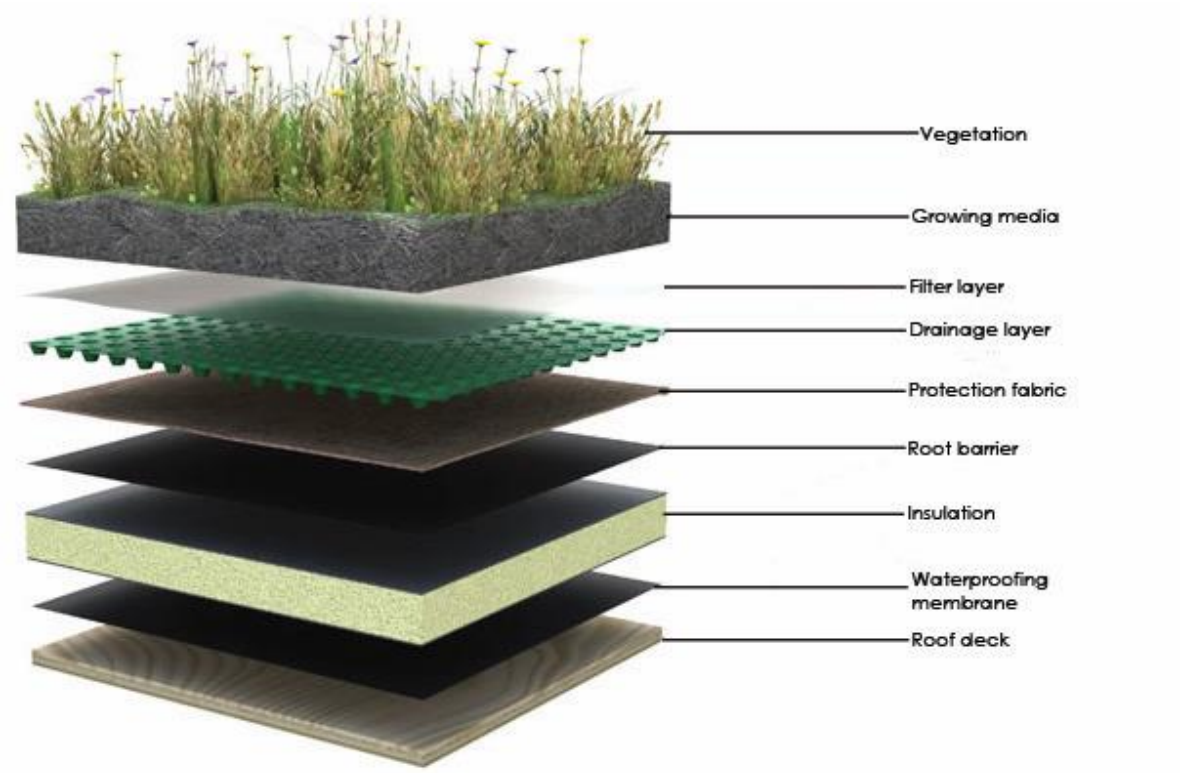
Deciduous trees allow sun to warm a building in the winter

[90] According to NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)
[91] NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)
[92] DMP policy DES5
[93] NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)

Green roofs and walls – cooling buildings and their environments and providing habitats

7.15 The design of buildings can incorporate the use of green roofs and/or walls as part of the policy requirements set out above. A green roof or wall is a part of a building that is covered completely or partially with vegetation or something that is growing. They can be referred to as 'intensive' (which are used to grow food or provide formalised green spaces), or as 'extensive' (which are more natural and may support wildflowers)[94]. They are planted over a waterproof membrane, and may also include a root barrier layer, and drainage/irrigation systems, and should always be considered very early on in the design of buildings to allow for additional loads, especially where this may retain water. Figure 26 below shows the elements of a green roof.

Figure 26: Green Roof Elements



7.16 Green roofs and walls can be useful for: enhancing the efficacy of solar panels[95] (see Chapter 6), as PV panels allow patches of shade and wet/dry[96]; providing insulation; cooling buildings and lowering urban air temperatures; and absorbing rainwater, alongside being aesthetically pleasing and providing habitats for wildlife[97]. However, there can be

94 Natural England/RSPB – Climate Change Adaptation Manual (NE751, Edition 2) (2020) – Evidence to support nature conservation in a changing climate

95 NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020) - Chemisana & Lamnatou 2014; Tomazin 2016

96 Livingroofs.org

97 Natural England/RSPB – Climate Change Adaptation Manual (NE751, Edition 2) (2020) – Evidence to support nature conservation in a changing climate

drawbacks, including the need to factor in additional weights to buildings designs, and designing green walls that do not provide a climbing route for intruders to the building.

Wildlife habitats

7.17 The borough's Environmental Sustainability Strategy's vision seeks to ensure that nature becomes an integral part of the urban environment. New development should benefit both wildlife and residents' well-being. The creation of habitats for nature can be provided through measures such as 'living' walls and roofs on buildings, as well as providing green usable spaces and improved air quality. Maintenance should be very carefully considered and designed into schemes for living pillars. These can be designed for bats and/or birds, and pollinator living walls can also be created. Living pillars can also be employed to the same effect – greening spaces whilst providing for wildlife and biodiversity – and water supply can be solar powered.

7.18 Other opportunities for the promotion of wildlife and biodiversity is through the provision of planting in the gardens of new-build homes on new estates.

Cooling buildings and their local environments

7.19 Developments should be designed to be as resilient to rising temperatures as possible, and it will be expected that applications can show that this has been considered, not just through the design of buildings within their environments, but also in how environmental features have been included in the design to enhance natural cooling.

7.20 A potential solution to over-heating within buildings is to provide green roofs and walls to cool them through evaporation of water from the plants, stored in substrates. This is known as evapotranspiritive cooling[98]. Cooling can work simply through shielding surfaces of buildings from the sun's heat.

7.21 Green roofs and walls can also reduce ambient temperatures around buildings – something that should be considered, especially regarding potential effects now and in the future of the Urban Heat Island effect. Greening on the outsides of buildings, whether roofs or walls, can allow heat/light that would otherwise be absorbed into the building's fabric and radiated back outwards to be intercepted. This process works through lowering the night-time heat radiating out from buildings, that has gathered throughout the day[99].

7.22 An additional sustainability benefit to the greening of buildings that it can reduce noise pollution (in and outside of buildings)[100].

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98 NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020) - Alexandria & Jones 2008
99 NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)
100 NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)

Shielding and insulation – trees and green walls/roofs

7.23 The design of new developments for larger sites should consider tree-planting for shielding against the weather, to save energy (and emissions) that can occur through heat loss from buildings and additional heating needs from cold winds; this can be achieved through the use of tree belts carefully placed to protect buildings from prevailing winds. (Thorough consideration should be given to appropriate tree cover as in paragraph 7.8.) Convex, rather than concave tree belt layouts, against wind directions, can deflect instead of just blocking air flows, and can therefore be more effective – though the effects upon neighbouring land-uses will need to be considered in any design.

Figure 27: Tree planting for shielding

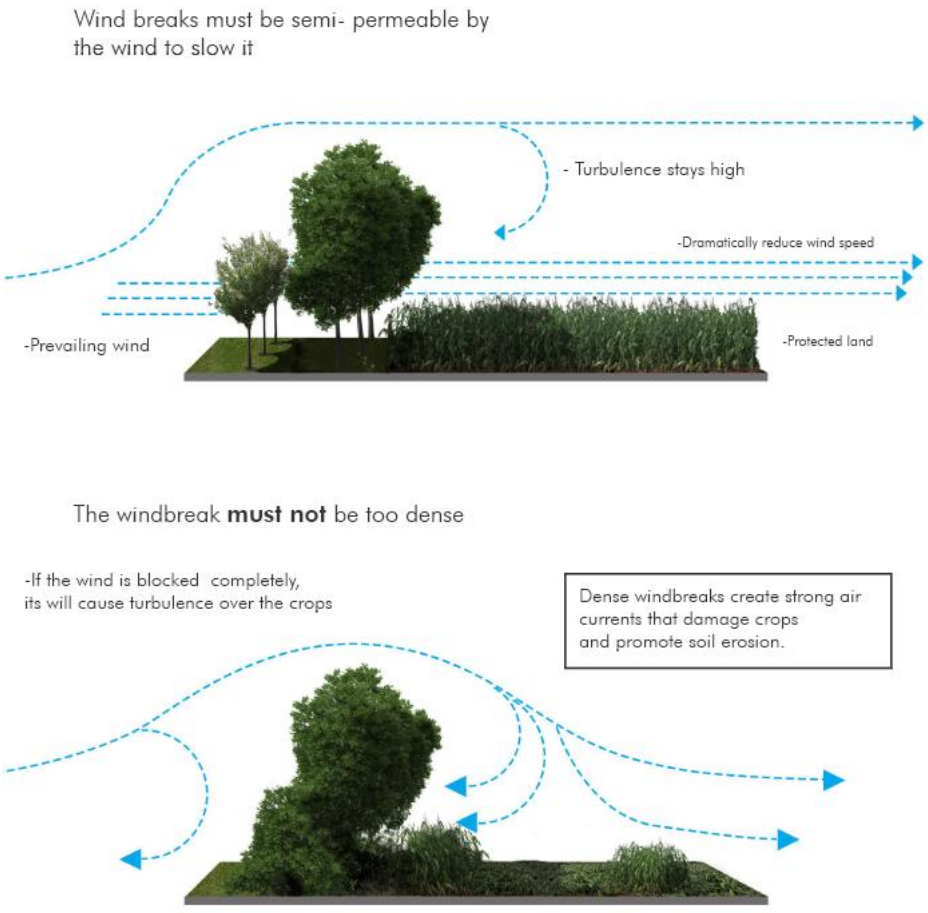
Source: Trees-energy-conservation.extension.org

Figure 28: Tree planting for shielding

Source: Arborday.org

7.24 All designs for tree planting should consider the density of tree belts, to allow some air through to prevent it accelerating over the tops of the trees, and then descending turbulently nearby (see Figure 29 below). Tree planting should also be included into designs for minimising cooling in the wintertime. Particular attention on the choice of trees for a scheme should review how they block or allow light and heat through during the colder months. Use of Leylandii or Laurel should be reconsidered with regard to heat and light loss to properties. Species that can allow light and heat through during the winter would be preferable.

Figure 29: Density of tree belts to prevent turbulent air descending



7.25 Because deciduous trees lose their leaves after the warmer months, they work well to allow more heat and light through to buildings in the autumn and winter when less shielding is needed, and more warming. However, some shielding is needed throughout the year, for example shielding developments from other land uses, so both requirements, where necessary, need to be carefully balanced.

7.26 Green roofs and walls (see section above) can also provide insulation from heat-loss, making buildings more heat efficient, saving energy and reducing carbon emissions, for example through reducing the need for heating in the winter[101].

[101] NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020) - Smith & Levermore 2008; Castleton *et al* 2010

Green infrastructure and drainage/water storage

7.27 The government's Environment Plan (2018)[102] promotes a move toward natural flood-risk management. This is rooted in the Water Framework Directive which seeks to prevent deterioration of the water environment and improve water quality by managing water in natural river basin districts. Where there is likely to be excess surface water within developments, strategically-placed street trees can assist in managing this, as well as improving pollution levels from surface water. Trees can provide natural solutions to flood attenuation. This needs to be in conjunction with sub-surface water retention systems under the paving, allowing water to collect and be used by the trees, before the excess passes to the drains[103].

7.28 Where there is likely to be an issue with a large amount of rainwater run-off from buildings in a small amount of time (as rainfall events become more substantial), green roofs and walls, can be considered for ameliorating this through retaining water in the roof's substrate and allowing it to re-evaporate into the atmosphere. An additional benefit of this, for the health of the environment and people, is that contaminants in rainwater can also be retained, and acidic rainwater neutralised[104].

7.29 Surface water run off benefits have been shown, through 'itree'.

7.30 The Environment Agency are promoting Urban Blue Corridors. These represent a new way of thinking about opportunities and solutions to urban flood risk management and can be applied at the strategic as well as at a Master-planning site-specific scale. It should be highlighted that a potential benefit or design element of green infrastructure is the provision of increased flood storage that can link with the enhancement of biodiversity as well as economic benefits.

7.31 Green infrastructure also contributes to the reduction of water pollution, by exploiting the natural processes of sedimentation, filtration and biodegradation to remove pollutants. Increased surface permeability may also make a small contribution to recharge of groundwater supplies, helping to maintain water levels over the year and reduce the risk of drought over the summer months. Further advice for developers from the Environment Agency can be found at: https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals.

Adaptation to climate changes – habitats, planting, and landscapes

7.32 Flora and fauna may also be susceptible to changes in climate, and there is evidence that this is starting to happen, for example the rapid drying-out of wetlands, heathlands, and aquatic areas[105]. By 2050 Climate change could significantly impact a range of species and habitats. Already some native species and pollinators are under threat. Effective design of

[102] https://www.gov.uk/government/publications/25-year-environment-plan
[103] NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020)
[104] NE/RSPB - Climate Change Adaptation Manual (NE751, Edition 2) (2020) – Berndtsson, 2010
[105] Natural England Climate change, biodiversity and Nature-based Solutions

green infrastructure will need to take account of changing wildlife habitats as a result of climate change.

7.33 Some native species are tolerant to climate changes and should be considered as part of the planting proposal for a scheme. However, there are some notable less tolerant exceptions to this including Rowan.

7.34 Climate change has implications for the historic natural environment and landscapes, which could create both opportunities and/or loss; some flora and fauna may be able to expand its habitat range, but those currently at the threshold of their tolerance for environmental conditions may be lost.

7.35 Hotter, drier conditions may also increase the risk of fire, particularly for upland landscapes. Flood water inundation and saturation can also damage historic buildings and designed landscapes, particularly if standing water conditions persist. Extreme weather, changes in temperature and future water availability will likely alter the character of parks and gardens, whose particular species are part of their appeal.

7.36 Therefore, schemes for redevelopment will need to address these needs as part of landscaping and planting schemes.

7.37 Natural England/RSPB's *Climate Change Adaptation Manual* (2020), suggests providing for a 'matrix' of habitats, catering for a diverse range of species. Planting should incorporate cool and shaded areas of 'refuge' for wildlife during hot/dry periods, and water should be included in designs for the benefit of animals and people. Also, where appropriate, wetlands or semi-natural habitats should be considered.

7.38 Invertebrates can thrive with the provision of green roofs, and these can also provide linkages between habitats for birds or flying insects[106] – so depending on the siting of the development this should be considered. For the best attenuation of water, habitats with greater diversity of species perform better, whilst supporting greater biodiversity[107], and assistance to wildlife can also be integrated into schemes for sustainable drainage systems (SuDS).

7.39 The choice of planting will need to reflect the weather conditions that are likely to be prevalent in coming years, for example drought-tolerant planting is likely to be most successful in drought conditions[108]. Therefore, indigenous plant species – or those with local characteristics - should be considered for planting in landscaping schemes, where these are suitable for soil conditions and climate, and offer benefits for wildlife.

7.40 In general, it will be prudent to consider a changing climate in all schemes, with a view to 'future-proofing' the borough's green infrastructure and landscapes, though many native species have a wide temperature range and distribution. (Many areas of the borough are

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[106] Natural England/RSPB - *Climate Change Adaptation Manual* (NE751, Edition 2) (2020)
[107] Natural England/RSPB - *Climate Change Adaptation Manual* (NE751, Edition 2) (2020)
[108] Natural England/RSPB - *Climate Change Adaptation Manual* (NE751, Edition 2) (2020)

covered by the Biodiversity Opportunity Area definition and these are set out in Appendix 2 of the Council's Green Infrastructure Strategy (August 2017). Statements for each have been prepared[109] with details of measures that can be taken to provide greater ecological resilience going forwards and may provide useful information.)

Preserving local ecology/trees in the design of developments

7.41 Natural England's guide to climate adaptation also notes the importance of brownfield sites to biodiversity, and how this can be lost through development. Therefore, where a site is redeveloped into a more urban form, applications should show how compensatory habitat has been considered. This could be through the provision of green walls or roof areas that can support wildlife; provision of tree belts and planting in gardens and car parks.

7.42 New developments should retain existing trees and plants, and schemes should where possible be built around existing trees (in particular mature trees). A 'scorched Earth' approach to design should be avoided.

7.43 The Government is proposing the introduction of Biodiversity Net Gain for new development. Further guidance will follow.

Greenspace for renewables

7.44 Greenspaces, for example in school grounds, provide space that can be used for renewable energy sourcing (see Chapter 6 above, regarding ground-source heat pumps), that is unobtrusive. These can supply local buildings (e.g. schools; swimming pools) with heat and district heating systems can be used to transfer heat. This may also be a suitable way to contribute to renewables for housing developments.

Planning Applications

7.45 All development applications need to show that green infrastructure and open space provision has been considered in response to DMP policy requirements for open space – and also in regard to climate change mitigation and adaptation, and other DMP policy areas, in line with the sorts of areas noted above. In particular green infrastructure/open space should be designed with adaptation to climate change, and contribution to passive design (see Chapter 5 above), in mind, and any potential contribution to sustainable drainage requirements where appropriate[110].

7.46 It is important that all green infrastructure schemes – such as garden planting, small areas of green for relaxation, trees, or living walls and roofs are not considered after the development of the scheme, but are considered at the start to fully capture the benefits that can be provided – in particular where wildlife/biodiversity benefits can be accrued.

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[109] Surrey Nature Partnership
[110] NHE4

7.47 Green infrastructure is not included within the carbon reduction statement as we do not consider that there is sufficient concrete means of calculating exactly the efficacy of trees and planting in reducing carbon emissions. However, schemes including roads should consider the planting of trees for amelioration of emissions. New development proposals are also expected to achieve a net gain in biodiversity under Policy NHE2 of the DMP, aside to the climate change aspects of biodiversity referred to above.

7.48 In the south of the borough close to the Gatwick flightpath careful consideration will be required where open water or certain types of green roofs/infrastructure, or tree-planting (which can attract Corvids and pigeons) are incorporated into the scheme as this could attract birds and in so doing increase the risk of bird strikes. Where fruit/berry species are included, consideration should be had in regard to flocking birds. Nonetheless, most green roofs attract smaller birds that are lower risk to aircraft and, as such, a careful judgement needs to be made.[111]

Sustainability checklist/Carbon Reduction Statement

7.49 The sustainability checklist contained in Appendix 5 will assist in the preparation of development proposals and planning applications.

7.50 Removal of mature trees will need to be factored into the Carbon Reduction calculations – as set out at paragraph 7.46 above.

Conditions

7.51 Conditions may be imposed on landscaping and planting schemes in regard to: maintenance; avoidance of over-pruning (for increased shade and cooling, etc); adequacy of soils and water supply; suitability of species and provision for future habitats; and protections of green spaces from fires.

Further information and tools

Surrey County Council Highways

Surrey County Council Tree Strategy 2020

Natural England/RSPB Adaptation Manual 2020

GRO Green Roof Code 2014

Green Heat in Greenspaces project

Itree

[111] https://www.aoa.org.uk/policy-campaigns/operations-safety/

https://www.bbc.co.uk/news/science-environment-54293962

Ordnance Survey Mastermap greenspace function

https://www.gov.uk/government/publications/25-year-environment-plan

8. Water Resources

8.1 There are two main issues regarding water efficiencies: saving water as a precious resource, and the energy use associated with the provision of safe water. Flooding and drainage are also related issues.

8.2 Reigate & Banstead's growing population is increasing the demand for water on both the supply and sewerage sides, and this is being further exacerbated by the steady increase in average temperatures particularly in the summer months; the Environment Agency (EA) has designated the Thames Water region, and the general area that encompasses Reigate & Banstead Borough, as 'seriously water stressed', and has identified the future pressures of development and climate change. The Reigate & Banstead area is noted by the EA as having limited capacity for new development or abstraction. The Council's Environmental Sustainability Strategy 2020 views water as a precious resource and includes priorities for water efficiency.

8.3 Providing increased resilience to the threat of water shortages is partly the responsibility of the utility providers, but the integration of water saving measures in developments can make a significant contribution to reducing water wastage.

8.4 As well as the amount of water used there is also the way water is consumed. Potable (drinking) water is often pumped over long distances and requires purification. Both these processes use energy. The Council's Environmental Sustainability supports water use as close to its source as possible. To support this ambition, this chapter provides suggestions on the inclusion, where suitable, for using grey or rainwater in new developments.

Relevant local plan policy links

CS10, CCF1, DES8, NHE 4, DES9

8.5 Local Plan policies seek to: reduce water usage in new developments; make more sustainable use of water; and protect and enhance existing blue infrastructure. DMP policy CCF1 (Climate change mitigation) requires that residential developments achieve water efficiency standards of 110 litres per person/day[112], and CS Policy CS10 (Sustainable development), point 9, addresses adaptation and the use of resources, including water supplies/quality, and impacts upon ecology.

Water Saving Measures

8.6 Developers will be required to meet the BREEAM standards for water-efficiency for all non-residential developments[113]. Residential and non-residential developments will be required

[112] The National Planning Practice Guidance (NPPG) also includes an additional standard for 105 litres per head per day, with an additional five litres provided for gardens.
[113] As per the requirements of Policy CS11 (1,b) that all non-residential development should meet BREEAM standard 'very good'.

to have installed devices such as low-flush toilets, aerated showers and other water saving measures.

8.7 Water-harvesting should be incorporated into the design of new developments with consideration given to how areas of impermeable surface can be used to contribute to rainwater harvesting. Rainwater can be harvested for activities such as watering gardens, and even for flushing toilets and for use in washing machines, and grey-water circuits can be installed to enable this.

8.8 Rainwater harvesting measures should be included in all applications for major developments. Water butts should be installed at new housing developments, and other provisions, such as allotments, where rainwater can be readily used. Underground tanks can also be considered.

8.9 Greywater – water that has already been used, for example for bathing – can also be harvested for other uses, and measures to collect the water can be considered for developments. However this needs very careful thought, as grey water can contain bacteria and pollutants. Advice from the Royal Horticultural Society[114] is that - 'Plants can be watered with shower, bath, kitchen and washing machine water (from rinse cycles), collectively referred to as 'grey' water. It varies in quality and may contain contaminants such as soap and detergent. Fortunately, soil and potting compost are effective at filtering them out, and the residues can sometimes act as a mild fertilizer.' Layouts should also be accommodating waste-water recycling facilities.[115]

8.10 For water-intensive developments, such as golf courses, it will be necessary that the supply of water can be shown to be independent of public and environmental water stocks, for example through collection of rainwater.

8.11 Saving water during construction should be considered, especially where a lot of water will be required. This may include the use of off-site construction methods, which can save water[116]. Applications will need to show how water will be saved – in line with the requirements of DMP policy CCF1.

Flood-risk, water run-off and Sustainable Drainage Systems (SuDS)

8.12 Flood-risk will increase with climate change. Furthermore, through increased development and higher building densities water runoff will become more restricted further increasing the risk of flooding.

8.13 Some potential measures to ameliorate these issues have been addressed in regard to trees and planting in Chapter 7, but in addition it may be necessary to include attenuation measures in new developments, including ponds or even rainwater gardens. Green roofs

[114] https://www.rhs.org.uk/science/gardening-in-a-changing-world/water-use-in-gardens/using-grey-water
[115] Rising to the Climate Crisis – A guide for local authorities on planning for Climate Change (TCPA/RTPI, Dec 2018)
[116] Such as 'modern methods of construction' https://www.rics.org/globalassets/rics-website/media/news/news--opinion/modern-methods-of-construction-paper-rics.pdf

may assist in avoidance of rainwater pooling. Advice on sustainable drainage systems (SuDS) for new developments can be found at Surrey County Council.

8.14 To address heavy rainfall events, buildings should be prepared with suitable gutters and pipes for more intensive events, and green walls and roofs can also be included for slowing the rate at which water is dispelled from buildings. All hard surfacing in new developments including footways/pavements, internal roads, car parking, etc, should be permeable enough to allow for a soaking away of surface water and prevention of water run-off and flash-flooding. This also allows for ground-water stocks to be replenished helping to maintain water supplies during drought events.

8.15 Developers will also be required to show that consideration has been given to ensuring that sewers will not be overwhelmed and cause flooding. Suitable drainage systems will need to be in place to avoid this, including Sustainable Drainage Systems (SuDS). As well as ameliorating flood-risk, SuDS can by their very nature address wildlife and habitats needs; improve water quality; and provide for recreation and amenity.

Planning Applications

8.16 All new housing developments will be required to demonstrate that appropriate water saving measures have been incorporated to comply with Policy CCF1, including water usage per person of less than 110 litres per day. In non-household schemes an assessment of water-saving measures will be required, and evidence of compliance with BREEAM water-efficiency standards to at least 'very good', as per the requirements of Core Strategy Policy CS11. Reference should also be made to the sustainability checklist regarding water/energy savings and efficiencies. Permission for water intensive developments will only be given where a separate supply of water can be demonstrated. Suitable drainage, for additional rainfall , and for prevention of sewer flooding elsewhere, will to have been considered. The lead local flood authority (LLFA) should confirm the suitability of any SuDS schemes presented as part of development proposal.

8.17 All developments should show that consideration has been given to the implementation of Sustainable Drainage Systems (SuDS) for surface-water management. Where a SuDS system is proposed this should allow for improved water quality; improvements for biodiversity; and enhanced amenity, turning the solution to potential problem into further benefit for people's health and wellbeing, through often-needed access to green space, and habitats for wildlife. However, all SuDS schemes in the proximity of an aerodrome, and in particular Gatwick Airport, should be carefully designed with regard to the risk of attracting birds, and bird-strike risk for aviation[117].

8.18 The lead local flood authority (LLFA) should confirm the suitability of any SuDS schemes presented as part of schemes.

[117] https://www.aoa.org.uk/policy-campaigns/operations-safety/

Further guidance and tools

Leeds Green Streets

Reigate and Banstead Environmental Sustainability Strategy 2020

Surrey County Council Planning Advise for Sustainable Drainage Systems (SuDS)

Susdrain

https://www.watersafe.org.uk/downloads/developers_info/developing_water_efficient_homes.pdf

9. Environmental sustainability, climate adaptation, and heritage assets

9.1 Development involving historic assets or within other protected designations, such as Areas of Outstanding Natural Beauty or Conservation Areas, will raise additional matters to those already identified. Such considerations include how to achieve the sustainability objectives whilst maintaining the integrity of historic assets, views, and landscapes, and their settings. Additionally, these assets may themselves be vulnerable to the effects of changes to climate or other issues, such as air pollution, and may therefore need additional care and conservation, so that they continue to form an important part of our identity and sense of place.

9.2 The council's conservation officer would be the first point of contact to discuss any adaptations to any historic assets.

Relevant local plan policy links

CS10, CFF1, NHE4, NHE9

Maintenance and renovation of historic buildings and structures in a changing climate

9.3 The requirements for maintenance and renovation of historic buildings and structures is changing due to the effects of different climatic patterns. Whilst unpredictable and severe weather is likely to be an ongoing issue, continued change will more regularly stem from individually less severe, but nevertheless cumulatively significant, impacts that a slight change in temperature could allow, such as fungal and plant growth, and insect infestations. Structural problems may also increase from greater fluctuations in temperature (heat as well as cold). Soil shrinkage from drier summers, particularly in clay rich areas in the north of the borough, can lead to building subsidence, structural deformation, and even and collapse in the most severe cases.

9.4 Where measures are being proposed to mitigate the effects of climate change in the case of statutory listed buildings, Listed Buildings consent will be required for the proposed works. Key considerations are the impact on the external appearance of the building or structure and the way the setting of the listed asset maybe affected by the proposal. Where the listing includes internal features, particular care should be taken to minimize any disruption to the features. Discussions with the conservation officer and a programme of works will be necessary to both appraise the proposed changes and to ensure that the most appropriate programme of actions is agreed prior to the interventions taking place, thereby ensuring that the fabric of the historic asset is retained.

Flooding and Historic Buildings

9.5 Most historic structures are durable, and relatively resistant to flooding compared with more modern buildings[118], but they are still vulnerable, not only at risk from flood damage but also damage from inappropriate remedial works. Whilst most historic buildings within the borough are generally unaffected by flooding due to having been located on higher ground, contractors making repairs to these assets will need a proper understanding of historic fabric first, to avoid issues such as the unnecessary removal/disposal of significant finishes and fittings or the use of unsuitable materials. Most historic timberwork, panelling, floorboards and plasterwork can be retained and conserved after flooding. Much damage can also be caused by rapid artificial drying methods that are not correctly controlled.

9.6 Historic England's *Historic Buildings and Flooding* provides detailed guidance on dealing with flood related matters and historic assets, and reference should be made to this document.

9.7 In the event of flooding incidences occurring at historic buildings in Reigate and Banstead borough, contact should always be made with the council's conservation officer for advice.

Energy efficiency improvements in historic and traditional buildings

9.8 Improving the energy efficiency of existing buildings can create specific challenges in the case of historic and traditional buildings, and Part L (of the Building Regulations) makes it clear that a reasonable compromise on energy efficiency targets may be acceptable in order to preserve the character and appearance of historic buildings. The regulations include exemptions and circumstances where special considerations apply for historic buildings and those of traditional construction. These include for: listed buildings at Grades I, II* and II listed in accordance with Section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990; buildings in Conservation Areas; and scheduled monuments. Additionally, special circumstances apply to: locally listed buildings; buildings in national parks and other historic areas; and traditionally constructed buildings.

9.9 Achieving an appropriate balance requires an understanding of the Regulations and the building, particularly the point at which alteration to the building's character and significance becomes unacceptable. Historic England favours a 'whole building approach', which seeks to save energy, sustain heritage significance, and maintain a healthy indoor environment. This approach can achieve significant improvements in most cases.

9.10 Historic England has prepared a useful document: Energy Efficiency and Historic Buildings – Application of Part L of the Building Regulations to Historic and Traditionally Constructed Buildings[119]. This document provides guidance from repairs to large scale alterations and should be referred to in any alterations to historic buildings to enable energy efficiency improvements.

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[118] Historic England
[119] https://historicengland.org.uk/images-books/publications/energy-efficiency-historic-buildings-ptl/heag014-energy-efficiency-partII/

9.11 The 'Whole Building Approach' is divided into five stages to be followed. **Stage 1: *Assessment – Understanding the building and its context*** includes an assessment of a range of factors[120] that can range from a simple 'walk-through' to a highly detailed analysis that might include computer simulations. The scope and depth of investigation and documentation undertaken should be proportionate to the size and sensitivity of the building, and the scale and complexity of the envisaged improvements. Although householders can carry out useful do-it-yourself appraisals, suitably qualified, experienced and independent practitioners should provide more thorough assessments.

9.12 **Stage 2: *Setting objectives and planning improvements*** considers short and long term energy objectives for the project and identifies the measures likely to be appropriate and practicable in the specific context.

9.13 **Stage 3: *Detailed design and specification*** consists of detailed, clear and unambiguous drawings and specifications. (These will need to be submitted to RBBC for review and consent.)

9.14 **Stage 4: *Installation*** provides information about the training and expertise required for installation of energy efficiency measures[121]. Before starting any installation works, it will be necessary to make sure that all necessary permissions have been obtained and any conditions complied with, including those from RBBC planning and building control.

9.15 **Stage 5: *Use, review and maintenance*** provides advice on ventilation, avoidance of condensation, and maintenance of good indoor air quality; comparisons between before and after energy usage; and maintenance of the services agreed.

9.16 The key for any successful thermal upgrade for historic buildings is that they are designed and implemented in such a way that the character and significance of the building is adequately respected in accordance with planning law. Double-glazing is not generally acceptable in Statutory Listed Buildings at the current time, but thermal efficiencies can be obtained by using secondary glazing, which can be designed to be as efficient[122].

Insulation and historic assets

9.17 Subject to planning consent, there are several ways that additional insulation can be provided/improved in historic buildings, including through the addition of dry lining to the inside of walls, or through the use of aerogels where there is need for a thin layer of insulation. However external wall insulation should generally be avoided in Conservation Areas or on traditional buildings, due to the impacts upon visual appearance.

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[120] Character and significance of the building; Local climate, orientation and exposure; Energy performance of the building envelope; Hygrothermal behaviour of the building fabric; the Condition of the building; Energy performance of building services; and levels of energy related to occupancy and human behaviour.

[121] Installers should have sufficient training, expertise and interest in the whole building approach. An experienced installer will be able to contribute valuable specialist practical knowledge to a project. Therefore, maintaining good communications between installer, and the designer, assessor and client is a key factor in ensuring the outcome of the project is successful.

[122] It is also recognised in the government grant scheme.

9.18 Cavity wall insulation may be acceptable for some buildings, in particular later Victorian and Edwardian homes, which were often built with cavity walls in Reigate & Banstead. This should be done using 'bonded bead'.

Renewable energy and impacts upon historic assets, Scheduled Monuments, and their settings, and Areas of High Archaeological Potential

9.19 Chapter 6 provided broad advice on the different types of renewable energy technologies, and issues associated with these. However, in the case of historic assets and scheduled monuments, and their settings, there are further issues to consider. The impacts upon the settings of designated sites/monuments of solar panels and wind turbines should be considered. PV cells protruding above the existing roofline or proposed for walls will not generally be acceptable. More sensitive solutions can be found for the siting of PV and solar panels, for example through siting them in the grounds of historic buildings, or in hidden valleys or flat on crown roofs. Unlike most other forms of renewable installations permission may be required for historic assets.

9.20 For larger proposals including solar arrays and wind turbines, it may be necessary to consult Historic England and/or SCC Historic Environment Planning and provide a heritage statement. Permission may also be required for the installation of other types of renewables, including external facilities for air source heat pumps.

9.21 Within a designated Area of High Archaeological Potential (AHAP), any ground disturbance caused by renewable technologies would require a formal permission.

9.22 Advice on installation on or in historic assets or their vicinities should always be sought from the conservation officer.

Planning Applications

9.23 In all cases affecting heritage assets, scheduled monuments and AHAPs, it is advisable to discuss your project with the planning conservation officer, including with regard to the need for AHAP permissions, required heritage statements, and consultations for larger proposals.

9.24 Further details are also contained in Chapter 6.

Listed Building Consent/planning consent

9.25 In the case of statutory listed buildings, Listed Building Consent will be required for the installation of photovoltaic (PV) cells and some forms of external fans for air source heat pumps, and within certain areas, such as Conservation Areas, they may require planning permission consent.

9.26 Similarly, for locally listed buildings and buildings in Conservation Areas, or Areas of Special Character (including Surrey Hills Area of Outstanding Natural Beauty), permission may be required.

Further guidance

Historic England, 2018 Energy Efficiency and Historic Buildings: Solar Electric (Photovoltaics)

Historic England, 2015 Facing the Future: Foresight and the Historic Environment.

Historic England, 2015 Historic Buildings and Flooding

Historic England Your Home

10. Sustainable Construction

10.1 Construction and demolition are important considerations in the drive to reduce carbon emissions and pollution, and to reduce wastage of resources and pressure on landfill. This chapter sets out key areas for construction companies and developers to address, potentially as part of a planning application/ planning condition, and in regard to Construction Management. These are:

- Materials;
- Demolition (and re-use);
- Reducing Embodied Carbon; and
- Construction operations.

Relevant Planning Policy links

CS10, CS11, CS19, DES1 and CCF1

Surrey Waste Local Plan Policy 4

Materials

10.2 Responsible sourcing and use of materials in construction can play an important part in reducing carbon emissions and wastage. Managing a product from the point at which a material is mined or harvested in its raw state, through to manufacture and processing, to use, re-use and recycling, until its final disposal as waste, all have a role to play.

10.3 BRE Global has developed a framework standard for the responsible sourcing of construction products, and there are a number of certification schemes which seek to increase both public and industry confidence that risks are being minimised or avoided. Their use ensures that specifiers are able to demonstrate the responsible nature of their selection decisions.

Sustainable sourcing of materials (including local and re-use)

10.4 The construction industry is the single largest user of materials in the UK[123] and 10% of national energy consumption is used in the production and transport of construction materials and construction products. There are many environmental impacts associated with the production and transfer of building materials including CO^2 emissions; water pollution; habitat loss/deforestation; fossil-fuel depletion; and use of precious water resources.

[123] Equating to 420 million tonnes every year

10.5 The Council will require applicants for building schemes within the borough to demonstrate that the selection of materials for use in the scheme has been carried out with due regard to the potential for use of local recyclable materials in the first instance, and then with regard to the use of locally-manufactured/produced materials (to reduce emissions from transport of goods) in line with the protocols set out in accredited certification schemes. These cover the use of recycled materials within schemes, and the use of sustainable procurement plans to support the use of responsibly sourced materials including from local sources.

Choice of materials for durability

10.6 Scheme proposals will need to show that the selection of materials for construction will be long-lasting and durable, minimising the need for frequent replacement incurring additional wastage, use of materials, energy needs, and associated emissions.

10.7 Proposals will need to show the rationale for materials selected taking account of what they are being used for and the conditions they will be exposed to (such as frequent traffic, pollution, weather and extremes of temperature). This will reduce the amount of materials needed to maintain a building. Various certification schemes cover this requirement.

Ethical materials selection

10.8 There are a number of certification schemes that seek to increase confidence in the responsible nature of selection decisions regarding construction materials. This may include the use of legally harvested and traded timber and the use of recognised certification schemes for other construction materials such as the Forest Stewardship Council (FSC).

Demolition and reclamation of materials (and waste stream management)

10.9 The most sustainable solution, and the one that would in most cases have the lowest construction carbon emissions, is to re-use any existing buildings (either all or some of the structures on the site), and it may be possible to achieve other environmental objectives (such as improving energy efficiency) by small additions and adaptations to the fabric (such as new window fittings and extra insulation).

10.10 Whilst the demolition of buildings and structures and the clearance of the site will be an essential element for many construction projects, this needs to be undertaken in a sustainable way. The re-use of demolition materials on-site where possible, such as for aggregate, fill or landscaping, or as part of new structures, helps reduce carbon emissions and waste, and it will be necessary for this to be set out as part of the Carbon Reduction Statement, and the Construction Method Statement.

10.11 Materials that it may be possible to salvage and re-use from demolition may include: bricks; wood (from buildings); asphalt (from roads and roofing shingles); gypsum (the main component of drywall); metals (such as copper and steel); glass; and plastics, all

of which should be salvaged as far as possible. Similarly, it may be possible to salvage components of buildings, such as: doors; windows; and plumbing fixtures.

10.12 As well as building materials and components, there may also be some natural materials that will be salvageable as a by-product of site-clearance which might include trees, stumps, earth and rocks.

10.13 How this salvage work is managed on site, and how materials and components are re-used, is crucial to reducing carbon emissions and other pollution, and reducing the wastage of resources/pressure on landfill. The Institute of Civil Engineers (ICE) have published a demolition protocol [124], developed in collaboration with the Resource Sustainability Initiative and the Chartered Institute of Waste Management (CIWM), which provides methods to assess and recover demolition material, as well as specifying recovered (recycled & reclaimed) material in new build.

10.14 Protocols for the collection of demolition (or other surplus) materials for recycling in other schemes are clearly set out in a number of certification schemes and the Council will require schemes to adhere to this so that materials can be sustainably re-used where possible.

ICE Demolition Protocol

10.15 This useful protocol incorporates information in the reduction of waste ending up in landfill sites (and the costs associated with this), and the sustainable use of resources through use of recycled materials.

Reducing Embodied Carbon

10.16 Embodied carbon is a term used for making an assessment regarding a building's greenhouse gas (GHG) emissions' footprint (which includes carbon dioxide). Depending on the scope of the assessment, it will include the total emissions generated through the various processes necessary to create the building, including the extraction/manufacture/processing of materials, and the transportation and assembly of these and all related elements/products used in the building's construction. It may also include the maintenance and replacements of parts, and the building's final disassembly and parts disposal.

10.17 Embodied carbon does not include the operational elements of running the building; it is concerned with the building's construction and fabric. It is sometimes referred to as 'capital carbon'.[125] Embodied carbon assessments are an emerging requirement

[124] http://www.ice.org.uk

[125] Based on the definition by the UK Green Building Council

influencing the selection of construction material and are likely to become normal practice as the country moves towards zero carbon.

10.18 RBBC will be supportive of all measures to consider the embodied carbon of materials used within the built environment, including the specification of building materials with lower embodied energy and through the application of embodied carbon assessments. This may include the use of modern methods of construction, such as pre-constructed building elements.

Construction operations

10.19 All construction sites should be carefully managed to prevent environmental damage and pollution, including the careful prevention of: sediment and chemicals from being washed into waterways including via roads/drains; and the production of excess dust, noise/light, and vibrations, causing disturbance to surrounding properties and wildlife. Mud on roads and pavements can become very slippery and dangerous unless cleaned off regularly.

10.20 Planning conditions will be used to control impacts from the construction of new development. This may include restrictions on hours of operation and construction. Conditions will also cover the type of machinery used, and construction/delivery hours. Applicants will also be required to prepare a Construction Method Statement to show how the construction will be undertaken including incorporating the measures outlined in this SPD.

10.21 Aware of the challenges that construction can have on the wider community, a national Considerate Constructors Scheme has been created by the industry. The scheme is a voluntary code of considerate practice, to which participating construction companies can sign up their sites. Registered sites should do all they can to reduce any negative effect they have on the environment, and should work in an environmentally conscious, sustainable manner. They should provide clean, appropriate facilities for those who work on them comparable to any other working environment and should do all they can to reduce any negative impact they may have on the area in which they are working.

10.22 Construction companies working in the borough are encouraged to follow best practice or preferably become registered in such schemes. Modern forms of prefabricated construction are supported as they can be a highly efficient way of construction, consume less water, facilitate the reduction of embodied carbon, and reduce carbon emissions.

Planning Applications

10.23 **Demolition**

Where demolition forms part of the development, a plan for the sorting and collection of demolition materials for reuse and recycling following the Institute for Civil Engineers (ICE) demolition protocol (or equivalent) will be required. This is best included with the planning application or a condition will be applied to a future planning permission to provide such a plan before works commence.

10.24 **Materials**

Areas to incorporate in the sustainability statement to support the development include the use of only sustainably sourced materials in the project, the controls in place to ensure that only the materials necessary for the project are ordered and that the materials used in the project are long lasting.

10.25 **Construction operations**

As part of the Construction Method Statement the types of matters to address could include that builders should be registered with a considerate constructor's scheme; the inclusion in the demolition and construction phases of dust spreading prevention measures such as watering down the site and using dust screens; and whether (where appropriate) there will there be pollution containment measures.

Further guidance and tools

General

Buildings Research Establishment (BRE) www.bregroup.com

Construction Industry Research and Information Association (CIRA) includes advice on waste reduction, recycling and making better use of resources and help tackle climate change. Information and training can be found at: www.ciria.org/

WRAP (Waste and Resources Action Programme) is a not for profit company backed by the Government to help individuals, businesses and local authorities reduce waste, recycle more, make better use of resources and help tackle climate change. WRAP can be accessed on www.wrap.org.uk

Demolition
Institute for Civil Engineers (ICE) demolition protocol can be found at: http://www.ice.org.uk

Materials and Embodied Carbon
Green book live. Available online at: http://www.greenbooklive.com/

BSE 6001 The Framework Standard for Responsible Resourcing

https://www.greenbooklive.com/filelibrary/responsible_sourcing/BES-6001--Issue-3.1.pdf

RICS professional standards and guidance, UK. Whole life carbon assessment for the built environment, 1st edition, November 2017. Available at: https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf

Construction Operations

Details of the national scheme can be found at: www.considerateconstructorsscheme.org.uk

Appendices

Appendix 1: Acronyms

AHAP	Area of High Archaeological Potential
ASHP	Air Source Heat Pump
AQMA	Air Quality Management Area
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CIBSE	Chartered Institute of Building Services Engineers
CHP	Combined Heat and Power [generator]
CO_2	Carbon Dioxide
CoU	Change of use from one development use to another
DER	Dwelling Emissions Rate
GHG	Greenhouse Gas
GI	Green Infrastructure
GSHP	Ground Source Heat Pump
LLFA	Local Lead Flood Authority
NPPF	National Policy Framework
PPG	Planning Practice Guidance
PV	Photovoltaic
RBBC	Reigate and Banstead Borough Council
SAP	Standard Assessment Procedure
SPD	Supplementary Planning Document
SCC	Surrey County Council
SuDS	Sustainable Drainage Systems
TER	Target CO_2 Emission Rate

Appendix 2: Glossary

Albedo – The proportion of incident radiation reflected by a system (or building). A perfect reflector would have an albedo of 1, whereas a perfect absorber would have an albedo of 0.

Article 4 Direction - Is a direction under article 4 of the General Permitted Development Order which enables the Secretary of State or the local planning authority to withdraw specified permitted development rights across a defined area.

Brise Soleil - A device, such as a perforated screen or louvres, for shutting out direct or excessive sunlight.

Building Emissions Rate or Dwelling Emissions Rate – The actual building/dwelling CO_2 emissions rate. It is expressed in terms of the mass of CO_2 emitted per year per square metre of the total useable floor area of the building ($kg/m^2/year$).

Building/ Thermal Envelope – The total area of all walls, floors, ceilings bordering the internal area of a building whose environment is to be controlled in line with the Building Regulations (e.g. not including some conservatories or porches).

Climate change adaptation - Adjustments made to natural or human systems in response to the actual or anticipated impacts of climate change, to mitigate harm or exploit beneficial opportunities.

Climate change mitigation - Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.

Combined Heat and Power – The simultaneous generation of heat and power in a single process.

Communal Heating/ Cooling – A heating/ cooling system where heat and cooling is supplied to multiple dwellings and/ or non-domestic uses from a shared source.

Energy Assessment/strategy – An energy assessment/ strategy is a document which explains how targets for CO_2 reduction will be met for a particular development within the context of the energy hierarchy.

Energy hierarchy – A classification of energy options, prioritized to assist progress towards a more sustainable system.

Embedded Carbon – A notional quantity of carbon, representing the amount of CO2 already emitted in order to manufacture or assemble any given construction material (s) and transport it to site.

Evapotranspiration – Evapotranspiration is the combined name for the processes of evaporation and transpiration.

Flood attenuation – Rainwater capture and slow release to reduce the risk of flooding further downstream.

'itree' – A software suite that includes urban and rural forestry analysis and benefits assessment tools.

Kilowatt (kW) – One thousand watts. A watt is a measure of power.

Megawatt (MW) – One million watts. A watt is a measure of power.

Network Ready – The state of a development being optimally designed for connection to a District Energy Network

Part L of the Building Regulations – Approved documents L1A and L2A of the Building Regulations relate to the conservation of fuel and power in new dwellings and new buildings other than dwellings respectively.

Passive Design – integrates the way the climate can maintain a comfortable temperature range in developments.

Passivhaus – is a building in which thermal comfort can be achieved solely by post-heating or post-cooling the fresh air flow required for a good indoor air quality, without the need for additional recirculation of air.

Regulated CO_2 emissions – The CO_2 emissions arising from energy used by fixed building services, as defined in Part L of the Building Regulations. These include fixed systems for lighting, heating, hot water, air conditioning, and mechanical ventilation

Standard Assessment Procedure (SAP) – A methodology introduced by the Government to assess and compare the energy and environmental performance of buildings to make sure that any new developments will not only meet Building Regulations, but also all energy and environmental policy initiatives.

Solar Gain - The increase in temperature of a building, object, or space that is caused by solar radiation

Simplified Building Energy Model – A computer program that provides an analysis of a building's energy consumption. The purpose of the software is to produce consistent and reliable evaluations of energy use in non-domestic buildings on a development.

Thermal Mass - A material's capacity to absorb, store and release heat. For example, water and concrete have a high capacity to store heat and are referred to as 'high thermal mass' materials. Insulation foam, by contrast, has very little heat storage capacity and is referred to as having 'low thermal mass'.

Communal Heat Network – A set of flow and return pipes circulating hot water to apartments and non-domestic buildings on a development

Standard Assessment Procedure – A methodology for assessing and comparing the energy and environmental performance of dwellings. Its purpose is to provide accurate and reliable assessments of dwelling energy performances that are needed to underpin Building Regulations and other policy initiatives.

Target CO_2 Emission Rate – The minimum energy performance requirement for a new dwelling/ building. It is expressed in terms of the mass of CO_2 emitted per year per square metre of the total floor area of the building (kg/m^2/year).

Appendix 3: Local Plan Policies

Core Strategy

Policy CS4: *Valued townscapes and the historic environment*

1. Development will be designed sensitively to respect, conserve, and enhance the historic environment, including heritage assets and their setting. Development proposals that would provide sensitive restoration and re-use for heritage assets at risk will be particularly encouraged.
2. Development will respect, maintain and protect the character of the valued townscapes in the borough, showing consideration for any detailed design guidance that has been produced by the Council for specific built-up areas of the borough. Proposals will:
   a. Reflect high standards of sustainable construction in line with policy CS11
   b. Be of high quality design which takes direction from the existing character of the area and reflects local distinctiveness
   c. Be laid out and designed to make the best use of the site and its physical characteristics, whilst minimising the impact on surrounding properties and the environment
   d. Protect and where appropriate enhance existing areas of biodiversity value and the links between them.

Policy CS10: *Sustainable development*

Development will:

1. Make efficient use of land, giving priority to previously developed land and buildings within the built-up areas.
2. Be at an appropriate density, taking account of and respecting the character of the local are and levels of accessibility and services.
3. Contribute to the creation of neighbourhoods which are supported by effective services, infrastructure and transport options and which are designed to be safe, secure and socially inclusive.

4. Protect and enhance the green fabric, and respect and contribute to the borough's green infrastructure network.
5. Respect the ecological and cultural heritage of the borough including the historic environment.
6. Minimise the need to travel, whilst increasing opportunities to walk, cycle or use public transport, including as part of the green infrastructure network.
7. Minimise the use of natural resources and contribute to a reduction in carbon emissions by re-using existing resources, maximising energy efficiency, minimising water use, and reducing the production of waste, including through sustainable construction methods. Encourage renewable energy/ fuel production whilst ensuring that adverse impacts are addressed, including on landscape, wildlife, heritage assets and amenity.
8. Be designed to minimise pollution, including air, noise and light, and to safeguard water quality.
9. Be designed reflecting the need to adapt to the impacts of climate change (for example higher temperatures, increased flooding, increased pressure on water resources, impacts on ecology and built heritage and impacts on ground conditions).
10. Be located to minimise flood risk, through the application of the Sequential Test and where necessary the Exception Test, taking account of all sources of flooding including fluvial, surface water, sewer and pluvial flooding, and reservoir failure, and manage flood risk through the use of SuDS and flood resistant/ resilient design features, and where necessary provide floodplain compensation.
    - The criteria within this policy, along with policy CS6, will guide the allocation of sites through the DMP.

Policy CS11: *Sustainable construction*

1. The Council will expect new development to be constructed to the following standards (taking into account the overall viability of the proposed development at the time the application is made):
    a. New housing: to a minimum of Code for Sustainable Homes Level 4, or future nationally described standards (justified by local evidence if required). To achieve Level 4, the Council may require (through the DMP) or encourage (through supplementary guidance) minimum standards for some tradeable Code elements to be provided in particular locations or for particular types of housing development.
    b. Relevant non-residential development of new or replacement buildings, or extensions to existing structures: to a minimum of BREEAM 'very good'.
2. The Council will work with developers and other partners to encourage and promote the development of decentralised and renewable or low carbon energy

(including combined heat and power) as a means to help future development meet zero-carbon standards affordably.

a. Where a major development is planned that generates, is within, or is adjacent to an area of significant heat density, it will be expected that the potential to create, or connect to, a district heating network is fully investigated. Such developments will be identified in the DMP where possible.

b. Where a district heat network exists or is planned, or where there is potential to utilises waste heat, the Council may require – where feasible and viable – development in these areas to be designed to facilitate its use and connect to it.

Policy CS17: *Sustainable construction*

The Council will work with Surrey County Council, the Highways Agency, rail and bus operators, neighbouring local authorities and developers to:

1. Manage demand and reduce the need to travel, by:

   a. Allocating land for development and directing development to accessible locations in the borough

   b. Securing provision of - or easy access to - services, facilities and public transport as part of new development.

2. Improve the efficiency of the transport network, by:

   a. Enhancing public interchange facilities in Redhill and Horley town centres and promoting Redhill/ Reigate as a transport hub

   b. Delivering improvements to the road network to meet all street users' needs, enhance accessibility along key corridors and accommodate the forecast increase in journeys.

3. Facilitate sustainable transport choices, by:

   a. Improving travel options through enhanced provision for bus, rail, walking, cycling and bridleways

   b. Promoting walking and cycling as the preferred travel option for shorter journeys

   c. Promoting non-car travel

   d. Requiring the provision of travel plans and transport assessments for proposals which are likely to generate significant amounts of movement

   e. Seeking to minimise parking provision in the most sustainable locations, and secure adequate parking provision relative to patterns of car ownership elsewhere.

Development Management Plan (DMP)

Policy DES1: *Design of new development*

1. All new development will be expected to be of a high quality design that makes a positive contribution to the character and appearance of its surroundings. Planning permission will be granted for new development where it meets the following criteria:
2. Promotes and reinforces local distinctiveness and respects the character of the surrounding area, including positive physical characteristics of local neighbourhoods and the visual appearance of the immediate street scene.
3. Uses high quality materials, landscaping and building detailing.
4. Has due regard to the layout, density, plot sizes, building siting, scale, massing, height, and roofscapes of the surrounding area, the relationship to neighbouring buildings, and important views into and out of the site.
5. Provides street furniture/ trees and public art where it would enhance the public realm and/ or reinforce a sense of place.
6. Provides an appropriate environment for future occupants whilst not adversely impacting upon the amenity of occupants of existing nearby buildings, including by way of overbearing, obtrusiveness, overshadowing, overlooking and loss of privacy.
7. Creates a safe environment, incorporating measures to reduce opportunities for crime and maximising opportunities for natural surveillance of public places. Developments should incorporate measures and principles recommended by Secured by Design[126].
8. Provides for accessible and sensitively designed and located waste and recycling bin storage in accordance with the Council's guidance document 'Making Space for Waste'.
    a. Incorporates appropriate landscaping to mitigate the impact, and complement the design, of new development. Schemes should:
        i. Protect and enhance natural features by:
        ii. Incorporating existing landscaping into scheme design where feasible.
    b. Integrating new landscaping, both hard and soft, and boundary treatments which use appropriate local materials and/ or species.
9. Provide details about how future maintenance of existing and new landscape works will be managed. Where necessary, conditions will be used to secure the delivery of landscaping schemes, protection of natural features during the course of development and requirements for replacement planting.

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126 https://www.securedbydesign.com/

10. Achieves, where applicable, an appropriate transition from the urban to the rural.
11. Makes adequate provision for access, servicing, circulation and turning space, and parking taking account of the impact on local character and residential amenity, including the visual impact of parked vehicles (see also TAP1).
12. Is accessible and inclusive for all users, including for people with disabilities or mobility constraints (See also DES7).
13. Respects aerodrome safeguarding requirements.

Policy DES8: *Construction management*

The Council will expect all developments to be managed in a safe and considerate manner, in addition to the following requirements:

1. Through the use of conditions, the Council may require Construction Management Statements to be agreed and implemented on a case by case basis. These may be required for:
    a. Minor and major developments creating new homes and / or commercial space.
    b. Other forms of development, particularly where the site is constrained or where it is identified that there is a specific risk to highway safety and/ or the amenity of neighbouring properties.
2. The Construction Management Statement must address how any development impacts will be managed. The statement should be appropriate to the scale and context of the development but should include:
    a. Prediction of potential impacts with regard to water, waste, noise and vibration, dust, emissions and odours, ground contamination and soil pollution, wildlife and features and heritage/ archaeology. Where potential impacts are identified, mitigation measures should be identified to address these impacts.
    b. Measures to manage traffic and parking impact, highway/ pedestrian safety and congestion.
    c. Information about phasing and co-ordination of works, including timing of deliveries, particularly where there are multiple developments in a single area.
    d. Information about measures that will be used to protect any on/ off-site features, including trees, verges, drains, kerb stones, and footways, that may be damaged due to works and remediation of any subsequent damage.
    e. Information about the measures that will be used to protect privacy and the amenity of surrounding sensitive uses, including provision of appropriate boundary protection.
    f. Means of commination and liaison with neighbouring residents and businesses.
    g. Hours of work.

3. Any advertisements and signage proposed to be displayed for the duration of construction works – including as part of site hoardings – must be appropriately designed in accordance with DES10. Conditions will be used to secure removal of any temporary advertisements.

Policy DES9: *Pollution and contaminated land*

This policy applies borough-wide, although particular attention should be paid within the following designated areas:

- Air Quality Management Areas
- Noise contours associated with Gatwick Airport

1. For all types of development, across the borough:
   a. Development will only be permitted where it can be demonstrated that (on its own or cumulatively) it will not result in a significant adverse or unacceptable impact on the natural or built environment (including sensitive habitats); amenity; or health and safety due to fumes, smoke, steam, dust, noise, vibration, smell, light or any other form of air, land ,water or soil pollution. Where there would be potential adverse effects from pollution and adequate mitigation cannot be provided, development will not normally be permitted. This includes pollution from construction and pollution predicted to arise during the life of the development. Particular attention should be paid to development within Air Quality Management Areas.
   b. New development will not normally be permitted where existing fumes, smoke, steam, dust, noise, vibration, smell, light or any other form of air, land, water or soil pollution are unacceptable and there is no reasonable prospect that these can be mitigated against to satisfactory levels. This is particularly relevant for sensitive development such as residential.
   c. Where a site is known to be contaminated, or where there is a reasonable possibility of contamination, appropriate investigation, and where necessary mitigation and/ or remediation will be required.
   d. Measures to reduce air pollution will be encouraged.
2. Within areas of poor air quality (as defined by the presence of Air Quality Management Areas) development must be designed to minimise the occupants' or users' exposure to air pollution, both internally and externally.
3. In areas near Gatwick Airport, residential development will be permitted where it can be demonstrated that the noise levels will not have a significant adverse effect on the proposed development. Proposals for residential development on sites falling within the 57 dB LAeq (07:00 – 23:00) or 48 dB LAeq (23:00 – 07:00) noise contours for Gatwick Airport must:
   a. Be accompanied by a full noise impact assessment.

b. Demonstrate that, though satisfactory design, mitigation and/ or attenuation measures, future occupants would not be subject to unacceptable noise disturbance both within buildings and externally.

Policy TAP1: ***Access, parking and servicing***

1. All types of development, across the borough, will be required to:

    a. Provide safe and convenient access for all road users, taking account of cumulative impacts, in a way which would not:

        i. Unnecessarily impede the free flow of traffic on the public highway, or compromise pedestrians or any other transport mode, including public transport and cycling.
        ii. Materially exacerbate traffic congestion on the existing highway network.
        iii. Increase the risk of accidents or endanger the safety of road users including pedestrians, cyclists, and other vulnerable road users.

    b. Incorporate a highway design and layout that:

        i. Complies with currently adopted highway standards and guidance (including roads which will not be adopted by the Highways Authority, unless evidence can be provided to clearly demonstrate a scheme would be safe and accessible).

        ii. Provides adequate access in particular with regard to circulation, manoeuvring, turning space, visibility splays and provision for loading/unloading for an appropriate range of vehicles.

        iii. Allows for access by service vehicles (including refuse vehicles) and emergency vehicles at all times without restriction, including adequate width to ensure there is no obstruction from parked vehicles. On existing road layouts, new development must not materially worsen the existing access for service and emergency vehicles and look to improve it where possible.

        iv. Achieves a permeable highway layout, connecting with the existing highway network safely and includes safe access for pedestrians and cyclists.

        v. Provides sufficient visibility and lighting for the safe and convenient use of the roads, cycle tracks, paths and parking places.

    c. Include car parking and cycle storage for residential and non-residential development in accordance with adopted local standards (see Annex 4) unless satisfactory evidence is provided to demonstrate that non-compliance would not result in unacceptable harm. Such evidence could include on-street parking surveys, evidence of parking demand, and/ or further information on accessibility. Development should not result in unacceptable levels of on-street parking demand in existing or new streets.

    d. If the development would result in the loss of existing car parking spaces, demonstrate that there is no need for these car parking spaces.

e. Incorporate pedestrian and cycle routes within and through the site, linking to the wider sustainable transport network where possible, especially in and to the borough's town centres.

f. Provide electric vehicle charging points.

g. Remove any dropped kerbs and crossovers made redundant by the development and reinstate the footway/verge.

2. Planning applications will be looked upon favourably unless they would have an unacceptable impact on highway safety or the residual cumulative impacts on the road network would be severe, taking into account proposed mitigation.

3. For all developments likely to generate significant amounts of movement, a Transport Assessment or a Transport Statement will be required.

4. Provision of the following should be considered and are encouraged in new development:
   a. Shared use of private parking provision for public parking when not in use.
   b. Initiatives to increase travel by more sustainable options and help reduce the impact and frequency of travel by individual private car journeys (such as car pools/car clubs) to and from the development.

Policy CCF1: *Climate change mitigation*

1. New residential developments must:
   a. Meet the national water efficiency standard of 110litres/person/day.
   b. Achieve not less than a 19% improvement in the Dwelling Emission Rate (DER) over the Target Emission Rate (TER) as defined in Part L1A of the 2013 Building Regulations.

2. New non-residential developments of 1,000 square metres or more of gross floorspace should include renewable or low-carbon energy generation to provide 10% of the expected energy usage of the development, unless it can be demonstrated not to be viable. This could be through renewable energy technologies (i.e. solar photovoltaics), implementation of or connection to a district heating network, or any other method that demonstrably reduces carbon emissions from energy usage.

3. The Council will support developments that make provision for on-site micro-generation.

4. The design of buildings should maximise opportunities for energy saving (e.g. orientation of the building to achieve solar gain), unless this conflicts with other policies.

5. The use of sustainable construction methods and materials will be encouraged.

Policy NHE4: *Green and blue infrastructure*

1. The Council will work with landowners, land managers and stakeholders to secure the provision of a multi-functional green and blue infrastructure network by:
    a. Resisting the loss of existing public open space. Where this is urban open space the criteria within OSR1(2) must be met to justify the loss.

    b. Ensuring best management practice of multi-functional green/blue spaces across the borough.

    c. Preserving and enhancing existing green infrastructure and water features in priority regeneration areas and throughout existing urban areas.

    d. Looking favourably on proposals that enhance, extend, or make new provision for allotments or community food growing opportunities.

2. Development proposals must:
    a. Where possible, increase access to and provision of green and blue infrastructure and open spaces.

    b. Avoid any adverse impacts on existing habitats and take the opportunity to enhance and incorporate biodiversity as an integral part of design, including watercourses and riverside habitats.

    c. Positively incorporate green and blue infrastructure as an integral part of the design of new developments; supporting initiatives within the Council's Green Infrastructure Strategy and Action Plan where possible. Any new green and blue infrastructure should link with existing green/blue infrastructure in the surrounding area where possible.

    d. Incorporate open spaces and green spaces which can be used in a variety of ways and support a range of activities.

    e. Protect and enhance public rights of way and National Trails.

    f. Where possible, create new links and corridors between open spaces, green/blue infrastructure and the countryside beyond, such as through the provision of footpaths and bicycle paths or through planting and landscaping.

    g. Identify measures for appropriate maintenance of relevant green/blue infrastructure.

3. Within land designated as a Riverside Green Chain, the following uses and facilities will be permitted to facilitate activities compatible with the area and the maintenance of a natural green and blue environment:
    a. Informal recreation.
    b. Formal outdoor recreation, allotments, agriculture and woodland where feasible.
    c. Establishment of Local Nature Reserves and similar nature conservation provision.
    d. Enhancements to the riverine environment for water related purposes, including the establishment of buffer zones.
    e. Safe access provisions to appropriate sections of the riverine environment including safety measures consistent with the scale of visitor and operation activity while protecting other areas as wildlife refuges in accordance with a nature conservation strategy for the area.
    f. Interpretation and supervised investigation of archaeological sites.
    g. Creation of ponds, swales, bunds, stormwater wetlands and similar features as part of the surface water drainage system serving major new housing development and consistent with an overall agreed landscape plan.
    h. Construction of a combined orbital cycle and pedestrian path with connections to new and existing housing areas consistent with nature conservation values.
    i. Provision of facilities for horse riders, where practicable.

Policy NHE9: *Heritage assets*

1. Development will be required to protect, preserve, and whenever possible enhance, the borough's designated and non-designated heritage assets and historic environment including special features, area character or settings of statutory and locally listed buildings.

2. All planning applications that directly or indirectly affect designated or non-designated heritage assets must be supported by a clear understanding of the significance, character and setting of the heritage asset, and demonstrate:

a. how this understanding has informed the proposed development

b. how the proposal would affect the asset's significance; and

c. any necessary justification proportionate to the importance of the heritage asset and the potential effect of the proposal.

3. In considering planning applications that directly or indirectly affect designated heritage assets, the Council will give great weight to the conservation of the asset, irrespective of the level of harm. Any proposal which would result in harm to or total loss of designated heritage asset or its setting will not be supported unless a clear and convincing justification is provided. In this regard:

a. Substantial harm to, or loss of, Grade II assets will be treated as exceptional and substantial harm to, or loss of, Grade I and II* assets and scheduled monuments will be treated as wholly exceptional.

b. Where substantial harm to, or loss of designated heritage assets would occur as a result of a development proposal, planning permission will be refused unless there are substantial public benefits which would outweigh the harm or loss; or

i. it can be robustly proven that there are no other reasonable and viable uses for the asset in the short or medium term nor any other realistic prospect of conservation; and

ii. the harm or loss would be outweighed by the benefits of redevelopment.

c. Where less than substantial harm to a designated heritage asset would occur as a result of a development proposed, the harm will be weighed against the public benefits of the proposal.

4. Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments will be subjected to the tests in (3) above.

5. In considering proposals that directly or indirectly affect other non-designated heritage assets, the Council will give weight to the conservation of the asset and will take a balanced judgement having regard to the extent of harm or loss and the significance of the asset.

6. All development proposals must be sympathetic to a heritage asset and/or its setting by ensuring the use of appropriate high quality materials, design and detailing (form, scale, layout and massing).

7. Development that would help secure the long term viable use and sustainable future for heritage assets, especially those identified as being at risk of loss and decay, in a manner consistent with its conservation will be supported. Any associated or enabling development should have an acceptable relationship to the heritage asset, and character of the surrounding area.

8. Proposals which retain, or if possible, enhance the setting of heritage assets, including views, public rights of way, trees and landscape features, including historic public realm features in a manner consistent with its conservation, will be supported.

9. Proposals affecting a Conservation Area must preserve, and where possible, enhance the Conservation Area, paying particular regard to those elements that make a positive contribution to the character of the Conservation Area and its setting, and the special architectural or historic interest of the area.

10. Demolition (full or partial) of a building or removal of trees, structures or other landscape features in a Conservation Area will be permitted only where:

a. a replacement development has been approved; and

b. the loss of the existing building, structure, tree or landscape feature will not detract, or where appropriate enhances, the character or appearance of the

Conservation Area. Assessment of the contribution of an existing building must have regard to its character, design and construction, but not its condition.

11. Development within or affecting the setting of a historic park or garden will be required to:

- **a.** Avoid subdivision.
- **b.** Retain or restore features of historic or architectural interest, including trees, other distinctive planting and hard landscaping, and garden features.
- **c.** Where relevant, be accompanied by an appropriate management plan.

12. An archaeological assessment including where appropriate a field evaluation, will be required to inform the determination of planning applications for:

- **a.** Sites which affect, or have the potential to affect, Scheduled Monuments.
- **b.** Sites which affect, or have the potential to affect, areas of Archaeological Importance or High Archaeological Potential.
- **c.** All other development sites exceeding 0.4ha.

13. Where the policies map, or other research, indicates that remains of archaeological significance are likely to be encountered on a site, the Council will require schemes for the proper investigation of the site to be submitted and agreed. These must incorporate the recording of any evidence, archiving of recovered material and publication of the results of the archaeological work as appropriate, in line with accepted national professional standards.

Surrey Waste Local Plan 2019-33

Policy 4 – *Sustainable Construction and Waste Management in New Development*

Planning permission will be granted where it has been demonstrated that:

i. The waste generated during construction, demolition and excavation phase of development is limited to the minimum quantity necessary.

ii. Opportunities for re-use and the recycling of construction, demolition and excavation residues and waste on site are maximised.

iii. On site facilities to manage the waste arisings during the operation of the development of an appropriate type and scale have been considered as part of the development. These include integrated storage to facilitate reuse and recycling.

Appendix 4 Carbon Reduction Statement Template

Carbon Reduction Statement

Unit[127] Number/ address	Target Emission Rate (TER)[128]	Dwelling Emission Rate (DER)	% Improvement on Part L 2013
Add rows for each unit			

Energy Hierarchy

	Proposed measures (Attach plans and drawings showing any proposed renewable technology being incorporated into the scheme)
Define proposed measures to show how less energy will be achieved	
Define proposed measures to show how energy will delivered more efficiently	
Define proposed measures to show how renewable technologies will be incorporated	

[127] In the case of blocks of flats – it is acceptable to use the average energy performance of all dwellings in the building.
[128] Should be in accordance with Approved Document L1A

Calculation	Notes
The carbon reduction requirement should be applied to each unit or residential building envelope	In the case of apartments and terraced housing it is acceptable to use the average energy performance of all dwellings within the building. The area weighted average DER and TER must be calculated in accordance with the block averaging methodology defined in clauses 2.7 and 2.16 of Approved Document L1A.
The TER and DER should be derived from the Building Regulation, compliance calculations.	
Sample SAP calculations should be attached to the submitted Carbon Reduction Statement	The Government is planning to ban gas boilers in new homes from 2025. There are also proposals to change the carbon intensity of electricity in SAP 10, which will take into account the decarbonisation of electricity. RBBC would recommend that SAP 10.0 emission factors be used.
Where carbon reducing renewable technologies are proposed, these should be an integral part of the design and relevant drawings supplied. Proposals incorporating Combined Heat and Power will need to provide Air Quality Assessments	

Where mitigation measures are required to address amenity and prevent nuisance, these should be identified in the statement.	Consideration of proposed technologies on noise, air quality, etc with suitable mitigation measures identified as required.

Appendix 5: Sustainability Checklist Template

REIGATE AND BANSTEAD BOROUGH COUNCIL

Applicant's Name	
Agent's Name	
Site Address:	
Description of proposal	
Date checklist completed	
Additional commentary regarding questions attached	

1. Location and Transport (Chapter 3)	Yes	No	N/A
Does the location of the proposed development minimise distances to the main employment centres, shops, recreation and community facilities, and schools?	☐	☐	☐
Is the development located away from an area liable to flooding?	☐	☐	☐
Are the transport links, including the roads, footpaths, and cycle ways to the site liable to flooding?	☐	☐	☐
Does the scheme facilitate active/healthy travel choices and reduce private car dependency?	☐	☐	☐

Do pedestrian and cycle routes link comfortably to surrounding areas/facilities, and to other transport networks, to provide a convivial travel experience? For larger developments, is there natural surveillance, for example active frontages?	☐	☐	☐
Does the proposal provide appropriate levels and standards of car parking (as set out in Annex 4 of the DMP)?	☐	☐	☐
Will the development incorporate electric vehicle charging points (that are unobtrusive and avoid street clutter)?	☐	☐	☐
Does the proposal provide appropriate levels of, and secure facilities for, cycle parking/storage?	☐	☐	☐
Will a Travel Statement (for smaller-scale developments) or Travel Plan (for proposals that generate significant traffic) be submitted with your proposal, including measures such as car-clubs/Smart travel?	☐	☐	☐
For larger developments, has the idea of a car-club been considered?	☐	☐	☐

2. **Layout and Design (Chapter 5)**	Yes	No	N/A
For larger development schemes – does the layout utilise design to minimise shadowing, and gain heating efficiencies?	☐	☐	☐
Will the development make the best use of existing landform, to protect against hotter or wetter weather conditions, and utilise thermal buffering?	☐	☐	☐
For larger sites - Does the proposed site layout and building orientation demonstrate a consideration of the potential for passive heating/cooling and light?	☐	☐	☐

Has the design of the buildings taken account of the need for healthy lighting and ventilation and minimised glare? Has the cooling hierarchy been followed? Are the dwellings dual aspect?	☐	☐	☐
Are the materials chosen appropriate for thermal mass, and has appropriate insulation and air-tightness been considered in the design of buildings, whilst balancing against the needs to avoid over-heating?	☐	☐	☐

3. **Energy savings and use of renewables (Chapter 6)**	Yes	No	N/A
Does the scheme achieve a 19% carbon reduction Dwelling Emission Rate above the Target Emission Rate (as required in DMP policy CCF1)?	☐	☐	☐
Do all the units in the scheme achieve a 19% carbon reduction Dwelling Emission Rate above the Target Emission Rate (as required in DMP policy CCF1)?	☐	☐	☐
Has a Carbon Reduction Statement been prepared for the application?	☐	☐	☐
On developments of more than 10 homes and/ or 1000 sqm of non- domestic development will 10% of the development's energy needs be met using renewable technologies (as required in DMP policy CCF1)?	☐	☐	☐
To contribute to the reductions in carbon emissions and/or energy reductions required in policy CCF1, have a variety of energy saving and/or renewable energy measures been considered (such as those set out in this document)?	☐	☐	☐
Has the scope for connection of larger developments schemes to an existing District Heat and Cooling System, or CHP system been assessed? Has reference been made to the government's CHP Focus site assessment	☐	☐	☐

tools?) Or has the incorporation of a new CHP system been considered?			
Have biomass energy sources been considered where this could have sustainability benefits?	☐	☐	☐
Have renewables technologies such as solar/PV or wind turbines been considered for the scheme, possibly in combination with other technologies such as those for storage of energy?	☐	☐	☐
Where solar panels are being incorporated have you considered the impacts of shadowing on the panels and how it could affect their power output and has the visual impact been minimised?	☐	☐	☐
Have ASHP/GSHP technologies been considered, particularly where there is available space?	☐	☐	☐
Has solar heating been considered (perhaps in tandem with thermal storage)?	☐	☐	☐
For all listed technologies, has consideration been given to the ecological/and or design requirements and suitability, and have air quality issues been assessed where this is an issue?	☐	☐	☐

4. **Green Infrastructure & Ecology (Chapter 7)**	Yes	No	N/A
For large developments does the proposed scheme incorporated green infrastructure for increased resilience and adaptation to potential changes in climate? (This will need to be set out as part of the planning application).	☐	☐	☐
For denser urban developments, has greenery been included in some form - for cooling surrounds and buildings?	☐	☐	☐

Has the planting of shrubs been considered for cooling the outside of buildings?	☐	☐	☐
For developments on or close to roads, have trees or planting been considered for carbon capture and/or sequestration of air pollution (particles, etc)? And for larger developments, are trees/planting included for this purpose?	☐	☐	☐
Have evergreen trees been considered in designs, to allow for carbon capture (and capture of air pollution) in the autumn/winter months?	☐	☐	☐
Does the scheme incorporate any green infrastructure measures for insulation of buildings?	☐	☐	☐
Does the scheme incorporate green roofs/walls?	☐	☐	☐
Does the scheme incorporate any green infrastructure measures to assist with water attenuation?	☐	☐	☐
Have measures to conserve, enhance and/or restore biodiversity (including to assist pollinators) in and around the development been considered, including to compensate for habitats lost through development of brownfield land, or through changes to the climate? (This could include a utilisation of a 'matrix' approach to habitats for adaptation to climate change.)	☐	☐	☐
If the site is within an identified Biodiversity Opportunity Area (BOA) – have green infrastructure measures been included in line with the needs for that area, including regarding climate change.	☐	☐	☐
In denser developments, have green roofs/walls been included to allow for linkages between habitats for birds and invertebrates, for example through measures such as living pillars?	☐	☐	☐
For larger developments, where there are flood-risks and /or rainwater attenuation issues, have Sustainable Drainage Systems (SuDS) been considered – which can also assist in the	☐	☐	☐

enhancement/maintenance of wildlife habitats and eco-systems?			
Have all mature or large trees on the site been incorporated into the design of the new proposal, wherever possible?	☐	☐	☐
Where there is landscaping in schemes have native tree/planting species been considered for inclusion, and are they suitable for a changing climate?	☐	☐	☐
Have you considered how green and blue spaces within the development will be connected to the wider green infrastructure assets of the borough?	☐	☐	☐
Does the planting of new green infrastructure take account of the change in climate in regard to selection of suitable types?	☐	☐	☐
Will you be protecting existing ecological features from damage during site preparation and completion of construction works where practicable?	☐	☐	☐
Does the proposal provide for on-going management of green and blue spaces, including biodiversity habitats?	☐	☐	☐

5. **Water and Drainage (Chapter 8)**	Yes	No	N/A
In terms of water-use efficiency, does the proposal comply with Building Regulations and DMP Policy CCF1's water usage requirements limit of 110 litres per day, per person?	☐	☐	☐
Does the application meet the requirements of CS10 in regard to careful use of resources?	☐	☐	☐
Will the development require water-intensive processes for construction and, if so, are there any water-saving measures that can be used to reduce this?	☐	☐	☐

Have measures been included into the scheme to reduce the amount of treated/purified water that would need to be pumped to the site, for example through measures to allow the harvest/recycling of rain, or 'grey' water (for example for gardens and other non-drinking water uses such as flushing toilets or possibly washing)? **For example, have water-butts been considered for housing developments? Or underground tanks?**	☐	☐	☐
Have you designed-in measures to minimise surface water run-off, e.g. minimising paved areas and impermeable surfaces, or including soak-aways?	☐	☐	☐
Where paved surfacing is used, can it be permeable and enable enhanced water-storage?	☐	☐	☐
What measures have been included to address flood risk/rainwater attenuation? (For example, for landscaped areas, the inclusion of ponds or rainwater gardens, or for developments without landscaping possible green walls or roofs.)	☐	☐	☐
Have you considered incorporating sustainable urban drainage (SuDS) into your development proposal?	☐	☐	☐
Have you defined maintenance responsibilities for any proposed SuDS?	☐	☐	☐
Have suitable gutters and pipes been identified to enable the building to withstand rainfall events in future?	☐	☐	☐
For water-intensive developments, has the storage of water been considered, for avoidance of drawing on public water supplies (eg golf courses)?	☐	☐	☐

6. **Heritage Assets (Chapter 9)**	Yes	No	N/A
Have you considered the impact of proposals for energy efficiency improvements, or renewables energy supplies, upon heritage assets? (This will need to be carefully addressed with recourse to advice from Historic England – as set out – and the Council's Conservation Officer, and planning consent or listed building consents may be required.)	☐	☐	☐
If the development effects the setting of any listed building or ancient monument, has there been consultation with the Council's Conservation Officer? (Listed Building consents may be required.)	☐	☐	☐
If considering improvements to the insulation of historic assets, have you: Considered dry lining, aerogels and /or cavity wall insultation, as opposed to external insulation (which may be inappropriate for the visual appearance of historic buildings)?	☐	☐	☐
Considered secondary glazing (rather than double-glazing)?	☐	☐	☐
Has all siting of PV cells and panels been sensitively considered to avoid visual intrusion?	☐	☐	☐
If flood repairs are to be carried out, have you contacted the Conservation Officer/consulted HE advice?	☐	☐	☐

7. **Demolition and Construction (Chapter 10)**	Yes	No	N/A
Has consideration been given to embodied carbon, or the assessment of embodied carbon?			
Where site demolition will be necessary, have procedures for the salvage of building part	☐	☐	☐

and/or materials been put in place (including any natural materials on site)?			
Has consideration been given to whether any of the salvage could be recycled back into the proposed development? Or how materials can be sustainably recycled?	☐	☐	☐
Has regard been had to the ICE demolition protocol?	☐	☐	☐
Can the scheme demonstrate that the selection of materials has incorporated locally recycled or produced materials where possible?	☐	☐	☐
Does the proposal encourage the use of durable products	☐	☐	☐
Have you considered using other responsibly sourced building materials?	☐	☐	☐
Has a framework or certification scheme been used to establish the responsible sourcing of materials for the scheme? Or is there a clear rationale for the materials selected?	☐	☐	☐
Has the use of water during construction been considered (for minimisation of waste)?	☐	☐	☐
Have you considered being part of a Considerate Constructors Scheme?	☐	☐	☐