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Sustainable Construction and Renewable Energy Supplementary Planning Document

CONTENTS

1. INTRODUCTION

What is a SPD and what is its role in the Decision Making Process?

1.1 A Supplementary Planning Document (SPD) is a document which contains additional detail on how the Local Planning Authority (LPA) will interpret and apply specific policies in its Development Plan. A SPD cannot include any new policies that do not currently form part of the Development Plan and a SPD also does not form part of the Development Plan. However, it is a material consideration in the determination of planning applications and applicants are advised to refer to the contents of the SPD, as this will provide guidance on how the Council will carry out its decision making functions.

Aims of the SPD

1.2 The aims of the SPD are:

- To aid effective implementation of the Core Strategy Sustainable Development policies relating to Sustainable Development;
- To provide a clear direction to all parties on how to interpret these policies;
- To assist applicants in understanding the techniques and building practices available to improve the sustainability performance of buildings through their design, construction and subsequent use;
- To provide householders with guidance on their permitted development rights (as relevant at the time of adoption) to install limited forms of renewable energy and/or low carbon technology on homes, without the need to apply for planning permission; and
- To assist in assessing an application's compliance with Council policy on sustainable construction and renewable energy.

Applying the SPD

1.3 The requirements for this SPD apply to developments that require planning permission within Chiltern District. Homeowners are however strongly encouraged to use the SPD to help consider what measures could be taken to improve their property even where planning permission is not required.

1.4 Although planning permission may not be required for certain developments, Building Regulations apply to most new buildings and many alterations to existing buildings, whether domestic, commercial or industrial. It is therefore recommended that designers/ developers seek early advice and guidance on Building Regulations, and opportunities to reduce carbon emissions from the Council.

1.5 The Government and other bodies are expected to prepare or amend their policies, advice and guidance in a number of areas referred to or relevant to this SPD. Where this occurs new or changed documents could also be

material planning considerations which may need to be considered alongside this SPD.

Relevant Core Strategy Policies

1.6 This SPD provides additional information and guidance to show how the Sustainable Development and Renewable Energy policies within the Core Strategy - Policies CS4 - Ensuring Development is Sustainable and CS5 - Encouraging Renewable Energy will be implemented. These policies are reproduced below:

POLICY CS4: ENSURING THAT DEVELOPMENT IS SUSTAINABLE

To ensure long–term sustainability of development and help contribute towards national targets to reduce overall CO_2 emissions, the Council will expect all new developments to have regard to the sustainable development principles set out in Table 1 below.

TABLE 1: Sustainability Principles for Chiltern

a) Locations which are easily accessible by public transport, walking and cycling and which are provided with fast broadband services to reduce reliance on the car;
b) Maximum use of previously developed land, achieving higher densities in accessible locations, making the best use of existing transport infrastructure and services;
c) Safer access for all types of transport and pedestrians;
d) Minimal disruption in terms of water, noise and light pollution in the wider environment;
e) Minimal impact on designated local Air Quality Management Areas (AQMA);
f) Waste management and resource efficiency, being located within existing recycling service networks or providing new recycling and waste management facilities within the development;
g) Use of renewable energy technology sources wherever required under CS5;
h) Use of water efficiency measures during construction projects and as part of new development to reduce consumption and ensure no detrimental impact on water quality;
i) Maximum re-use of construction and demolition materials and the use of locally produced building materials wherever possible;
j) Assessment of surface water drainage impacts and the inclusion of Sustainable Drainage Systems (SUDs) which consider all SUDs options and ground conditions, under advice set out in national policy. The design and consideration of SUDs in the Critical Drainage Areas should be given particular attention so that it will not increase the risk of flooding within the site and to adjoining land/ properties;
k) Reduced risk of flooding in appropriate circumstances as a result of the new development;

l) Preservation and enhancement of nature conservation interests and important features of the natural environment such as rivers, streams, river corridors, flood plains, trees, hedgerows, ensuring there is a net gain in the District's biodiversity resources by meeting the targets in the national and local Biodiversity Action Plans as required under Policy CS24 of this Strategy;

m) Protection and enhancement of the historic and cultural heritage of the District including significant assets of the historic environment such as archaeological sites, historic buildings and settlements, designated landscapes, commons, ancient woodlands and hedgerows.

n) Remediation of contaminated land, including treatment of contaminated material in line with national policy advice;

o) Incorporation of cycle and vehicle parking appropriate to the needs of the site;

p) Travel plans for any residential development of over eighty dwellings and for other development as defined by the local transport authority in its published document (including updates) "Travel Plan Guidance for Developers" http://www.buckscc.gov.uk/bcc/transport/travelchoice_guidance.page;

q) Efficient and sustainable use of soils including taking account of the presence of the best and most versatile agricultural land when siting new development. Soil function should be maintained as far as practicable through sustainable urban drainage systems, including amongst other things, the use of water-permeable treatments for hard surfaces, thus avoiding unnecessary soil compaction and paving over soil;

r) The creation of safe and accessible environments where crime and disorder or fear of crime does not undermine quality of life or community cohesion;

s) Active contribution to the national targets for reducing CO_2 emissions set out in paragraph 8.3.

1.7 Policy CS4, in broad terms, covers most aspects of Sustainable Development. Whilst it covers quite a broad spectrum of topics many of its 'Sustainability Principles' are not particularly specific.

POLICY CS5: ENCOURAGING RENEWABLE SCHEMES

Stand Alone Schemes

Proposals for stand alone renewable energy generation schemes will be encouraged and permitted where individually, or cumulatively, there are no significant adverse effects on:

a) The surrounding landscape, townscape and historical features / areas;
b) Residential amenity;
c) Highway safety; and
d) Designated nature conservation or biodiversity interests.

Renewable Energy in New Developments

In developments of more than 10 dwellings or 1,000 square metres of non-residential floorspace, the Council will require that at least 10% of their energy requirements are from decentralised and renewable or low-carbon sources. Where developers cannot meet this requirement, the Council will require robust professional evidence to demonstrate why this is not feasible or viable. The Council will also encourage the incorporation of combined heat and power schemes.

1.8 Policy CS5 encourages renewable energy schemes in both new developments and stand-alone schemes. A stand-alone scheme is one that is neither attached to a building nor an off-the-grid electricity system. Examples of stand-alone schemes would be solar PV or wind farms, combined heat and power (CHP) or energy from waste development.

1.9 This policy requires a **minimum of 10%** of energy requirements serving a development to come from decentralised and renewable or low-carbon sources which is installed on site, unless the developer can demonstrate to the satisfaction of the District Council that it is not feasible or viable to do so. These terms are defined below:

1.10 *Decentralised energy* is energy and heat produced and supplied close to where it is used. Currently the UK produces most of its electrical energy from centralised power stations which is only 35% efficient, as energy is lost through cooling and during transmission. The main reasons for installing decentralised energy is therefore to create energy production which isn't tied to the national grid or fossil fuels and so as to make the UK's energy supply more resilient for the future.

1.11 Decentralised energy comprises the use of technologies such as gas, CHP, biomass, wind, solar (electric and heat), water etc. It is where energy is produced at the point of demand. Local generation increases energy efficiency, cost effectiveness and lowers carbon emissions. For example, a swimming pool may have a CHP unit which runs 24/7 to supply required electricity and heat. In the evenings, however, demand for generation may be

much lower but the excess energy and heat from the CHP could be used to supply adjacent housing or flats.

1.12 *Renewable energy* is energy flows which occur naturally and repeatedly in the environment, for example from the wind, water flow, tides or the sun.

1.13 *Low Energy Technologies energy* comes from sources which produce fewer greenhouse gases than traditional means of power generation, such as, air/ ground source heat pumps, or biomass boilers.

1.14 Policy CS5 also states that the Council will encourage the incorporation of Combined Heat and Power (CHP) schemes. These schemes integrate the production of useable heat and power in a cost effective, and an environmentally beneficial and responsible way. By producing heat and power simultaneously, CHP can reduce carbon dioxide emissions by up to 30% compared to conventional electricity generation, lowering fuel costs and reducing emissions. It is preferable if the useful heat can be used locally either on site or by an adjacent heat customer through a district heat network, thereby reducing losses through transmission.

What is the scope of the SPD?

Sustainable Construction

1.15 The scope of the SPD is:

- Energy Consumption, including the siting and orientation of a building, and its energy efficiency, and insulation;
- Renewable and low carbon energy sources and the opportunities for them in the District (both in existing and new developments and stand-alone schemes).
- Water Consumption and Quality, including water efficiency measures and reusing greywater and harvesting rainwater;
- Flood Risk and SuDS (Sustainable Drainage Systems);
- Air Quality;
- Noise;
- Biodiversity;
- Waste (other than matters falling within the responsibility of Buckinghamshire County Council (BCC) as Minerals and Waste Local Planning Authority); and

1.16 Transport, although an important sustainability factor, it is not covered in this document. It is suggested that applicants look at the latest Buckinghamshire County Council (BCC) Transport Strategy http://www.transportforbucks.net/Strategy/LTP3.aspx and contact BCC directly for further advice. Other sustainability factors such as heritage, tree planning and woodlands are covered in the Development Plan and other relevant documents like the National Planning Policy Framework (NPPF).

1.17 For each of the topic areas in scope, the SPD sets a base line position, and best practice measures to secure improvements through the control of development and implementation of relevant Local Plan policies. Where appropriate, it also highlights standards to be met. For example, what can be done to reduce energy use in new buildings and to retrofit existing ones. Any sources of further guidance will be set out at the end of each topic area.

1.18 It should be noted that that the SPD considers the most relevant technologies, responsibilities and advice at the time of writing and so consideration of other new or emerging technologies, changes or new advice should not be discounted and may be material planning considerations. Careful consideration and application of this SPD reference documents/advice to proposed development design will implement the requirements and objectives for Policies CS4 and CS5.

2. MEASURING AND DEMONSTRATING SUSTAINABILITY

2.1 This section provides a brief introduction and policy context to Sustainable Construction.

Sustainable Construction

2.2 Sustainable development is commonly defined as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (Brundtland 1987).

2.3 The purpose of the planning system, as set out within the National Planning Policy Framework (NPPF)[1] and supported by National Planning Practice Guidance (NPPG), is to contribute to the achievement of sustainable development. The need to support the transition to a low carbon future in a changing climate, taking full account of factors such as flood risk, and encouraging the reuse of existing resources, including conversion of existing buildings, and encouraging the use of renewable resources (for example by the development of renewable energy) is included within the NPPF as a core planning principle. For planning purposes, the Government has interpreted sustainable development through the NPPF as a whole. Policies CS4 and CS5 of the Core Strategy will therefore need to take account of the NPPF.

Climate Change

2.4 It is widely acknowledged that the climate is changing due to the effects of global warming. The release of CO_2 into the atmosphere, as a result of the burning of fossil fuels, results in a gaseous layer becoming trapped in the upper atmosphere and this layer acts like a greenhouse, warming the earth below. The resulting temperature rises upset the balance of the earth's climate, causing polar ice caps to melt, sea levels to rise and weather patterns to be disturbed. There is concern that if temperatures are allowed to rise beyond certain levels, the effects of climate change will be irreversible and this could have catastrophic effects.

2.5 The Climate Change Act 2008 contains a statutory target of securing a reduction in carbon dioxide levels of 80% below 1990 levels by 2050, with an interim target of 34% reduction by 2020. In 2011 the Department of Energy and Climate Change and Local Government Association signed a memorandum of understanding, outlining their shared commitment to helping to secure this reduction in the public sector. Planning plays a key role in providing resilience to the impacts of climate change as is clearly set out both in the NPPF (Section 10) and also in the NPPG (Section on Climate Change).

[1] National Planning Policy Framework, Department for Communities and Local Government, March 2012.

2.6 According to Good Practice Guidance on Sustainable Design and Construction[2], half of all of the country's carbon emissions come from the energy used in constructing, occupying and operating buildings. Local policies on sustainable construction and renewable energy are therefore important in helping to meet the reduction targets. In general terms, this relies on measures being undertaken to:

- minimise the use of resources (including energy and water);
- minimise carbon dioxide emissions;
- ensure that the built environment mitigates and is resilient to the impact of climate change including reducing flood risk and minimising carbon dioxide emissions;
- protect and enhance biodiversity and green infrastructure;
- provide buildings and spaces that are pleasant and healthy for occupiers and users, and where appropriate flexible or adaptable to other uses or to meet changing needs (e.g. dwellings that are adaptable to meet ageing population/ people with disabilities);
- ensure the sustainable sourcing of materials and
- to utilise sustainable construction technologies and minimise waste.

Renewable Energy

2.7 The 2009 UK Renewable Energy Directive set a target for the UK to achieve 15% of all its energy consumption from renewable sources by 2020.

2.8 The Government is committed to increasing the amount of energy from renewable and low carbon technologies. The National Planning Practice Guidance contains a section providing advice on renewable and low carbon energy which makes it clear that the Government sees planning as having an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable.

[2] Good Practice Guidance: Sustainable Design and Construction, Cross Sector Group on Sustainable Design and Construction, August 2012.

3. NATIONAL ASSESSMENTS TO ACHIEVE RESOURCE EFFICIENCY IN BOTH RESIDENTIAL AND NON-RESIDENTIAL BUILDINGS

3.1 This section provides a brief introduction to how national assessments can be applied to achieve resource efficiency in new build locally.

3.2 There are two industry leading assessment ratings that can be used to determine the sustainability of a development's design and construction, Codes for Sustainable Homes and Building Research Establishment Environmental Assessment Method (BREEAM).

3.3 For new residential buildings the Code for Sustainable Homes is a national standard for key elements of design and construction and for non-residential developments. In addition, the Homes and Community Agency's Housing Quality Indicators, apply to Registered Providers delivering new affordable housing developments and therefore also need to be taken into account for this type of development. BREEAM standards can assess the environmental performance of buildings in both new and existing buildings.

3.4 In August 2013 the Government consulted on a Housing Standards Review paper, which set out its intention to create a set of national standards for home building and to simplify the array of standards that currently exist.

Code for Sustainable Homes

3.5 The Code for Sustainable Homes is a voluntary range of standards designed to improve the overall sustainability of new homes by setting a single framework within which the house building industry can design and construct homes to higher environmental standards. Whilst the code is currently voluntary for private housing development, since April 2008 all publicly funded homes have had to meet Code Level 3 (see the Housing Quality Indicator information below).

3.6 The Code measures the sustainability of a home against nine design categories:

- Energy/ CO_2
- Pollution
- Water
- Health and well-being
- Materials
- Management
- Surface water run off
- Ecology
- Waste

3.7 Homes are rated as a whole. For most of the categories within the Code assessment, with the exception of water and energy where a minimum standard must be achieved, developers and designers can choose standards to suit a given site and development.

3.8 The Code uses a sustainability rating system indicated by 'stars', to communicate the overall sustainability performance of a dwelling. One star is the entry level and six stars is the highest level – reflecting exemplar development in sustainability terms.

3.9 A recent report (February 2014)[3] suggested that there has been a significant decline in additional costs associated with building to the proposed Zero Carbon Standard Costs and that costs are expected to continuously fall until 2020. This trend is encouraging in that it means that zero carbon developments are becoming more affordable, so assumptions that zero carbon cannot yet be delivered by the market may often be wrong. In addition, such homes may well also have a higher value and/ or be more saleable.

3.10 The energy performance of dwellings is assessed using a Standard Assessment Procedure (SAP) which is the Government's methodology for assessing and comparing the energy use, carbon dioxide emissions and environmental performance of dwellings. The most recent version **(http://www.bre.co.uk/sap2012/page.jsp?id=2759)** of SAP 2012 came into force for Building Regulation compliance on 6th April 2014, under the Approved Document L1A.

3.11 The Energy Saving Trust has been working with the construction industry and the Department of Energy and Climate Change to publish technical guidance on designing and building new homes that reduce energy requirements. These guides can be viewed at: http://www.energysavingtrust.org.uk/Generating-energy/Getting-started-with-renewables/Microgeneration-guides.

Homes and Communities Agency Housing Quality Indicators

3.12 These standards apply to Registered Providers delivering new affordable housing developments.

3.13 Housing Qualities Indicators (HQI) measure the quality of housing schemes funded by the Homes and Communities Agency. The HQI system is a measurement and assessment tool to evaluate housing schemes on the basis of quality rather than just cost. They incorporate the design standards required of affordable housing providers receiving further funding through the National Affordable Housing Programme and Affordable Housing Programme.

3.14 There are ten indicators that measure quality including one on sustainability, which refers to the CSH levels and points system. Further information can be found on the HCA's website: https://www.gov.uk/housing-quality-indicators.

[3] https://connect.innovateuk.org/web/modernbuiltktn/article-view/-/blogs/cost-of-building-to-zero-carbon-declines-significantly?p_p_auth=PHxM9Afq&_33_redirect=https%3A%2F%2Fconnect.innovateuk.org%2Fweb%2Fmodernbuiltktn%2Foverview%3Fp_p_id%3D101_INSTANCE_AuQUon4D9Vuz%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_count%3D5

BREEAM

3.15 The Building Research Establishment's Environmental Assessment Method (BREEAM) is used to assess the environmental performance of both new and existing non-residential developments including offices, schools, industrial and retail units.

3.16 Environmental performance is assessed by trained assessors against nine categories and buildings are scored against 5 different ratings (pass, good, very good, excellent and outstanding). Further information on BREEAM can be found at www.breeam.org

Housing Standards Review: Consultation, August 2013[4]

3.17 The Housing Standards Review: consultation, published by the Department for Communities and Local Government, proposes integrating the principles of Lifetime Homes, Secured by Design, and the 'Merton rule'.[5] The aim would be to establish standards for water and energy efficiency, materials, accessibility, security and indoor environmental considerations should as daylight, sunlight and air quality.

3.18 Development projects are regulated by two regimes. Land use is managed by the planning system, while construction is governed by building regulations. Over time, the distinction between the two has become less clear.

3.19 In its response to the Housing Standards Review Consultation (13th March 2014), the Government has announced that technical standards for housebuilders will become part of nationally set building regulations.

3.20 Proposals are also to introduce optional building regulations on issues including water efficiency and accessibility for disabled and older people which councils can decide whether to apply to developments being built in their areas. This is to allow for local discretion and would be triggered by planning conditions, subject to the normal plan making process of evidencing need and testing viability.

3.21 The new regulations are expected to come into force in 2015. A Government response to consultation[6] was published in August 2014 but final national

[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/230250/1-_Housing_Standards_Review_-_Consultation_Document.pdf
[5] The Merton Rule was developed by the London Borough of Merton, which required new developments to generate at least 10% of their energy needs from on-site renewable energy equipment in order to help reduce annual carbon dioxide (CO_2) emissions in the built environment.
[6] See DCLG's "Next steps to zero carbon homes – Allowable Solutions: Government response and summary of responses to the consultation, published July 2014: https://www.gov.uk/government/consultations/next-steps-to-zero-carbon-homes-allowable-solutions.

housing standards are yet to be published. See section 4 for the latest position.

SUSTAINABLE CONSTRUCTION GUIDANCE

4. ENERGY CONSUMPTION

Background

4.1 The Government's Carbon Plan[7] makes it clear that a key Government priority is to reduce the energy demand and carbon emissions created by both new and existing homes. It outlines the progress already made by measures such as improved thermal insulation and better performing boilers, and sets out what more needs to be done to minimise climate impact from buildings and help reduce energy costs.

4.2 Heat generation is often a by-product of energy generation. The heat produced in energy generation can be captured and used as another form of energy. It can be an efficient and effective form of energy for warmth. In March 2012 the government produced a Heat Strategy – The Future of Heating: A Strategic Framework for low carbon heat in the UK https://www.gov.uk/government/publications/the-future-of-heating-a-strategic-framework-for-low-carbon-heat

4.3 In its 2013 Budget the Government reaffirmed its commitment to implement zero carbon homes from 2016 [8]. One of the key means of meeting this target is through strengthening Part L of the Building Regulations (under which developers have to improve energy efficiency in buildings) which came into force on 6th April 2014 (see para. 3.11 above). The special interests and embodied energy in existing historic buildings need to be recognised, however, and balanced to avoid the erosion of historic character as set out in the English Heritage advice booklet http://www.english-heritage.org.uk/publications/energy-efficiency-historic-buildings-ptl/eehb-partl.pdf.

4.4 The National Planning Policy Framework (NPPF) states in paragraph 93 that planning plays a key role in helping to shape places to secure reductions in greenhouse gas emissions and increase the use of renewable energy sources. Paragraph 95 states that energy efficiency improvements should be actively supported.

4.5 The Government is seeking to stimulate greater investment in energy efficiency and renewable energy generation through a wide range of measures. The Energy Act (2008) provided the basis on which the Secretary

[7] The Carbon Plan: Delivering our low carbon future, HM Government, December 2011 https://www.gov.uk/government/publications/the-carbon-plan-reducing-greenhouse-gas-emissions--2

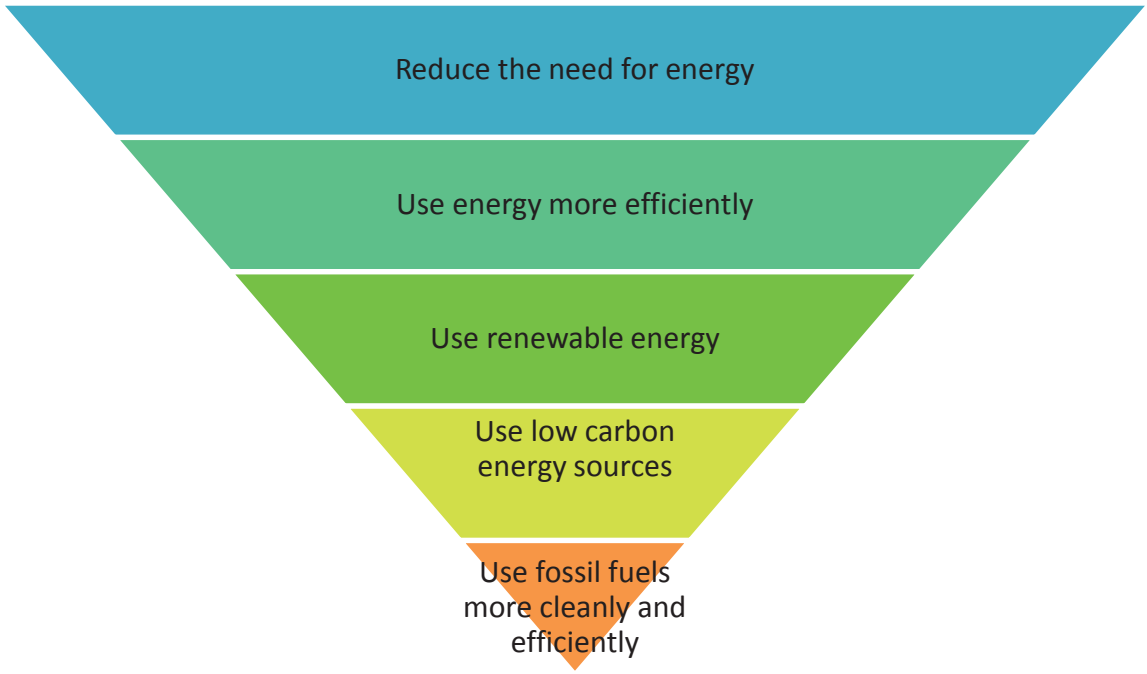
[8] The zero carbon standard is for the net carbon emissions from energy use, regulated under Building Regulations, to be abated over the course of a year ('regulated' energy use is the energy involved in heating, hot water, lighting, ventilation and other fixed building services). All new houses must be zero-carbon from 2016 onwards.

of State could introduce fiscal measures that reward the generation of low or zero carbon energy. This includes the introduction of a Feed-In-Tariff for small scale renewable electricity in April 2010 and the introduction of renewable heat incentive in autumn 2011 (non-domestic) and October 2012 (domestic). These measures have been designed to provide a guaranteed income to owners and installers of small scale low or zero carbon heat and power generating technologies at a level and for a duration that is sufficient to incentivise significant investment in these measures. If we are to build sustainable buildings it is important that energy conservation is considered at the beginning of the design process using the Energy Hierarchy.

4.6 The Energy Hierarchy provides the most practical and cost effective methodology to achieve low carbon development. All developments should consider how energy use can be minimised. The order in which energy saving and 'green' energy measures should be prioritised is set out in the 'Energy Hierarchy'.

1. Reduce the need for energy ;
2. Use energy more efficiently;
3. Use renewable energy;
4. Use low carbon energy sources;
5. Use fossil fuels more cleanly and efficiently.

Figure 1: Energy Hierarchy



4.7 Where possible opportunities should be taken for development to achieve the highest position within the energy hierarchy, in order to reduce energy consumption and therefore reduce pollutants and greenhouse gas emissions. This would also make development more cost-effective and able to recover investment costs through operational savings. On some developments it may be appropriate to have a mixed approach as the best outcome.

4.8 An Energy Strategy for Buckinghamshire is being developed in partnership between the County Council and the District Councils and other public and private stakeholders across Buckinghamshire. The Strategy aims to increase decentralised energy generation (see para. 1.9 for more information) and build energy resilience across the County. The Strategy will deliver real benefits to the people that live in Buckinghamshire. The Strategy, once adopted, will be available on the Buckinghamshire County Council website (see http://www.buckscc.gov.uk/ for the most up-to-date position). Once prepared, this will be a material planning consideration that can be used in the determination of planning applications. Normal planning considerations will also need to be considered for development proposals.

4.9 In addition, the re-cast Energy Performance of Buildings Directive (EPBD) (2012/ 27/EU)) requires that by the end of 2020 all new buildings are to be nearly 'zero-energy buildings'. The European target is set for energy efficiencies of 20% across the EU by 2020.

4.10 The UK Government has produced an indicative national energy efficiency target to achieve certain amounts of final energy savings over the obligation period (1st January 2014 – 31 December 2020).

4.11 2019 is the earliest date that nearly zero-energy requirements for new buildings will come into force. A current example of a nearly zero-energy dwelling will be Passivhaus.[9]

Current Position

4.12 Energy is used to heat homes, to power transport and in commercial processes. The production of energy by the combustion of fossil fuels not only depletes finite resources but also leads to significant environmental consequences, such as climate change. As a result, ways of using, and opportunities for producing, energy more efficiently and cleanly should be sought. Where influenced by development this then becomes a requirement of Policies CS4 and CS5.

4.13 The Department of Energy and Climate Change (DECC) provide data on total final energy consumption by local authority area. The latest 2009 data, which was made available in January 2013, is set out in Table 1:

Table 1: Energy Consumption by Local Authorities in Buckinghamshire

	Sales per consumer – domestic consumption		Sales per consumer – commercial and industrial consumption	
	Gas (kWh)	Electricity (GWh)	Gas (kWh)	Electricity (GWh)
Chiltern	21,277	5,205	239,408	49,219
South East	15,536	4,477	450,447	70,434

[9] http://www.passivhaus.org.uk/index.jsp

Great Britain	15,383	4,280	663,764	77,415

Source: DECC website[10]

4.14 Consumption of both electricity and gas in the commercial and industrial sectors is below average when compared to the region and country as a whole, as would be expected in an area with relatively low levels of heavy industrial activity. There is however still scope for reducing emissions, particularly in new developments, and considering opportunities for decentralised energy developments. The table also shows that both gas and electricity consumption in the domestic sector is high in the District when compared to the rest of the South East region; and 38% (gas) and 22% (electricity) higher than the country as a whole. This is therefore an area where the most scope exists to reduce usage, in terms of making the existing dwellings more energy efficient and also by reducing the energy requirements of new dwellings being constructed.

4.15 The burning of fossil fuel is a major contributor to increasing carbon dioxide emissions in the atmosphere. Greenhouse gas emissions, particularly carbon dioxide (CO_2), are the main causes of climate change.

4.16 The Department of Energy and Climate Change provide data for CO_2 emissions from local authority areas. The figures exclude emission sources over which local authorities have no influence (such as motorways and some EU Emission Trading Scheme installations). The latest results for the year 2010 (January 2013) are set out in Table 2:

Table 2: Emissions within the scope of influence of Local Authorities for 2010

	Per capita – Industry and Commercial (tonnes)	Per capita – Domestic (tonnes)	Per capita – Road Transport (tonnes)	Per Capita – Total (tonnes)
Chiltern	1.6	2.9	1.5	5.9
Bucks.	1.8	2.5	1.6	6.0
South East	2.2	2.3	1.6	6.1
National	2.7	2.4	1.6	6.6

Source: DECC website[11]

4.17 Overall carbon dioxide emissions for Chiltern District are just better than the average for Buckinghamshire and the South East region. However, singling out the domestic CO_2 emissions proportion of this (2.9 tonnes per capita) we rank less favourably than the rest of Buckinghamshire and, the South East, and the 20% higher than the national average. The trend in Chiltern District's

[10] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49412/1171-regional-energy-cons-stats-2009.xls
[11] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/136019/Subset_data_tables.xls

domestic CO_2 emissions from 2005 to 2010[12] was a reduction of between 0.02 and 0.04 tonnes per capita per year. To meet the NPPF and Policy CS4 goal (matching the Government's target of 80% emissions reduction from 1990 levels by 2050) Chiltern District's domestic CO_2 emissions must average only about 0.7 tonnes per capita[13] by 2050. To achieve this needs an average year on year reduction of 0.055 tonnes per capita, by action across the whole of the existing and new-build housing stock, between now and 2050. This rate of CO_2 emissions reduction is 1.4 to 2.8 times faster than was achieved over 2005 -10.

4.18 This emphasises the importance of the planning system in enabling sustainable methods of construction and renewable energy generation in the District, for new dwellings and for extensions and refurbishments, and the opportunities that each of these provides to deliver reductions in carbon dioxide emissions.

Reduce the need for energy in both new buildings and by retrofitting existing ones

4.19 There are a number of ways of reducing energy use in buildings. It is important that reducing energy use is considered not just in terms of new buildings but also in relation to existing buildings, since these contribute more significantly to the District's total carbon dioxide emissions. The Government is seeking to encourage owners of existing buildings to make them more energy efficient through programmes such as the Green Deal[14] and the Energy Companies Obligation[15]. The Government has also made a number of changes to permitted development rights[16] in order to help homeowners make changes to their properties to make them more energy efficient without requiring planning permission.

4.20 Local authorities also have duties under the Home Energy Conservation Act (HECA) to improve the energy efficiency of housing stock and there is considerable scope to improve the efficiency of current public buildings through retrofitting using schemes such as Green Deal.

4.21 Measures for reducing energy use in buildings should be taken into account at the earliest opportunity i.e. at the design stage. Applicants should, for

[12] AMR Report, 2013, Indicator SA10.5: Amount of CO2 emissions per year
[13] Projecting the 0.02 to 0.04 rate back to 1990 suggests that in 1990 Chiltern's rate was 3.3 to 3.6 . The 2050 target must be 20% of this (80% reduction) = 0.66 to 0.72.
[14] The Green Deal is a Government initiative to improve energy efficiency in UK households. Various works to save energy are offered to residents for no upfront cost. The money is paid back over time through small payments taken out of the household's energy bills.
[15] The Energy Companies Obligation was introduced in January 2013 to reduce the UK's energy consumption and support people living in fuel poverty by funding energy efficiency improvements. The scheme runs alongside the Government's Green Deal, supporting the installation of energy efficient measures in low-income households and in properties that are harder to treat.
[16] Permitted Development Rights are changes that can be made to a property that don't require planning permission. These are updated on a regular basis and in order to find out the latest position it is necessary to follow the existing http://www.planningportal.gov.uk/permission/responsibilities/planningpermission/permitted

example, look at reducing their development's carbon footprint by using sustainable construction materials, good design and sourcing materials locally wherever possible. The Chilterns AONB Design Guide[17] provides useful information on this topic area in that one of its objectives is to "Promote sustainability in design and use of resources, particularly locally produced building materials." Supplementary Technical Notes to the Design Guidance on local building materials (Flint, Brick and Roofing Materials) provide additional information with regard to the local sourcing of materials. These documents can be accessed via the following link http://www.chilternsaonb.org/conservation-board/planning-development/buildings-design-guidance.html

Retrofitting an existing house with external insulation

4.22 The Environment Agency's Construction Carbon Calculator[18] can also be helpful in identifying potential carbon savings that can be made during the design and construction of development and assist developers to meet the requirements of Policies CS4 and CS5.

[17] http://www.chilternsaonb.org/uploads/files/ConservationBoard/PlanningDevelopment/BuildingsDesignGuide2010.pdf
[18] https://publications.environment-agency.gov.uk/skeleton/publications/SearchResults.aspx?name=GEHO0712BWTW-E-X

Passive Solar Design

4.23 One of the simplest ways to reduce energy demand is to use passive solar designs to provide heat and light. Building orientation, materials and landscaping can also have a significant localised effect on climatic conditions. Not only does this offer reduced energy bills for the occupier but it can also improve the living/ working environment. It has been calculated, by the Centre for Alternative Energy, that a combination of a passive solar design solution and energy conservation measures can reduce a new building's conventional heating requirements by 50-80%.

4.24 The Energy Saving Trust[19] provides further details with regard to typical energy savings from passive solar design for different types of developments.

Example of Energy Efficient Dwellings in Watford (BRE Global)

Use Energy More Efficiently

4.25 A number of measures can be taken in new build and existing buildings to make buildings more energy efficient. These include:

- Heat loss – Heat loss from a building should be minimised in order to minimise energy use. A range of measures can be incorporated into a building to deliver improvements in energy efficiency. High levels of insulation can be integrated into roofs, walls and floors. Heat loss through windows can be reduced through the use of double, triple and secondary glazing as can heavier curtains. Where feasible, external doors in new developments should have a secondary inner door to act as an air-lock from the outside, thus preventing heat loss.

[19] http://www.energysavingtrust.org.uk/About-us

- Natural Ventilation – is the process of supplying and removing air through an indoor space without using mechanical systems. It enables the flow of external air to an indoor space as a result of pressure or temperature differences.

  It can be increased by a variety of measures including:

  - Cross ventilation which is obtained when cool air from outside enters a building and forces warm air out through an outlet such as a window or door.

  - Passive stack effect which uses pressure differentials to bring cool fresh air from outside the building, without the use of mechanical systems.

- Thermal mass which relates to a building materials capacity to absorb, store and ultimately release heat.

- Energy efficient appliances and lighting where advances have been made in recent years so that consumers can now compare appliances based on the amount of energy that they consume.

- Tree planting can improve the environmental performance of buildings by reducing heating and cooling costs, thereby cutting bills.

Use Renewable Energy and Low Carbon Energy Uses

4.26 A key part of reducing carbon emissions will be the generation of energy from renewable sources and low carbon sources. Renewable energy is defined as a naturally occurring, inexhaustible source of energy that includes biomass, solar, wind, tidal, wave and hydroelectric power, that is not derived from fossil or nuclear fuel.[20] Low Carbon Energy are sources of power which produce fewer greenhouse gases than traditional means of power generation e.g. district heating, combined heat and power (CHP) and heat pumps using sources such as ground, air and water.

4.27 Local planning authorities are responsible for renewable and low carbon energy developments of 50 megawatts or less installed capacity. Larger schemes i.e. those over 50 megawatts capacity are considered by the Secretary of State for Energy under the Planning Act 2008. Micro-generation[21] is often permitted development and may not require planning permission.

4.28 The planning system can only deliver sufficient additional renewable energy schemes if positive planning policies are in place.

[20] Source: www.dictionary.reference.com
[21] Micro-generation is the generation of electricity or heat on a small scale, typically for domestic use and by methods that do not contribute to the depletion of natural resources, such as solar panels

4.29 The National Planning Policy Framework makes it clear that local planning authorities should adopt a proactive approach to mitigating and adapting to climate change in line with the Climate Change Act 2008. More specifically it suggests that local planning authorities should:

- Encourage the use of renewable resources (paragraph 17 6th bullet point) plan for new developments in locations and ways which reduce greenhouse gas emissions;
- Actively support energy efficiency improvements to existing buildings and
- Adopt nationally described standards for a building's sustainability.

4.30 National Planning Practice Guidance, 'Renewable and low carbon energy'[22] (published 6th March 2014) states that local, community led renewable energy schemes are to be supported through the plan making process. Measures such as Neighbourhood Plans, Neighbourhood Development Orders and Community Right to Build Orders proposing these schemes should be actively supported by clearly setting out any strategic policies that local and community groups need to consider.

4.31 The South East Plan, before it was revoked in March 2013, contained targets for the Thames Valley and Surrey sub-region, which includes Chiltern District within it. The targets were based on background work undertaken by ETSU/ AEA Technology plc. and Terence O'Rourke plc.

4.32 The targets for Thames Valley and Surrey are set out in the table below. Whilst no sub-regional targets have been identified beyond 2016, the overall target for the region is likely to result in further increases equating to approximately a doubling of the 2016 levels by 2026.

Table 3: Renewable Energy Targets for Thames Valley and Surrey

Sub-region	2010 Renewable Energy Target (Mega watts)	2016 Renewable Energy Target (Mega watts)
Thames Valley and Surrey	140	209

Source: Extract from policy NRM14 of the South East Plan, 2009

These targets were based on evidence collected specifically for the region and its sub-regions and also drew extensively on a significant guidance document (The London Renewable Energy Toolkit)[23].

4.33 The Thames Valley and Surrey Sub-region, of which Chiltern District forms part, has in the past been heavily dominated by Energy from Waste schemes (a County Council matter). According to the evidence base documents, in

[22] http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/
[23] Integrating Renewable Energy into New Developments: Toolkit for Planners, Developers and Consultants, London Energy Partnership/ London Renewables (September 2004).

terms of renewable energy technologies, potential exists in the sub-region for biomass, wind, energy from waste and photovoltaics. Hydro is also of limited interest.

4.34 Significant progress needs to be made if the now revoked regional targets and also the national target to achieve 15% of all energy consumption from renewable sources by 2020 (see paragraph 2.6) are to be met (see also para. 4.9 which refers to the production of an Energy Strategy for Buckinghamshire).

4.35 Community led renewable energy schemes are, according to Government advice in the NPPG, "likely to play an increasingly important role and should be encouraged as a way of providing positive local benefit from renewable energy development." Community energy is about many different types of community getting involved in energy issues in many different ways. It could be a group of local people setting up their own solar installation or wind turbine; a local authority leading a collective purchasing scheme to help local people get a better deal on their energy tariff; an energy advice session at a local community centre; or a whole range of other schemes.

4.36 In recognition of the increasing importance of the role of community energy, the Government produced its first community energy strategy. This document provides further details of the main types of energy activity that communities can get involved in:

- Generating energy (electricity or heat)
- Reducing energy use (saving energy through energy efficiency and behaviour change)
- Managing energy (balancing supply and demand)
- Purchasing energy (collective purchasing or switching to save money on energy).

For standalone renewable energy schemes, Government and community energy representatives have collaborated to produce the Voluntary Protocol[24] that developers should follow. It proposes that a significant portion of the scheme ownership should be offered to the local community. The protocol arises from the Shared Ownership Task Force report[25], in response to the Government's Community Energy Strategy[26].

The Council's Position

4.37 The Council recognises that significant progress needs to be made if the national and regional targets for the generation of renewable energy are to be met and encourages the development of renewable energy installations in the District (through Core Strategy policy CS5: Encouraging Renewable Energy

[24] See: http://sco-res.uk/Protocol/index.html
[25] See: http://sco-res.uk/Home/Taskforce/index.html
[26] See: http://sco-res.uk/Community/Strategy/index.html

Schemes) where appropriate to the District taking into account the Development Plan as a whole.

4.38 Chiltern District Council is unable to quantify the actual number of renewable energy installation schemes in the District at the current time, particularly with regard to solar thermal installations, as there is no requirement under planning or other reporting mechanisms to do so. As a result of the Feed in Tariff (FIT) scheme[27], 163 photo voltaic (PV) installations have taken place between 01/04/2010 to 31/12/2012 but the actual amount of energy being produced from these installations is not known.

4.39 Applicants should take appropriate steps to mitigate any adverse impacts of proposed development through careful consideration of location, scale, design and other measures. All reasonable steps to minimise noise should be taken.

4.40 Applicants should provide sound evidence of the availability of the resource which will be harnessed or the fuel to be used, including details of the adequacy of transport networks where applicable and detailed studies to assess potential adverse impacts such as noise nuisance, flood risk, and interference with telecommunications.

Renewable and Low Energy Technologies in New Developments

4.41 There are a number of renewable and low energy technologies which are typically suitable for integration with buildings. The most effective technology (or technologies) will depend on a range of factors including things such as site features, and the likely scale and energy use of the development.

4.42 For residential developments, many micro-generation renewable projects are now covered by Permitted Development Rights. An interactive house on the Planning Portal website (see http://www.planningportal.gov.uk/permission/) provides guidance on whether or not planning permission is likely to be needed on many common householder projects, including micro-generation renewable installations.

4.43 The Carbon Trust website http://www.carbontrust.com/resources/guides/energy-efficiency/low-carbon-buildings-design-and-construction provides a range of information on helping to plan, build and manage cost effective low carbon buildings that save both money and carbon. It provides advice and tips covering the key parts of low carbon buildings and their delivery.

[27] The Feed-In-Tariff scheme was introduced by the Government in April 2010 to help increase the level of renewable energy in the UK. Payments are made to energy users for the renewable energy that they generate. Its aim is to increase the UK's contribution of renewable energy towards its legally binding target of 15% of total energy from renewables by 2020.

4.44 Community initiatives will be likely to play an increasingly important role and should be encouraged as a way of providing positive local benefit from renewable energy development.

4.45 Discussions with industry experts can help to identify the siting requirements and likely impacts of technologies. The National Policy Statements on the Department of Energy and Climate Change's website[28] gives general and technology specific advice relevant to siting particular technologies.

Renewable Energy Technologies

1. Solar water heating

4.46 Solar water heating systems use roof mounted systems to heat water for a variety of purposes. Amongst the most common are domestic use, light industrial and agricultural use and the heating of swimming pools. The widest use currently is for residential domestic hot water.

4.47 A good modern system will make a significant contribution to water heating requirements. A well designed system should provide 50-60% of annual hot water requirements at minimal operating cost.

4.48 Two main types are common in the UK: flat plate collectors and evacuated tube collectors. In both types, radiation from the sun is collected by an absorber, and is transferred as heat to a fluid, which may be either water, or a special fluid employed to convey the energy to the domestic system using a heat exchanger.

4.49 The National Planning Practice Guidance (NPPG) gives further guidance with regard to Renewable and Low Carbon Energy) http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/planning-for-renewable-low-carbon-energy-introduction/

2. Photovoltaics

4.50 *Photovoltaic (PV) systems* exploit the direct conversion of daylight into electricity in a semi-conductor device. They can either be roof mounted or free standing, or integrated into the roof or facades of buildings. The most common form of device is solar panels. A number of modules are usually connected together to produce the required output. Other forms of solar PV technology include solar tiles – these can be integrated into new buildings or refurbishments alongside conventional tiles or slates.

[28] https://www.gov.uk/consents-and-planning-applications-for-national-energy-infrastructure-projects

Solar panels mounted on a roof

4.51 The Government produced a Solar PV Strategy in April 2014 https://www.gov.uk/government/publications/uk-solar-pv-strategy-part-1-roadmap-to-a-brighter-future. The main message from the Strategy is that the Government is keen to focus growth of solar PV in the UK on domestic and commercial roof space and on previously developed land. Further information on active solar technology (which includes both PVs and solar water heating) can be found at: http://www.energysavingtrust.org.uk/Generating-energy/Getting-started-with-renewables/Microgeneration-guides.

4.52 Where a planning application is required for such developments the NPPG sets out a number of factors that should be borne in mind including:

- The importance of siting systems in situations where they can collect the most energy from the sun;
- Need for sufficient area of solar modules to produce the required energy output from the system;
- The effect on a protected area such as an Area of Outstanding Natural Beauty or other designated areas;
- The colour and appearance of the modules, particularly if not a standard design.

3. Micro Wind Turbines

4.53 Wind turbines harness the power of the wind. The wind forces blades around, which drives a turbine, generating electricity. Small "microwind" systems produce enough electricity for the lights and electrical appliances in a typical home.

4.54 There are a variety of models and designs for stand-alone and roof mounted turbines. The energy produced by a wind turbine depends on the strength of the wind to which it is exposed. A turbine located on a site with an annual mean wind speed of 6 metres per second will typically produce only half as much energy as the same machine on a site where the annual wind speed is 8 metres per second. Wind speed rise with elevation above the ground.[29]

Small Wind Turbine mounted on a roof

4.55 The Renewable and Low Carbon section of the NPPG[30] gives further more detailed information with regard to this technology and planning issues (Paragraphs 14-24) such as the need to consider nuisances such as noise from such installations.

4. Biomass Heating

4.56 Biomass heating systems work by burning solid fuels, such as wood, sawdust and paper to provide heating and hot water. Modern biomass boilers are

[29] The Department for Business, Innovation and Skills website wind speed database contains estimates of annual mean wind speeds throughout the UK at 10m, 25m and 45m above ground level.
[30] http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/

highly efficient and can have particular benefit when using fuel for sustainable local sources.

4.57 Producing energy from biomass has both environmental and economic advantages. It is a carbon neutral process as the CO_2 released with energy is generated from biomass is balanced by that absorbed during the fuel's production.

4.58 Biomass systems are becoming more popular in small industrial or institutional applications where they are used for generating electricity and heating factories and warehouses. Many industrial units create a lot of waste such as cardboard and packaging, meaning that biomass can be very cost effective.

4.59 For biomass to work well you need a large amount of raw materials available and it is therefore unlikely that a home will be completely self-sufficient. It is more likely that it will supply part of a home's energy requirement. For example, wood stoves and fireplaces can be connected to a back boiler in order to provide general space heating and hot water requirements.

4.60 Further information on how biomass systems work, suitability, costs and maintenance are available on the Energy Saving Trust's information page at: http://www.energysavingtrust.org.uk/Generating-energy/Choosing-a-renewable-technology/Wood-fuelled-heating

5. Micro Hydro

4.61 A small hydro scheme is one which generates up to 1MW. This technology is well established in England. Water flowing from a higher to a lower level is used to drive a turbine, which produces mechanical energy. This mechanical energy is usually turned into electrical energy by a generator, or sometimes it is used to drive a mechanical device.

4.62 Hydro schemes require a reasonably constant supply of water. The two principal rivers in Chiltern, the Chess and the Misbourne, are both subject to seasonal and annual variations in their flows and consequently there is unlikely to be much potential for this type of renewal energy within the District.

4.63 The Renewable and Low Carbon section of the NPPG[31] gives further more detailed information with regard to this technology and planning issues (Para. 11). In particular it sets out that applications for hydropower should normally be accompanied by a Flood Risk Assessment. It also suggests early engagement with the local planning authority and the Environment Agency to identify potential planning issues.

[31] http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/

Low Carbon Technologies

6. District heating

4.64 A district heating scheme is an alternative way of supplying heat to buildings, which conveys heat efficiently. A scheme would use a network of insulated pipes to deliver heat, in the form of hot water or steam, from a central heat source to end user.. District heating schemes currently account for a small source of energy supply in the UK, about 2%, but there is potential for them to increase in the future. They are, however, most suitable for areas of high heat demand.

4.65 Heat networks can be supplied with heat from a diverse range of sources including power stations, Energy from Waste (EfW) facilities; Industrial processes; Biomass and biogas fuelled boilers and CHP plants; Gas-fired CHP units; Fuel cells and Heat pumps.

7. Combined Heat and Power (CHP)

4.66 Combined Heat and Power (CHP) has been discussed earlier in this document (see para. 1.13). CHP captures and uses heat which is a by-product of electricity generation. It can be used at different scales from a replacement boiler in the home to a large scale development. As set out in para. 1.13, it is preferable if useful heat can be used locally thus avoiding losses through transmission.

4.67 The Department of Energy and Climate Change produces information on local heat demand to assist planners and developers to identify locations with opportunities for heat supply. (See the National Heat Map[32] and the UK CHP Development Map UK CHP Development Map - Department of Energy and Climate Change[33]).

8. Ground Source Heating/ Cooling

4.68 Ground source heating/ cooling systems are a developing technology, which work by extracting the heat differential between the air and the ground. It works on the principle that the ground stays at a fairly constant temperature throughout the year. In the winter the ground temperature is normally higher than the air temperature and a heat pump extracts this heat and moves it to an area of lower temperature. In the summer the air temperature will usually be higher and the technology can be used to cool a building thus removing the need for artificial air conditioners.

4.69 Ground source heating systems are usually used to heat radiators, under floor or warm air heating systems or they can also be used to supply domestic hot water.

[32] http://tools.decc.gov.uk/nationalheatmap/
[33] http://chp.decc.gov.uk/developmentmap/

4.70 The heat pump itself requires electricity and, consequently unless this electricity is generated from a renewable source such as photovoltaic cells, should be viewed as a low carbon source.

4.71 Further information on ground source heating/ cooling can be found on the Energy Saving Trust's website: http://www.energysavingtrust.org.uk/Generating-energy/Choosing-a-renewable-technology/Ground-source-heat-pumps

9. Air Source Heat pumps

4.72 Air source heat pumps absorb heat from the outside air. An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15 degrees centigrade. There are two main types:

- An air-to-water system uses the heat to warm water. Heat pumps heat water to a lower temperature than a standard boiler system would, so they are more suitable for under-floor heating systems than radiator systems.
- An air-to-air system produces warm air which is circulated by fans to heat your home.

4.73 Further information on air source heat pumps can be found at: http://www.energysavingtrust.org.uk/Generating-energy/Choosing-a-renewable-technology/Air-source-heat-pumps

Stand-alone Renewable Schemes

4.74 Large scale renewable energy installations such as wind farms and large scale solar schemes can feed significant amounts of renewable electricity into the National Grid. Developers should consider potential cross-boundary effects of schemes (beneficial or adverse), where the area for assessment overlaps with land in another authority area (for example, where the scope of a Landscape and Visual Impact Assessment falls across the boundary). The main opportunities for stand-alone renewable energy schemes in Chiltern District are thought to be from the following sources:

Biomass

4.75 Stand-alone biomass schemes are similar to Biomass schemes designed to be integrated with buildings. They use a number of different fuel types including: wood fuel from woodland management or forest thinning operations, waste wood from sawmills and the construction industry, agricultural products and wastes including straw, slurry and chicken litter, energy crops such as short rotation coppice, and household putrescible waste. Biomass cannot include fossil fuels.

4.76 This technology is considered to be carbon neutral, as the energy released from biomass on burning is the same as that absorbed during its production. Given the wooded nature of Chiltern District and fuel source through woodland management, there is likely to be potential for woody biomass in particular in the District.

4.77 It is important that in assessing applications for biomass schemes that consideration is given to the source of the fuel being proposed. Support should be given for schemes which have plans to locally source biomass. Where biomass from distant sources is proposed, transport considerations will also need to be taken into consideration.

4.78 Biomass boilers can adversely affect air quality as they produce nitrogen dioxide (NO2), particulate matter (PMs) and sulphur dioxide (SO2). Particulate matter and nitrogen dioxide are the two pollutants that cause most concern. See the Environmental Protection UK's Guides for Developers and local authorities at:
http://www.lacors.gov.uk/lacors/NewsArticleDetails.aspx?id=21913

4.79 Where a biomass boiler is proposed for a development, a detailed air quality assessment should be completed, including an emissions assessment, demonstrating that there will be no adverse air quality effects from the boiler relative to a conventional gas boiler and indication of mitigation controls. A development proposing Combined Heat and Power must also complete an emissions assessment as part of the air quality assessment.

4.80 When the use of biomass is proposed, the boiler must be certified as an exempt appliance in accordance with the Clean Air Act (1993). A list of exempt appliances can be found at:
www.uksmokecontrolareas.co.uk/appliances.php.

4.81 The District Council expects a "Biomass Boiler Information Request Form" to be completed to accompany any application for a biomass boiler. These can be obtained from: envhealth@chiltern.gov.uk

Wind

4.82 Stand-alone wind turbines make a significant contribution to electricity supply in the UK having access to something like 40% of the entire European wind resource.

4.83 As with micro-wind turbines, stand-alone wind turbines harness the power of the wind to drive a turbine which generates electricity. The Renewable and Low Carbon section of the NPPG[34] gives further more detailed information with regard to this technology and planning issues (Paragraphs 14-24). A Department of Transport Circular provides useful information in relation to wind turbine proposals that could affect the Strategic Road Network (see references below).

[34] http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/

4.84 Wind speed and direction is critical to the performance of wind turbines. The Department for Business Innovation and Skills wind speed database is a useful starting point to examine wind speeds: http://webarchive.nationalarchives.gov.uk/20121217150421/http:/decc.gov.uk/en/content/cms/meeting_energy/wind/onshore/deploy_data/windsp_databas/windsp_databas.aspx. However, this database is no longer being updated and consequently should only be used as a starting point for such developments.

4.85 Annual Mean Wind Speed Maps at 10m, 25m and 40m above ground level but this only gives average speeds at different turbine heights above ground level (10, 25 and 40 metres). The data provided on wind speeds is not particularly detailed at the District level (as can be seen from - 9 below).

4.86 A speed of around five metres per second is required at 10 metres above the ground in order to make wind technology viable. It would appear from the attached maps that these speeds are being achieved in large parts of the District at 25 and 45 metre heights but to a lesser degree at 10 metres above the ground.

4.87 Large areas of Chiltern District are covered by the Chilterns Area of Outstanding Natural Beauty (AONB) and proposals for wind turbines in, or close to, the AONB would need to demonstrate that development would not undermine the objectives behind its designation. A position statement on renewable energy is available on the Chiltern AONB's website at: http://www.chilternsaonb.org/conservation-board/planning-development/position-statements. It is extremely unlikely that a wind turbine will be permitted in the Chiltern's AONB.

4.88 Locating wind turbines in any location within the District would require applicants to undertake detailed studies to fully assess wind speeds by undertaking a site specific wind survey over a period of at least 12 months in order to demonstrate that wind speed at a given site can support the use of a wind turbine. In addition, applicants would be expected to assess the potential adverse impacts such as noise nuisance, flood risk, and interference with telecommunications.

Figure 2: Annual Mean Wind Speed at 10m above ground level meter/second

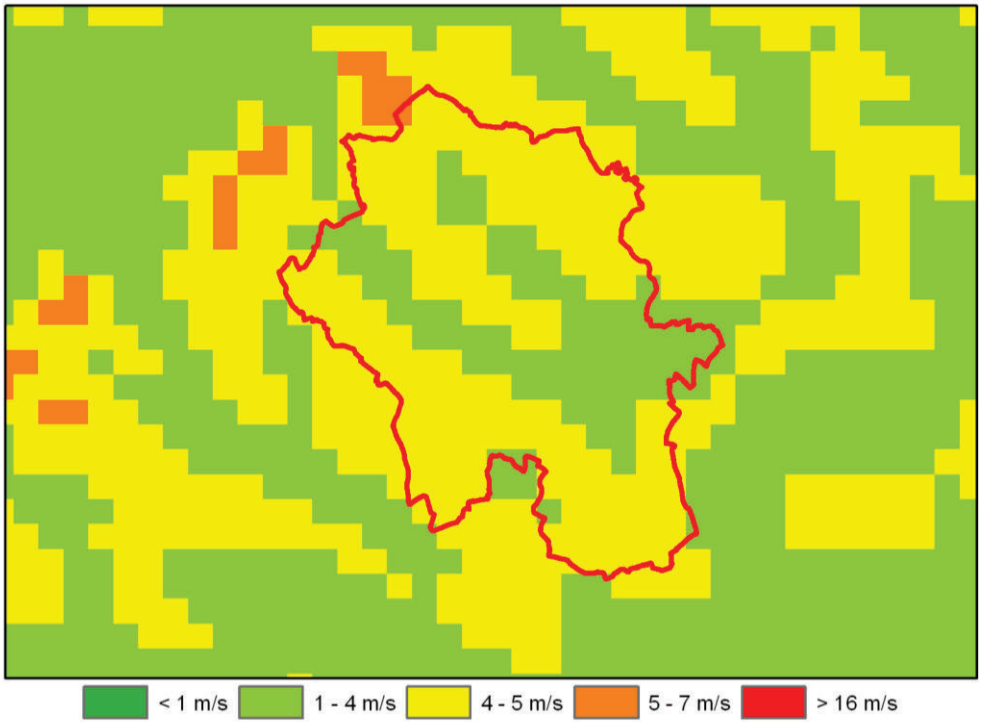


Figure 3: Annual Mean Wind Speed at 25m above the ground level meter/second

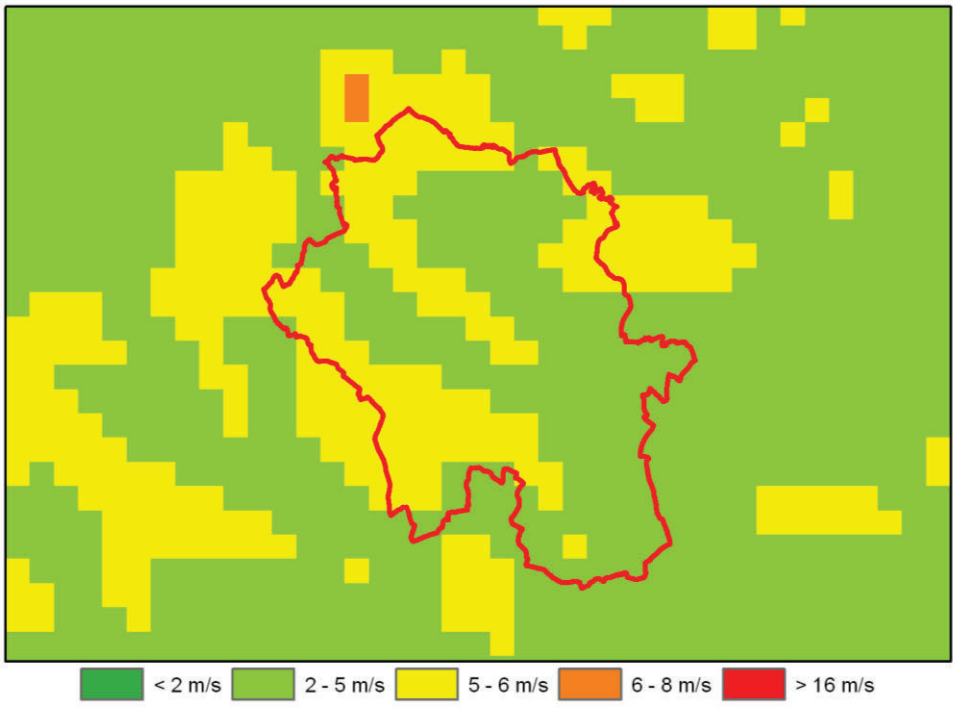
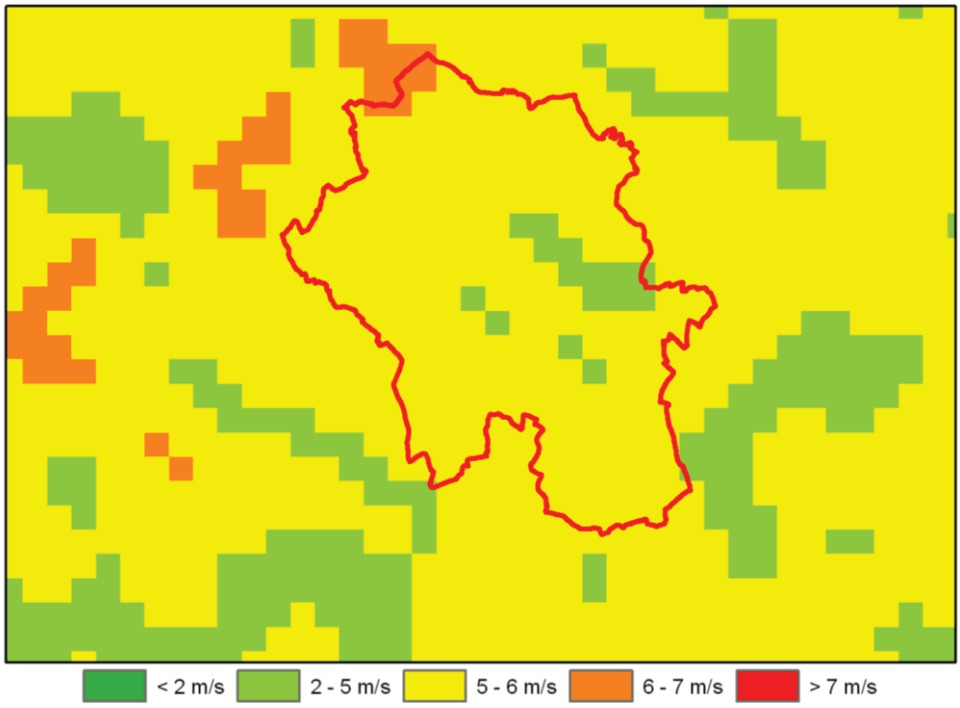


Figure 4: Annual Mean Wind Speed at 45m above the ground level meter/second



Source: DECC website

Energy from Waste

4.89 There is only one landfill site in Chiltern District at present, Meadhams Farm near Chesham, but it has no landfill gas electricity generation capacity. The sludge from the only sewage treatment works in the District is not used for producing energy and there are no plans to do so in the future.

4.90 Potential sources of energy from waste include landfill (active and closed) which generate electricity from the landfill gas that they produce, anaerobic digestion plants which produce a gas which can be used as a fuel, and incinerators with energy from waste (which produce a large amount of heat, as well as electricity).

4.91 Proposals for incinerators and other forms of energy from waste plants located within the District would be County matter applications, and as such would be dealt with by Buckinghamshire County Council, and so are not considered further within this SPD.

Hydro

4.92 Hydropower is well developed in England, where most sites with a potential greater than 1MW have already been developed. There is still some potential for small schemes of less than 1MW.

4.93 There are only two principal rivers in Chiltern District, the Misbourne and the Chess, and both are subject to over abstraction issues (as already referred to

above) and flow rates on the rivers are variable. Hydro power is therefore unlikely to be a significant source of renewable energy in this District and consequently the potential for this source of energy in the District is extremely limited.

Photovoltaics

4.94 As set out above in paragraph 4.51, the Government produced a Solar PV Strategy in April 2014. This Strategy made it clear that whilst there is still a place for larger-scale field-based solar in the UK's energy mix, new larger solar installations i.e. those >1 hectare need to be sensitively placed and give proper weight to environmental considerations such as landscape and visual impact, heritage and local amenity, and provide opportunities for local communities to influence decisions that affect them. National guidance provides best practice planning guidance in respect of how large ground mounted arrays are developed setting out planning considerations and requirements (see http://www.bre.co.uk/filelibrary/pdf/other_pdfs/KN5524_Planning_Guidance_reduced.pdf).
Given the constrained nature of Chiltern, in terms of Green Belt and the coverage of the Chilterns Area of Outstanding Natural Beauty, it is likely that few such schemes will be able to satisfy these requirements in the District.

4.95 However, the Strategy makes it clear that the Government wants to maximise the potential of mid-size projects on commercial and industrial rooftops. There may well be the potential for such schemes in the District.

Energy Statement and what it should contain

4.96 Core Strategy Policy CS5: Encouraging Renewable Energy Schemes requires that an Energy Statement is produced for developments of more than 10 dwellings or 1,000 square metres of non-residential floor space. This section sets out in more detail the steps which need to be gone through in order to comply with this policy requirement.

What is the purpose of an Energy Statement?

4.97 The purpose of an Energy Statement is to demonstrate that energy use mitigation measures have been taken into account in a schemes design and evolution, and that they are appropriate in the context of the development.

When is an Energy Statement required?

4.98 A number of studies have shown that planning for renewable and low carbon energy is most effective at the design stage. It is therefore important that it is considered at the earliest opportunity and where relevant as part of the planning application process. Applicants should consider the advice in this SPD at Pre-Application stages as well as set out below.

Table 4: When an Energy Statement is required

Development Type	Energy Statement Required	
	Outline	Full or Reserved Matters
Residential development – of more than 10 dwellings – including conversions, subdivisions and changes of use.	Need to show how the proposed development will achieve the requirements of Policy CS5 of the Core Strategy. At the outline application stage, best estimates of energy use will be acceptable.	Yes – detailed Energy Statement required.
Non-residential development[35] – of 1000m^2 or greater – only new buildings and not extensions to existing buildings.	Need to show how the proposed development will achieve the requirements of Policy CS5 of the Core Strategy. Best estimates of energy use at outline application stage will be acceptable.	Yes – detailed Energy Statement required.

[35] This applies to all developments outside use class C3 i.e. it includes nursing homes and residential institutions.

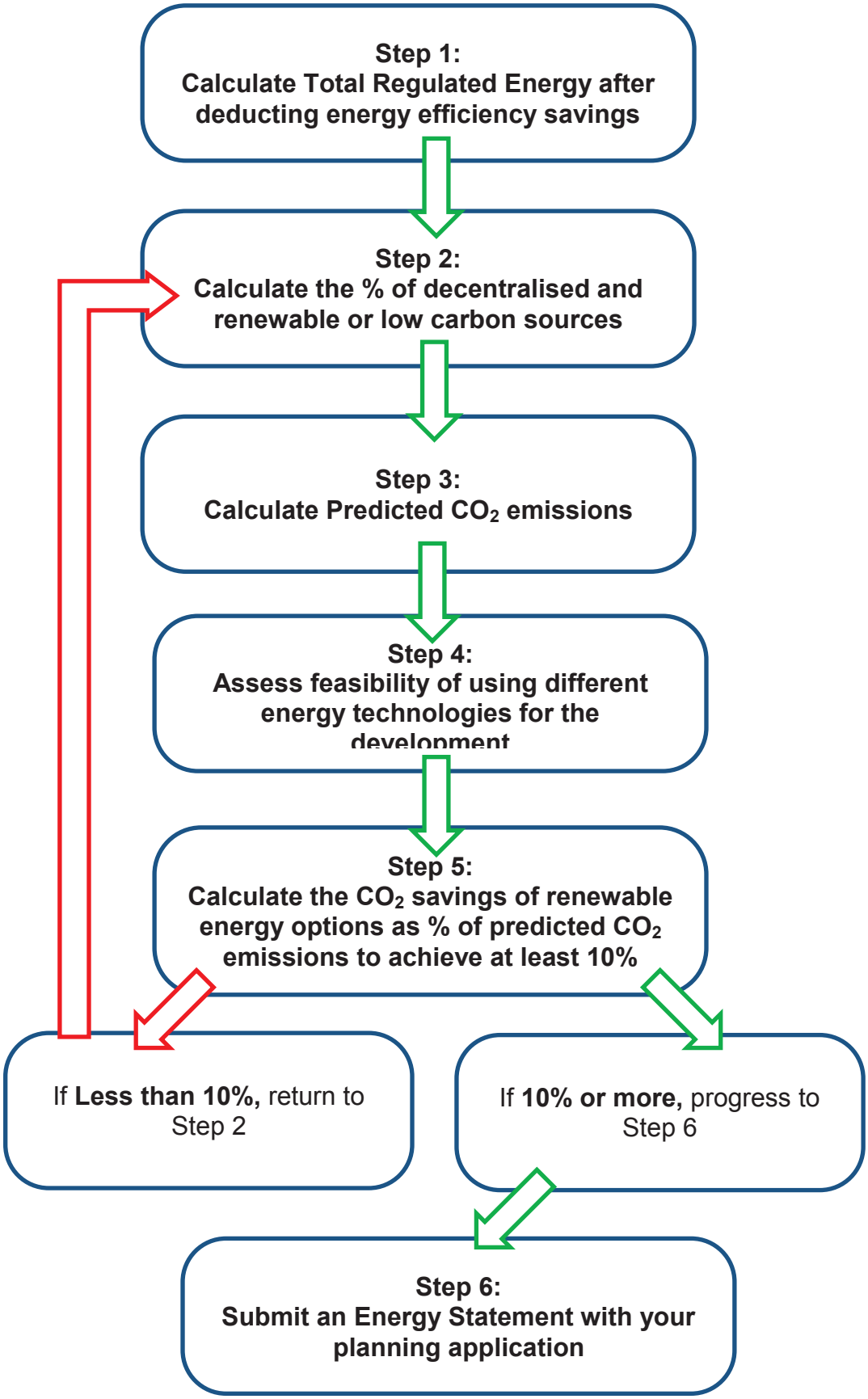
Householder extensions	No	No – although an energy report is produced for Building Control.
Other Applications*	No	No

* Including applications for Listed Building Consent, Certificate of Lawfulness (Proposed and Existing uses), and advertisement consent. Although an energy statement is not required for planning application purposes, applicants are encouraged to consider energy use which could be assisted by undertaking an Energy Statement.

What should the Statement include?

4.99 Figure 5 shows the methodology that should be followed when carrying out an energy statement.

Figure 5: Energy Statement Methodology



Step 1 Calculate total regulated energy demand for the development

The total regulated energy demand for the development (baseline) figure is equal to the predicted total energy consumption of the site after allowances have been made for energy efficiency measures. It should take account of predicted annual energy demand for space heating, hot water and internal lighting.

Design layout and other issues will also need to take account of other material Development Plan considerations such as effect on amenity of nearby users, protection of trees, impact on the street scene etc. The objective should be to minimise energy demand from the development and maximise renewable energy production within the constraints and opportunities of the site.

Step 2 Calculate the Percentage of decentralised and renewable or low carbon sources

Energy efficiency measures aimed at reducing energy consumption (such as those set out on p.23 of this SPD) cannot count towards achieving the 'at least 10%' amount required by this policy but can reduce energy use.

The calculation should be undertaken as follows:

Total estimated regulated energy use 'minus' allowances for energy efficient measures = Baseline energy

The 10% is a rolling target i.e. 10% over any updated Building Regulation standard/ or new standard coming out of the Housing Review Consultation[36].

The 10% requirement for decentralised, renewable or low carbon technology can be calculated by using the following:

Baseline x 0.1 = 10% requirement for renewable technology.

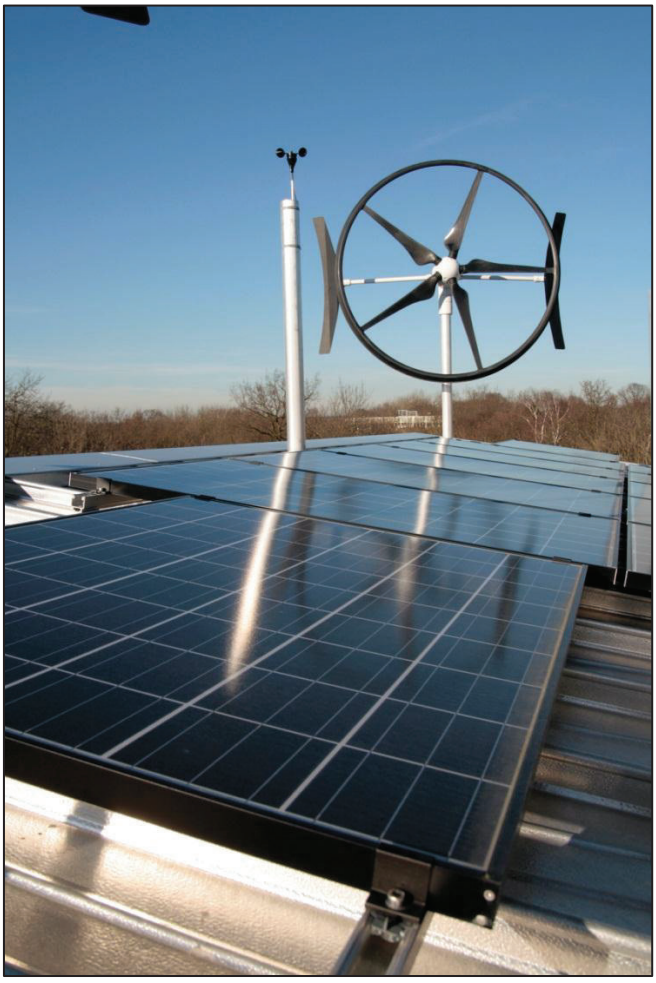
Step 3 Calculate Predicted CO_2 emissions

The purpose of incorporating decentralised, renewable or low carbon technology into a building is so that it uses significantly less energy and emits less carbon than current industry benchmarks. It is therefore important to calculate the predicted CO_2 emissions from a building.

Parts L[37] of the Building Regulations cover energy use. Energy use is calculated from the emission rate (in kgCO2/m2/year) based on the energy used for heating, ventilation, cooling and lighting systems.

[36] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/230250/1-_Housing_Standards_Review_-_Consultation_Document.pdf

The energy use of new buildings is assessed using a Standard Assessment Procedure (SAP) for housing and simplified Building Energy Model (SBEM) for non-domestic buildings. These are standard methods of calculating the design energy use of a building, approved by the Government.



Example of Micro Wind and Solar Power Technology (Photo by BRE Global)

Step 4 Assess the feasibility of using different energy technologies for the development and calculate the energy generation saving potential of so doing.

The minimum 10% requirement should have been calculated in Stage 2 you need to decide which decentralised, renewable or low carbon technology is suitable for the site (see pages 20 - 24 for advice).

This can either be one or a range of different renewable technologies. For residential purposes, the website www.systemdesigner.co.uk can help to create a low carbon/ renewable energy system design and explains how it could work.

[37] L1A & B L2A & B The Building Regulations 2010 Approved Documents Conservation of fuel and power

In deciding which types of technology should be used, the following factors should be borne in mind:

- The ability to provide at least 10% of a sites energy demand after energy efficiency measures have been incorporated.
- The ability to be integrated satisfactorily into the development taking into account Development Plan requirements including design, amenity, conservation etc.
- The cost effectiveness of the technologies taking into account development life time costs.

The types of renewable technologies which can be incorporated into a scheme in order to meet the 10% target are not prescriptive. The type of information that will be required as part of the planning application for each technology selected is set out in table in Appendix 1 of this SPD.

Step 5 Check the CO_2 savings of renewable energy options as a percentage of predicted CO_2 emissions to achieve at least 10%

$$= \frac{\text{Total energy from technology (Step 4)}}{\text{Total energy demand of development (Baseline predicted in Step 2)}} \times 100$$

The above calculation needs to be **at least 10%** in order to meet the requirements of Policy CS5:

If the figure is **less than 10%** than **return to Step 2** and incorporate additional renewable or low carbon technologies and work through the other stages again.

If the figure is **10% or more, progress to Step 6**.

Step 6 Submit an Energy Statement with your planning application

The Energy Statement needs to set out the information outlined in steps 1- 5 above and be submitted with a planning application, as set out above, in order to demonstrate how the scheme complies with policy CS5: Encouraging Renewable Energy Schemes.

The Energy Statement should also include detailed information on the selected technology e.g. layout plan, floor plans, elevations, visual impact etc. further detail is set out in the Table 7 in Appendix 1.

References

BIFFA Article about Energy from Waste
http://www.biffa.co.uk/waste-processing/energy-from-waste/about-energy-from-waste.html
Building Regulations: Part L – Conservation of Fuel and Power
http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/

Carbon Trust, Renewable Energy Sources: Opportunities for businesses
http://www.carbontrust.com/media/7379/ctv010_-_renewable_energy_sources.pdf

Construction Carbon Calculator, Environment Agency
Helps to identify carbon savings during the design and construction of your development.
http://www.environment-agency.gov.uk/static/documents/Business/Copy_of_Carbon_calculator_v3_2.xls

Department of Transport Circular 02/13, The Strategic Road Network and the Delivery of Sustainable Development
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/237412/dft-circular-strategic-road.pdf

DCLG, Housing Standards Review, Consultation, August 2013
https://www.gov.uk/government/consultations/housing-standards-review-consultation

DEFRA Waste from Energy
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/181831/pb13892-energy-from-waste.pdf.pdf

Energy Efficiency CIBSE
https://www.cibseknowledgeportal.co.uk/component/dynamicdatabase/?layout=publication&revision_id=1663

Environment Agency leaflet on Energy from Waste
http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geth1108boyp-e-e.pdf

The English Heritage website sets out information with regard to energy efficiency in relation to historic buildings and also gives advice on generating energy in older houses

http://www.english-heritage.org.uk/professional/advice/advice-by-topic/climate-change/energy-efficiency/

http://www.english-heritage.org.uk/your-home/saving-energy/generating-energy

London Renewables Toolkit
http://static.london.gov.uk/mayor/environment/energy/docs/renewables_toolkit.pdf

Planning Practice Guidance on 'Renewable and low carbon energy', Department of Communities and Local Government
http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/

Public Health England
http://www.hpa.org.uk/ProductsServices/ChemicalsPoisons/IntegratedPollutionPreventionControlIPPC/ippcIncineration/

Trees and Design Action Group 2010
http://www.tdag.org.uk/uploads/4/2/8/0/4280686/no_trees_no_future.pdf

5. WATER RESOURCES AND QUALITY

Background

5.1 Chiltern lies in the South East region which is one of the driest areas of the United Kingdom. It receives an average of 690mm rainfall per year compared with an annual national average of 897mm. The domestic and industrial water needs of its population along with environmental needs can put substantial pressure on this resource.

5.2 A high proportion of local drinking water supplies come from chalk aquifers and these aquifers also provide water supplies to groundwater-fed chalk streams like the Chess and the Misbourne. Over abstraction is one of the reasons that these chalk streams run dry in certain places at certain times of the year, because there is insufficient groundwater to supply them. It is vital that with a changing climate and increasing population, measures are taken by developers to increase the water efficiency of new development to minimise impact on ground water supplies. Current occupiers are also encouraged to retrofit water efficiency measures into their properties to reduce water consumption.

Dry River Bed on the River Misbourne at Chalfont St Giles, 2012 (Environment Agency)

5.3 Water efficiency measures reduce the amount of water that needs to be taken out of the natural environment to supply new and existing housing developments. This has other benefits as well, it increases the amount of

water that is available for other purposes, such as agriculture, and can reduce the amount of water that has to be abstracted from the environment. Reducing water consumption can have a positive impact on water quality and as a consequence the associated biodiversity and reduce the amount of energy and chemicals used in providing, distributing and treating it.

5.4 Demand management, such as measures to promote efficient and sustainable water use, helps to deliver the actions set out in the Environment Agency's Thames River Basin Management Plan, which is the local implementation plan for the Water Framework Directive.

5.5 The Water Framework Directive was adopted and came into force in December 2000. The purpose of the Directive, of relevance to Chiltern, is to establish a framework for the protection of inland surface waters (rivers and lakes), and groundwater. The Directive requires the Environment Agency to establish river basin districts and for each of these a river basin management plan and also to prevent water bodies, including rivers and groundwater, from deteriorating, and to improve or maintain them to achieve 'good status', using a number of qualitative and quantitative indicators, by 2027.

5.6 The National Planning Policy Framework states that local planning authorities should adopt proactive strategies to take account of water supply and demand considerations. In addition, the planning system should, it considers, prevent both new and existing development from contributing to or being put at unacceptable risk from water pollution. The NPPG states that water should be considered as part of planning applications where there could be concerns about water supply, water quality or both.

Current Position

Water Resources

5.7 Chiltern District is included in the Environment Agency's Colne Catchment Abstraction Management Strategy. This Strategy classifies the aquifers from which water is abstracted in the District as being over abstracted. This has impacts on both the availability of drinking water supplies and on groundwater-fed streams such as the River Chess. These impacts will be exacerbated by future population growth and climate change.

5.8 The over abstraction of water from aquifers can exacerbate any water pollution issues in that it can lead to an over concentration of nutrients in the rivers which can thus increase water pollution levels. A lot of work has been undertaken in recent years to address these issues by organisations such as the Environment Agency and also the Chilterns Conservation Board's 'Chilterns Chalk Stream Project'. The Chilterns Chalk Stream Project, led by the Chiltern's Conservation Board, is a partnership of statutory agencies, local authorities and voluntary bodies committed to conserving the chalk streams in the Chilterns Area of Outstanding Natural Beauty and to encourage enjoyment and understanding of them.

Water Quality

5.9 The European Water Framework Directive (WFD) is now the key measure for water quality for rivers in England (http:/data.gov.uk/dataset/wfd-surface-water-classificiation-status-and-objectives). The rivers Misbourne and Chess are both in the Colne Catchment. Details of the WFD status of the rivers can be found in the Thames River Basin Management Plan (RBMP).

River Misbourne (Photo supplied by the Environment Agency)

5.10 The only failure, in terms of water quality, in recent years has been because of high levels of phosphates in both the Misbourne and the Chess as a result of the continuous discharge of sewage effluent from sewage treatment. This is an issue that the Environment Agency is working with Thames Water to address. Any other industrial or commercial processes that discharge to a watercourse are required to contact the Environment Agency for a licence or permit.

5.11 ***Groundwater*** is an important natural resource. It acts as a reservoir from which good quality water can be abstracted for drinking and for use in industry and agriculture. It is also valuable in maintaining wetlands and river flows, acting as a buffer in dry periods. Consequently, it is essential for biodiversity and makes an important contribution to the landscape and Chilterns AONB.

5.12 Groundwater moves slowly through the ground and so the impact of human activities may last for a relatively long time. It may be difficult to clean up, even once the source of pollution has been removed, so we need to focus on

preventing pollution in the first place, both during construction and for end uses. Groundwater provides base flows for surface water systems and so its quality may affect the quality of those surface waters.

5.13 In terms of groundwater quality, the underground rock strata are significant in terms of filtering out pollutants. In the case of Chiltern, a large part of the District has chalk near the surface and the soil above has little effect as a filter for groundwater pollution. This means that the soil leaching potential is high, and the groundwater is vulnerable to pollution. The most vulnerable areas are currently identified as being – Amersham and Chesham and the River Chess and the River Misbourne Valleys.

Sustainable Construction

Water Consumption

5.14 Applicants should make sure that developments are designed so that they use water resources efficiently. In addition, they should consider if an alternative design for their development may have less impact on the water environment.

5.15 The Government have produced a guidance document for assessing potable water consumption in new dwellings: http://www.planningportal.gov.uk/uploads/br/water_efficiency_calculator.pdf This may be of assistance when considering this issue further.

5.16 Local circumstances are such that for new dwellings the Council expects a minimum water efficiency standard for new residential development of 105 litres or less per person per day. This corresponds with Code level 3 and 4 of the Code for Sustainable Homes.[38]

5.17 There are various ways of reducing water use both in buildings and in gardens/ landscaping in order to meet this target. These are summarised below:

a. Water efficiency measures can be designed into new buildings, as well as being retrofitted into existing ones. Examples include:

- Dual flush/ low flush toilets
- Waterless urinals
- Install small bath and spray water restrictors for showers/ or install gravity fed showers that are not electronically pumped.

- Spray taps
- Gardens/ landscaping demand for water can be reduced by:

[38] The Cost of Building to the Code for Sustainable Homes – Updated Cost Review, August 2011 shows that the additional cost of achieving Code for Sustainable Homes Level 3 to 4 (105 litres/ person/ day) on top of building regulations requirements is only £150-200 at 2011 prices.

- Using mulches such as organic matter, home compost and composted bark to boost the amount of water that soil can retain;
- Choose drought resistant plants;
- Water early in the morning or in the evening to reduce losses through evaporation; and
- Use a hose fitted with a lance or trigger device. These control the flow, directing the water gently to where it is needed.

b. Reusing greywater and harvesting rainwater

Greywater – collects water that has been used for washing and, after filtering, reuses it for uses such as toilet flushing. Greywater can significantly reduce the amount of water used but it is essential that it does not contaminate the drinking water supply.

Harvesting rainwater is the collection and storage of rainwater for uses such as toilets, washing machines and watering gardens. In its simplest form, is a water butt which collects water from a drain pipe but it can also be incorporated into roof spaces linked to guttering collecting rainwater.

Water Quality

i. Land Contamination and Water Quality

5.18 There are a number of areas in the District that have been subject to contamination, including former industrial processes/ uses and chemical and agricultural uses. It is important that proposed development does not inadvertently cause pollution to ground or surface controlled waters both directly or indirectly such as through disturbing existing ground contamination. According to the Environment Agency, there are several hundred river pollution incidents every year in the UK, yet most are easily preventable.

5.19 Work in identifying and remediating contaminated sites in the District is on-going through a Contaminated Land Strategy. Preliminary Risk Assessments are required for planning applications which are located on potentially contaminated land such as former Waste Treatment Plants, Garages and Petrol Stations, Scrap yards etc. so as to reduce the likelihood of water run-off which may bring with it pollutants that compromise the quality of water in a river or stream.

5.20 There are a number of sensitive ‘receptors’ of land contamination, such as groundwater, surface waters or human health, all of which are affected by different pollutants and to differing degrees. This is why it is important for applicants to carry out a desktop study/ Preliminary Risk Assessment (PRA) to assess any sources of contamination, any pathways that could mobilise contaminants (e.g. foundations, piling, and drainage) and the sensitive receptors that could be affected. If contamination is suspected or known, the applicant will have to undertake further intrusive site works to characterise and remediate the contamination, so that it no longer poses an unacceptable risk to the receptors.

ii. Polluted surface water runoff

5.21 Polluted surface water flows from areas like car parks should always have sufficient pollution prevention measures in places to ensure the protection of groundwater and watercourses from specific pollutants like petrol (hydrocarbons) and suspended solids. Developers should follow the appropriate pollution prevention guidance, such as 'Pollution Prevention Guidelines 3: use and design of oil separators in surface water drainage systems' http://0nulled.com/doc/pdf/download/www__gov__uk--government--uploads--system--uploads--attachment_data--file--290142--pmho0406biyl-e-e.pdf
when designing drainage for large areas of hardstanding. Ideally, applicants should introduce more 'surface' SuDS (see paras. 6.20 – 6.21) to aid improvements in water quality, such as swales along hard-standing boundaries, or a more advanced reed bed system for larger sites. These SuDS techniques are easier to maintain than engineered solutions like petrol/ oil interceptors, which require regular maintenance to ensure they operate correctly.

Testing Water Quality (Photograph supplied by the Environment Agency)

iii. Drainage misconnections

5.22 Drainage misconnections can occur in new developments, redevelopments, extensions or through refurbishment. Developers should ensure that they do not connect any foul drainage (including sinks, showers, washing machine/ dishwasher outlets and toilets) to a surface water sewer, as this can send

polluted water into watercourses. Additionally, developers should ensure that they do not connect surface water drainage (e.g. roof gutter downpipes) into foul sewers as this can cause overloading of the foul sewer during heavy rainfall events. This could exacerbate current issues with foul sewers experienced in parts of the District. The Environment Agency continually works with Thames Water to identify polluting outfalls, and trace the outfalls back to the polluting site. Site owners are expected to rectify any faults causing pollution, and could find themselves liable to prosecution. A group of organisations known as Connect Right, are collectively working to ensure that plumbing is connected properly. Further details can be found by accessing their website on http://www.connectright.org.uk/.

Watercourse Management

5.23 Applicants or developers who own a site with a watercourse running through or adjacent to it are known as riparian owners of the stretch of watercourse running through their site (whole channel) or adjacent to their site (up to the centre line of the channel). This includes culverted watercourses. The Environment Agency's 'Living on the Edge' document is a key document for riparian owners, in order for them to be aware of their responsibilities and obligations under the Thames Region Land Drainage Byelaws (1981).

5.24 Applicants should remove watercourses from existing culverts where this is feasible. This will help to reduce flood risk from blocked or collapsed culverts and open channels are significantly easier for landowners to maintain, provide ecologically valuable habitat and contribute to WFD objectives. Culverts that cause blockages of the watercourse are the responsibility of the owner to repair.

5.25 One of the reasons for the WFD failure on the River Chess is obstacles to fish passage. There are a number of impounding structures, such as weirs, that block the passage of fish upstream. Most of these structures are redundant, with many being used for mills or existing aquaculture activities like watercress beds. The Environment Agency encourage applicants, subject to first obtaining planning permission, to remove existing structures in channels on their land, and to resist putting new structures in their place which do not allow adequate means for fish passage. Applicants would need to speak to the Council first to check that these structures aren't constrained in some way, such as through the structure being listed. In instances where the structure cannot be removed entirely the Environment Agency would expect other solutions to be found such as constructing 'fish passes' around the structures or 'notching' the structures to enable fish passage. In addition, if applicants wish to carry out any works in the channel or within eight metres of the top of the bank of a main river they would first need to obtain consent from the Environment Agency.

5.26 The Environment Agency asks developers to maintain an undeveloped, naturalised eight metre buffer zone adjacent to main rivers[39]. Many existing areas adjacent to the Chess and Misbourne have good quality, natural buffer zones that could be left unmanaged and undisturbed. Some sites with lower quality stretches of marginal habitat may require some basic riverside management, such as the removal of weeds, setback of existing structures and planting with locally appropriate, native species. It is advisable to first check with the Council when doing work on structures as it may require planning permission. Other sites, where the river has been modified with hard bank, concrete channels or artificial straightening, can benefit from re-naturalising the river to a more natural course and channel, with soft banks and re-connecting the river to the floodplain, providing additional areas for the safe storage of floodwater. Applications that propose to install hard bank protection will not be supported.

5.27 Many watercourses have lost their connection to the natural floodplain by historic raising of land in floodplains, 'canalising' river channels (i.e. creating concrete lined, often artificially straightened channels), removing or reducing buffer zones and building on the natural floodplain. All of these actions can have the effect of losing areas where water would naturally flow or be stored during flood events. In turn, this means that the water that would have flooded the floodplain is forced elsewhere, sometimes to where it isn't wanted, for example into people's properties or businesses. If there are opportunities to reinstate areas of floodplains, this will create additional areas of storage for flood water, which will reduce flood risk off-site by creating 'safe' areas for flood water to be stored.

5.28 This can bring huge benefits in terms of helping the river to achieve its WFD objectives, for local biodiversity, flood management and as improved green spaces for people to enjoy.

5.29 Structures such as fencing or footpaths should not be included within the buffer zone as they can lead to a detrimental impact on the integrity of the buffer zone and can increase flood risk through the inclusion of close-board fencing for example. Any works or structures that applicants intend to erect/ install within eight metres of a main river will require 'Flood Defence Consent' from the Environment Agency, and may also require planning permission.

References

Code for Sustainable Homes Technical Guide, DCLG, November 2010 https://www.gov.uk/government/publications/code-for-sustainable-homes-technical-guidance

Colne Catchment Abstraction Management Strategy, Environment Agency, https://www.gov.uk/government/publications/colne-catchment-abstraction-licensing-strategy

[39] The eight metre buffer zone is considered to be measured from the top of the river bank (i.e. where the channel meets the surrounding land).

Environmental Permits – https://www.gov.uk/environmental-management/environmental-permits.

Flood Defence Consent – https://www.gov.uk/government/publications/flood-defence-consent-england-and-wales.

Foul Drainage Assessment form [for non-mains drainage proposals] – https://www.gov.uk/government/publications/foul-drainage-assessment-form-fda1.

GPLC3 – Reporting Checklist, Environment Agency, March 2010
This document contains eight checklists relating to risk assessment which focus on risks to water.
https://www.gov.uk/government/publications/managing-and-reducing-land-contamination

Groundwater protection: principles and practice (GP3) – https://www.gov.uk/government/publications/groundwater-protection-principles-and-practice-gp3.

Interim Water Framework Directive data from 2009-2012
http://data.gov.uk/dataset/wfd-surface-water-classification-status-and-objectives

Living on the Edge – A guide to your rights and responsibilities of riverside ownership, Environment Agency, August 2012
https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

Maintaining secure water supplies, high standards of drinking water and effective sewerage services -
https://www.gov.uk/government/policies/maintaining-secure-water-supplies-high-standards-of-drinking-water-and-effective-sewerage-services.

Planning Practice Guidance – Water supply, wastewater and water quality - http://planningguidance.planningportal.gov.uk/blog/guidance/water-supply-wastewater-and-water-quality/.

Planning: a guide for developers / 'Building a Better Environment' – https://www.gov.uk/government/publications/planning-a-guide-for-developers.

Thames River Basin Management Plan, Environment Agency,
https://www.gov.uk/government/publications/thames-river-basin-management-plan.

Water Resources in England and Wales, Environment Agency, December 2008. It is available to download via the National Archives

(http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/geho1208bpas-e-e.pdf) but this will not be updated.

Waterwise – save water - http://www.waterwise.org.uk/pages/save-water.html.

6. FLOOD RISK AND SUSTAINABLE DRAINAGE SYSTEMS (SUDS)

Background

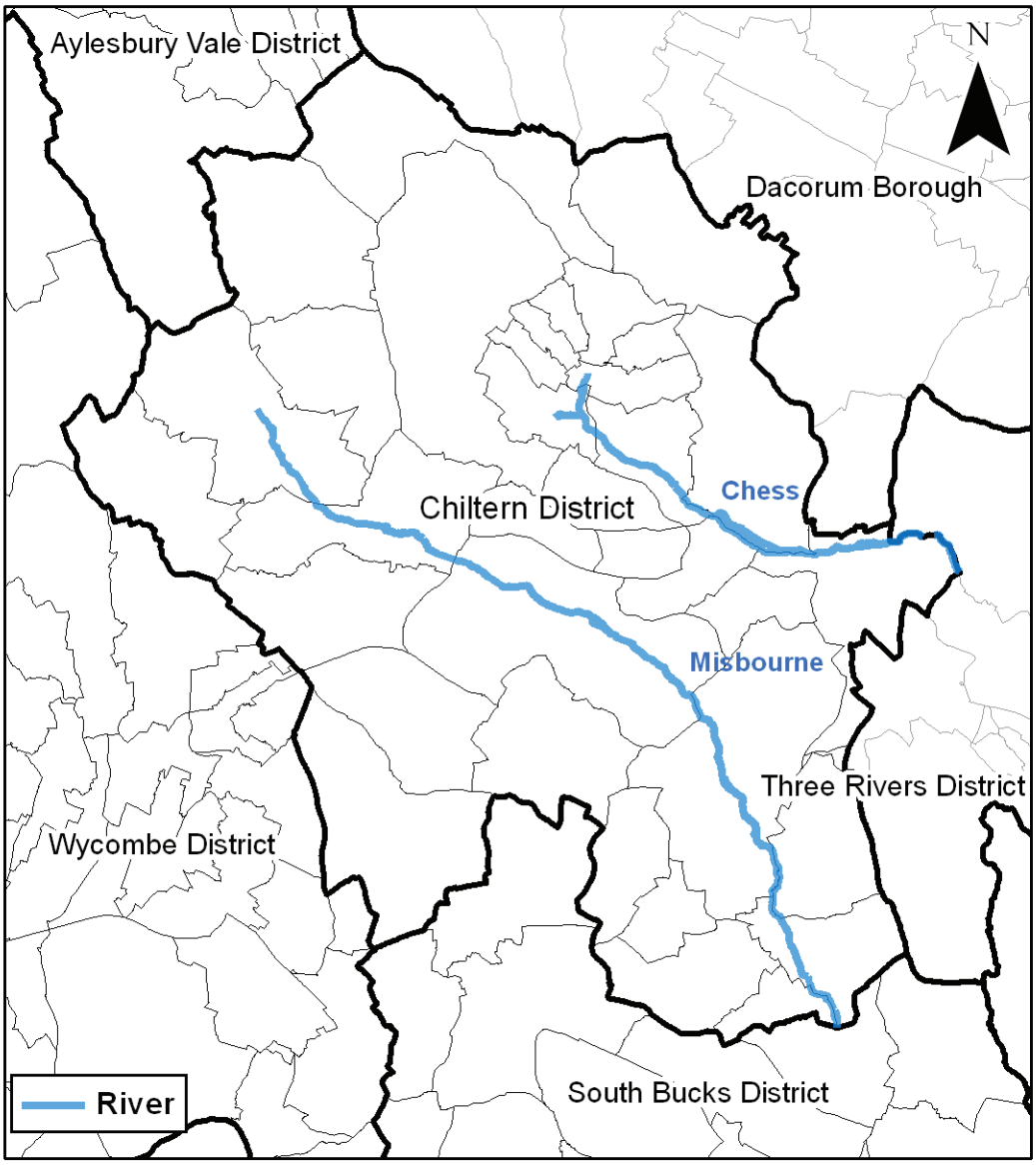
6.1 There are various different types of flooding. For example, river or fluvial flooding is where a river bursts or flows over its banks; groundwater flooding is where levels of water in underground aquifers rise to such a degree that they cause flooding, whereas surface water flooding is where the volume of water falling overwhelms the existing natural and/or man-made drainage systems. Surface water flooding incidences may well increase in the future as the result of climate change (see para. 2.4) which is expected to result in more incidences of short heavy bursts of rainfall.

6.2 Chiltern District Council consults the Environment Agency for specialist advice on the risk of flooding for development in Flood Zone 2 or 3, or sites greater than one hectare in Flood Zone 1. Buckinghamshire County Council is responsible for 'local' sources of flood risk, including 'ordinary watercourses', groundwater and surface water. The County Council took over the responsibility for surface water flooding from the Environment Agency when the Flood and Surface Water Act was enacted and the County Council became a Lead Local Flood Authority (under this act). The implementation of Schedule 3 of the Flood and Water Management Act has been delayed and the Government is currently consulting on changes to the system. We are currently waiting to hear back from DEFRA to find out further details as to what the new arrangements will be.

6.3 There are two principal rivers that cross the District (see Figure 6); the Misbourne and the Chess, both of which drain south eastwards, away from the Chiltern Hills towards London.

Flooding in Chalfont St Giles, 2014 (Photo supplied by the Environment Agency)

Figure 6: Rivers in Chiltern District



6.4 The National Planning Policy Framework (NPPF) and the National Planning Practice Guidance (NPPG) provide detailed advice with regard to flooding. As far as new developments are concerned, it advises that opportunities are taken to reduce the causes and impacts of flooding whilst at the same time ensuring that flood risk is not increased elsewhere. The NPPF requires that local planning authorities prepare a Strategic Flood Risk Assessment (SFRA). The primary purpose of a SFRA is to determine the variation in flood risk and to use this as a basis for steering new development away from areas with a high risk of flooding wherever possible (sequential approach).

6.5 A Strategic Flood Risk Assessment has been undertaken for Chiltern District. According to the SFRA, a relatively small proportion of the District is at risk from flooding from rivers (also known as fluvial flooding).

6.6 Flooding caused by groundwater, surface water runoff, ordinary watercourses and/ or culvert blockages may result in localised flooding at various locations within the District, resulting in damage to property and severe disruption. Sustainable Drainage Systems (SuDS) aim to mimic natural drainage by absorbing, slowing and filtering surface water runoff in a series of stages starting as close to the source as possible. SuDS provide water management, enhance water quality and offer a habitat for wildlife. SuDS can take a number of different forms including swales, permeable paving, ponds, detention basins, infiltration trenches, rain gardens and green/ living roofs, depending on the nature of the development and the locality. The Environment Agency and CIRIA have both produced guidance which explains the design requirements for SuDS and helps developers to select the most appropriate and sustainable SuDS for a particular site (see references below for links to these documents).

6.7 The Flood and Water Management Act 2010 states, in Schedule 3, that a SuDS Approval Body (SAB) (Buckinghamshire County Council) will be created and required to assess and approve any sustainable drainage systems and, if approved, adopt and maintain those systems for their lifetime. The details of when Schedule 3 will be enacted and further details of its implementation are currently being developed by DEFRA and further information will be made available prior to the adoption of the SPD.

Current Position

6.8 Some locations in the District have surface water drainage capacity issues that periodically cause the foul sewage system to overflow. This can be exacerbated in areas where drainage clearance has not taken place.

6.9 Surface water flooding is a serious local issue, particularly in Chesham. A Surface Water Management Plan for Chesham and Wycombe was produced in November 2011 by Buckinghamshire County Council. This Plan gives background information on the issue and, based on modelling of flood risk in the town, outlines a number of options for physical works to reduce the risk of flooding in the town and proposes other measures to help address the problem.

6.10 The Chesham Pathfinder project, managed by Buckinghamshire County Council in partnership with the Environment Agency, Chesham Town Council, the National Flood Forum and the District Council, seeks to increase awareness of flooding in Chesham and work with the community to help build resilience. One of the project's activities, known as the Aquaprint concept, has been developed to help address the surface water flooding issue in the town. Aquaprint aims to allow the planning system to safeguard areas for flood water storage in Chesham, thereby improving flood storage capacity and also indirectly helping to educate the local population about their flood risk.

6.11 Existing culverts, weirs and riverside structures/ buildings can increase flood risk through blockage, collapse or poor maintenance. The removal of them can be a simple and effective way to reduce flood risk through development.

Sustainable Construction

Flooding

6.12 It is vital that applicants do what they can to avoid and reduce flooding impacts from new developments. For example:

6.13 Early discussion should be undertaken with the District Council, and when the SuDS Approval Body has been created, Buckinghamshire County Council and the Environment Agency in order to obtain advice on flooding and ensure that the proposed development has been designed not to increase flood risk either on-site or off-site.

6.14 Applicants should check the Environment Agency's website https://www.gov.uk/government/organisations/environment-agency to see if a proposed development is in an area at risk of river flooding. Inappropriate development in areas at risk of flooding should be avoided. Where the development is necessary, it must be safe and resilient to the effects of flooding, without increasing the risks elsewhere.

6.15 Applicants should also check out whether their development is located within an area of flood risk as identified by the Strategic Flood Risk Assessment (SFRA) maps (see paragraph 6.5 above).

6.16 Developers will need to undertake a site specific Flood Risk Assessment (FRA) for most development proposals in flood zones 2 or 3. These should focus on flood risk from fluvial sources, as well as any other 'local' sources of flooding, such as groundwater or surface water. FRAs for development in Flood Zone 1, over one hectare in size, will need to focus on the management of surface water flooding, whilst also addressing any other forms of 'local' flooding. Some applications, such as the majority of householder extensions, will fall under the Environment Agency's Flood Risk Standing Advice (FRSA) and may not need an FRA.[40] The Standing Advice matrix is used by local planning authorities to estimate the level of environmental risk involved without the need to consult the Environment Agency directly.

6.17 Areas of Critical Drainage are areas, identified on the Strategic Flood Risk Assessment 2013 maps, which are likely to be the most at risk from flooding from surface water, groundwater and ordinary watercourses and where SuDS would be a priority. In these areas (or areas identified in subsequent updates), developers should submit a checklist with their applications in order to show that development proposals will not exacerbate flood risk. A copy of the checklist is set out in Appendix 2 of this document. This requirement does not apply to small scale development. The definition of what constitutes 'small

[40] See Footnote 20 of the National Planning Policy Framework page 24 for more guidance.

scale development' is set out within the checklist (see Appendix 2 of this document).

6.18 Property owners and developers can implement measures in their properties to improve flood resistance and/ or resilience. Products like non-return valves for drainage, flood gates/ barriers, tree planting and airbrick covers, as well as design techniques like raising electrical sockets and laying solid floors, will help property owners to improve the flood resistance of their properties and/ or ensure that the property can be cleaned-up more quickly following a flood. The Chesham Floodsmart website http://www.buckinghamshirepartnership.gov.uk/floodsmart/ provides some really useful guidance for property owners at risk of flooding. Property owners should check with the Council if measures require planning permission or other consents (e.g. Listed Building Consent).

Sustainable Drainage Systems

6.19 **Sustainable Drainage Systems (SuDS) need considering prior to design and need to be designed at the very start of the process, thus ensuring appropriate SuDs for the development.** Certain types of SuDS may not be appropriate for use in all areas due to factors such as land uses adjacent to the site, the ground conditions, the slope both of the site and adjacent to the site etc. For example, in terms of ground conditions, SuDS that work well in sand/ gravel soils do not work as well in clay soils. The Environment Agency has produced a SuDS hierarchy, (set out in the table below). Those techniques at the top of the hierarchy offer additional benefits and are more sustainable than those towards the bottom of the hierarchy.

Table 5: Environment Agency's SuDS Hierarchy

	SuDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable ↑	**Living Roofs**	✓	✓	✓
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention Ponds - Retention Ponds	✓	✓	✓
	Filters strips and swales	✓	✓	✓
	Infiltration devices - soakaways - infiltration trenches and basins	✓	✓	✓
	Permeable Surfaces and filter drains - gravelled areas - solid paving blocks - porous paving	✓	✓	
↓ Least Sustainable	**Tanked systems** - over-sized	✓		

pipes/tanks - storm cells			

Living roofs or green roofs are ideal on most flat or gently sloping roofs. A living roof is a multi-layered system covering the tops of buildings with vegetation.

Basins and Ponds – these are either dry most of the time (basins) or permanently wet (ponds and wetlands) and are used to attenuate water from a development. Runoff is held back long enough for solids to settle and plants such as reeds can be used to treat the pollutants.

Filter Strips and Swales – these are sloping vegetated areas or broad shallow channels that water runs along when it has been raining. As runoff flows across the surface it is filtered by vegetation which traps the silt and solid contaminants.

Infiltration devices/ soakaways – these devices make use of the ability of the soil to absorb water and encourage infiltration by having a large surface area to drain water through. Soakaways are beneficial in that they recharge aquifers. Storage can either be an underground chamber with holes in the sides and base or within the voids of a volume of coarse crushed rock. As runoff soaks into the ground it is filtered and biological action reduces organic pollutants. It is essential that any proposals for soakaways are first agreed with the Environment Agency in order to ensure that sensitive aquifers do not become polluted.

Infiltration SuDS may not be appropriate for sites where all, or part of a site, is covered by an Area of Critical Drainage due to high groundwater levels. Filtration SuDS, such as swales, filter strips, basins and ponds, would be more suitable for these sites.

Permeable surfaces and filter drains – these are designed to allow water to drain through a sub-base at a faster rate than rain falls. The sub-base stores water and either infiltrates into the ground or drains to a discharge point. Pollutants will be washed into the device and the sub-base will filter out any solid particles.

Traditional piped/ tanked systems are not true SuDS and should only be considered if it can be shown that all sustainable options in the hierarchy are not possible.

6.20 Applicants should look to maximise the use of SuDS at the top of the hierarchy and explain in any FRA/ statement why they have discounted any techniques from the hierarchy. The statement, where relevant, should also take account of relevant Development Plan policies such as in relation to sites with heritage or biodiversity value.

References

Anglian Water, Guidance on the use of SuDS
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CIRIA Guidance on General Water Management including their SuDS Manual
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http://www.environment-agency.gov.uk/homeandleisure/floods/31644.aspx

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Improving the Flood Performance of New Buildings – Flood Resilient Construction, CLG and the EA, May 2007

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http://www.environment-agency.gov.uk/research/planning/125035.aspx

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https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6378/1972728.pdf

Water Framework Directive

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7. AIR QUALITY

Background

7.1 At the European level, the Air Quality Directive 2008 requires the Government to prepare an air quality plan, demonstrating how it will meet the targets contained within it.

7.2 The Air Quality Directive was implemented by the Air Quality Standards Regulations 2010. The 2010 Regulations empower the Secretary of State for Environment, Food and Rural Affairs to require local authorities to monitor and improve air quality in line with the National Air Quality Strategy, produced by the Government under the Environment Act 1995. The Strategy sets out UK's air quality standards and objectives for improving ambient air quality in the UK for seven pollutants which local authorities are obliged to meet. Local authorities are required to put in place an Air Quality Management Area (AQMA) if air quality falls short in their area.

7.3 Air quality will, in many cases, be a material consideration in the planning process. Local planning authorities are under a legal duty to take air quality into account in determining planning applications, and a failure to do so could lead to a planning decision being judicially reviewed. Local authorities must consider, in relevant cases, any adverse effects which a proposed development may have on local air quality, and whether existing air quality levels may have adverse effects on the proposed development.

7.4 The National Planning Policy Framework (NPPF) provides that the planning system should contribute to and enhance the natural and local environment by "preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability" (Para. 109).

7.5 With regards to air quality, the NPPF goes on to state, in paragraph 124, that "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

7.6 Policy CS4: Ensuring that Development is Sustainable of the Core Strategy expects all new developments to have regard to a number of sustainable development principles, one of which being that new developments will have minimal impact on designated local Air Quality Management Areas (AQMAs).

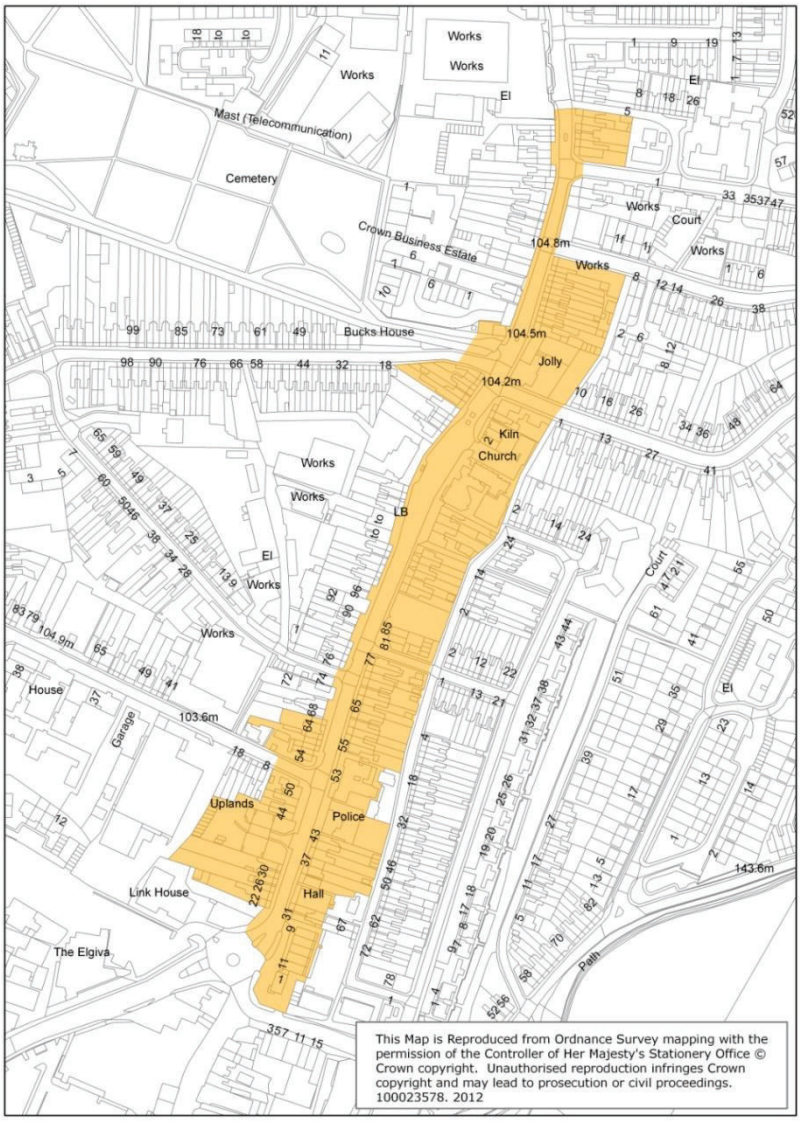
Current Position

7.7 Air quality in Chiltern is generally good. The main sources of air pollution in the District are motor vehicles and, to a lesser extent, industry. The reliance on motor vehicles for transportation of goods and people has vastly increased the amount of exhaust emissions released into the atmosphere. Improved emission standards have had some effect in limiting the increase of air pollution; however, they have not managed to reverse it. This is particularly important as vehicular emissions are at ground level and have a more immediate impact on the local population.

7.8 There is currently one designated AQMA in Chiltern which covers Berkhampstead Road and Broad Street (A416) in Chesham (see map below). The main source of air pollution in this vicinity is road traffic. Many measures to solve this problem are outside the scope of planning, such as stricter controls on vehicle emissions, others are set out within Paragraph 7.10 below. The desirability of reducing the need to travel and encourage the use of public transport, walking and cycling whilst planning issues are outside the remit of this SPD.

Vehicle emissions are a major source of air pollution in the AQMA

Figure 7: Chesham Air Quality Management Area



7.9 There are other areas within Chiltern District which are just below the declaration levels, and which might therefore become AQMAs in the future. Monitoring of areas where the objective for NO_2 is being or is close to being exceeded is continuing, and these will be flagged up to developers, as sites that will require further consideration and if relevant mitigation, if planning permission is sought in these areas[41].

Sustainable Construction

7.10 The location of a development is crucial for air quality considerations and applicants should ensure that development type suits the particular site. In areas of poor air quality, for example, it may not be appropriate to build schools or other types of development where people, in particular vulnerable people, will spend a substantial amount of time in the accommodation and thereby be exposed to continuous high levels of air pollutants. Site layouts

[41] http://www.chiltern.gov.uk/airreview

may, in some cases, need to be redesigned so that main rooms, such as bedrooms, aren't located at the front. Green infrastructure can also be used to mitigate pollution from cars, the planting of hedgerows and trees next to roads can be especially effective. Design may be required to minimise exposure to air pollutants both within buildings and in accessible outdoor areas adjacent to buildings in some areas at air quality risk.

7.11 The demolition and construction phase of a development has the biggest risk to local air quality, for example, through dust and emissions generated through plant and vehicle emissions, and also a risk to soil pollution. Emissions should be minimised from the demolition and construction of a development. (See the IAQM guidance on Assessment of dust from demolition and construction 2014 http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf).

7.12 In terms of siting and design applicants should ensure that where there is a localised and proximate source of air pollution, buildings are designed and sited to reduce exposure to air pollutants. Buildings themselves can be used as barriers between sources of air pollution and those areas where people will linger in the outside environment, such as private, communal or public gardens and public realm. Buildings should be actively ventilated allowing air to be drawn from the less polluted side of the building (where a balance needs to be achieved between air quality and energy consumption required for active ventilation). Consideration should also be given to ensuring that building facades, which face directly onto a pollution source, are airtight and all services entries should be carefully sealed. Airtight membranes can be included within the building to reduce air leakage.

Planting at the Chess Health Centre in the Chesham AQMA

Air Quality Assessments

7.13 Applicants should contact the Council at an early stage on sustainable@chiltern.gov.uk in order to ascertain whether an air quality assessment should be undertaken for a particular development. Guidance on this can be found in the National Planning Practice Guidance. An air quality assessment is a detailed study of the effects of a development on air quality, undertaken using an approach that is robust and appropriate for the scale of the likely impacts. Developers will normally be required to submit an air quality assessment for an application where the impact on air quality is likely to be significant or where the development is located in an area where the existing air quality environment may be unacceptable for the proposed development.

7.14 Where a biomass boiler is proposed, a detailed air quality assessment should be completed, including an emissions assessment, demonstrating that there will be no adverse air quality effects from the boiler relative to a conventional gas boiler. A development proposing Combined Heat and Power must also complete an emissions assessment as part of the air quality assessment.

7.15 As a minimum air quality assessments should set out the following:

- Details of the assessment methods including the model and the input data used for the assessment and any assumptions that have been made
- Identification of sensitive locations
- Description of baseline conditions
- Assessment of impacts
- Description of construction phase impacts
- Mitigation measures
- Summary of assessment results

7.16 The above list is a summary of what is expected. Further detail can be found in Development Control: Planning for Air Quality (2014 Update) published by Environmental Protection UK. In addition, further advice on how to deal with air quality in relation to planning applications is set out in the following 2014 guidance update from EPUK/ IAQM.
http://www.iaqm.co.uk/text/guidance/epuk/aq_guidance.pdf

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www.bucksairquality.co.uk

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http://aqma.defra.gov.uk/aqma/home.html

Development Control: Planning for Air Quality (2014 Update), Environmental Protection UK, 2014
http://www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-planning/

Greater London Authority and London Councils – Best Practice Guidance: Pollution and Noise from Demolition and Construction Sites, (Provides useful guidance with regard to section 106 agreements in relation to construction phases).
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http://www.ies-uk.org.uk/sites/default/files/documents/air_quality_planning_technical%20_note.pdf

8. NOISE

Background

8.1 Noise can be a significant nuisance. Persistent and intermittent noises and vibrations, such as those made by traffic, building services plant, sound systems, construction activities or other people, can undermine quality of life for those who live, work and visit the District.

8.2 Noise can have a significant effect on the environment and on the quality of life. There are a number of ways of reducing the impact of noise, particularly in residential developments, and these can be taken into account in the overall design and internal layout of new buildings and spaces. Developers should take into account existing sources of noise and overall ambient noise levels for both the current exposure and that which may be reasonably expected in the foreseeable future. In addition to external noise, the transmission of noise between adjoining users or buildings, such as flats, can cause problems.

8.3 The National Planning Policy Framework (NPPF) states that the planning system should prevent both new and existing development from contributing to or adversely affecting noise pollution. It recognises the significant adverse impacts on health and quality of life of noise pollution.

A significant contributor to noise is construction and industrial processes

8.4 Further guidance is set out within a specific 'Noise' section of the NPPG. This includes advice on:

- How to determine the noise impact;
- Observed effect levels;
- How to recognise when noise could be a concern;
- What factors influence whether noise could be a concern;
- How can the adverse factors of noise be mitigated?;

- Are there further considerations relating to mitigating the impact of noise on residential developments?;
- Can local plans include noise standards?;

In addition, it includes a reference to the Noise Policy Statement for England (NPSE). The NPSE applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise (with the exception of noise in the workplace).

Sustainable Construction

8.5 Measures that can help address noise issues include:

- External layout: consideration should be given at the outset as to the appropriateness of different land uses in close proximity to each other and how noise and vibration arising from one might impact on the other. For example road traffic, railway and venues should try and either avoid locating close to sensitive areas such as schools or residential development or allow an adequate distance between them. Screening by use of less sensitive buildings, walls and landscaping can be used to help to reduce impacts.
- Internal layout: rooms which are not sensitive to noise should be located towards the noise source so forming a barrier between the noise and more sensitive activities. For example, bedrooms should not be located above or below the living area of an adjoining flat.
- Landscape and landform: dense vegetation such as groups of trees or hedges can act as barriers by helping to absorb or deflect noise. Effectiveness can be improved by the incorporation of bunds (soil mounds) along with any dense vegetation. The overall layout of the development should allow for any landscaping barrier to mature and be managed without causing conflict with buildings.
- Positioning of Building Services: building services such as air extraction ducting should be positioned away from windows. Particular care should be taken to avoid or attenuate fan and vent noise with passive alternatives sought where possible.
- Noise insulation: good practice includes the use of noise insulation techniques. Particular attention should be paid to roofs, glazing and party walls and floors.
- Construction noise and disruption should be minimised through good site management and operation.
- Construction activities should be planned to limit both the level and duration of noise so as to minimise disturbance to premises and amenities in the vicinity of the development.

References

DEFRA, Noise Policy Statement for England, March 2010
http://archive.defra.gov.uk/environment/quality/noise/policy/documents/noise-policy.pdf

Sustainable Construction: Best Practice Programme
http://www.sustainableconstruction.co.uk/design.htm

9. BIODIVERSITY

Background

9.1 Biodiversity is: *"the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable".*[42]

9.2 Councils have a duty to have regard to the purpose of conserving biodiversity in all their functions under the Natural Environment and Rural Communities Act 2006. Guidance is provided by DEFRA for Public Authorities on Implementing the Biodiversity Duty at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/69311/pb12585-pa-guid-english-070516.pdf.

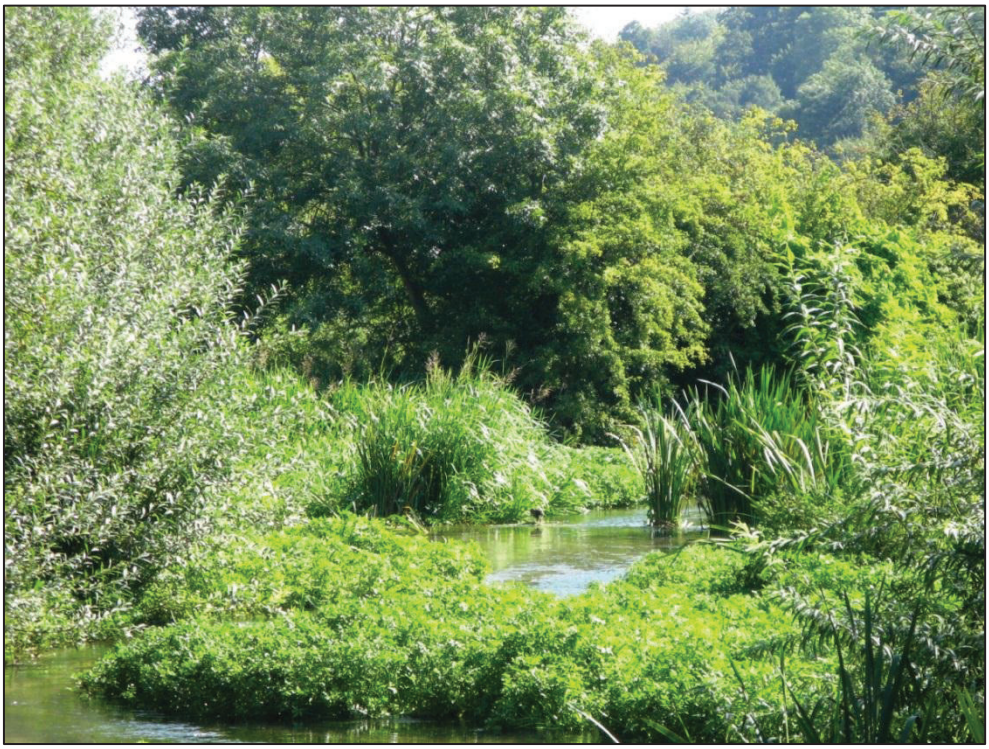
9.3 Biodiversity is a key indicator of the health of the environment and represents the variety of biological life and activity of plants and animals. Loss of biodiversity will be resisted under national and local policy, unless mitigation and off-setting can be achieved. Preservation and enhancement of biodiversity is to be encouraged wherever possible. Redevelopment of a site can offer new opportunities to provide new links or corridors between existing habitats for example. Buildings can provide opportunities for new biodiversity too with the provision of green roofs and facades and bird or bat boxes.

9.4 Improving the biodiversity of an area can have a number of other benefits such as improving the amenity of local residents, providing shading and reducing surface water run-off. Careful design can ensure that the natural environment can co-exist with and help complement the built environment to the benefit of both residents and wildlife.

9.5 The built environment makes a vital contribution to supporting biodiversity with both gardens and buildings supporting a range of plants, invertebrates, birds and mammals. Development offers an opportunity to create habitats and to incorporate beneficial biodiversity features.

9.6 Gardens can make a significant contribution to local character, biodiversity, tranquillity and sense of space. They also help to enhance the setting of buildings and provide amenity value for residents.

[42] Oxford English Dictionary: http://www.oxforddictionaries.com/definition/english/biodiversity



Chalk streams are internationally rare biodiversity habitats found in Chiltern

9.7 Section 11 of the NPPF 'Conserving and Enhancing the Natural Environment' seeks to achieve a net gain in biodiversity within developments and for local planning authorities to plan for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure.

9.8 Policy CS24 of the Core Strategy seeks to conserve and enhance biodiversity by working with partners to protect legally protected species and international habitats, ensure that developments should look to restore habitats, and where possible developments should not harm biodiversity. A copy of Policy CS24 is provided:

POLICY CS24: BIODIVERSITY

The Council will aim to conserve and enhance biodiversity within the District. In particular

- **the Council will work with its partners to protect and enhance legally protected species and all sites and networks of habitats of international, national, regional or local importance for wildlife or geology.**
- **development proposals should protect biodiversity and provide for the long-term management, enhancement, restoration and, if possible, expansion of biodiversity, by aiming to restore or create suitable semi-natural habitats and ecological networks to sustain wildlife. This will be in accordance with the Buckinghamshire Biodiversity Action Plan as well as the aims of the Biodiversity Opportunity Areas and the Chiltern AONB Management Plan.**
- **where development proposals are permitted, provision will be made to safeguard and where possible enhance any ecological interest.**
- **where, in exceptional circumstances, development outweighs any adverse effect upon the biodiversity of the site and there are no reasonable alternative sites available, replacement habitat of higher quality will be provided through mitigation and/or compensation to achieve a net gain in biodiversity.**

The Delivery DPD will indicate on maps the location of the various sites mentioned above as required by PPS9.

9.9 In addition to Policy CS24, Policy CS32 of the Core Strategy should also be considered, as it provides the policy context for the protection and enhancement of Green Infrastructure in the District. A copy of Policy CS32 is provided below:

POLICY CS32: GREEN INFRASTRUCTURE

Together with its partners, the District Council will identify, protect and enhance strategic green infrastructure assets in the District. Where green infrastructure is brought forward alongside new development, or where development is deemed to sever existing assets, opportunities will be sought to connect provision to surrounding green infrastructure in line with the Buckinghamshire Green Infrastructure Strategy (April 2009)

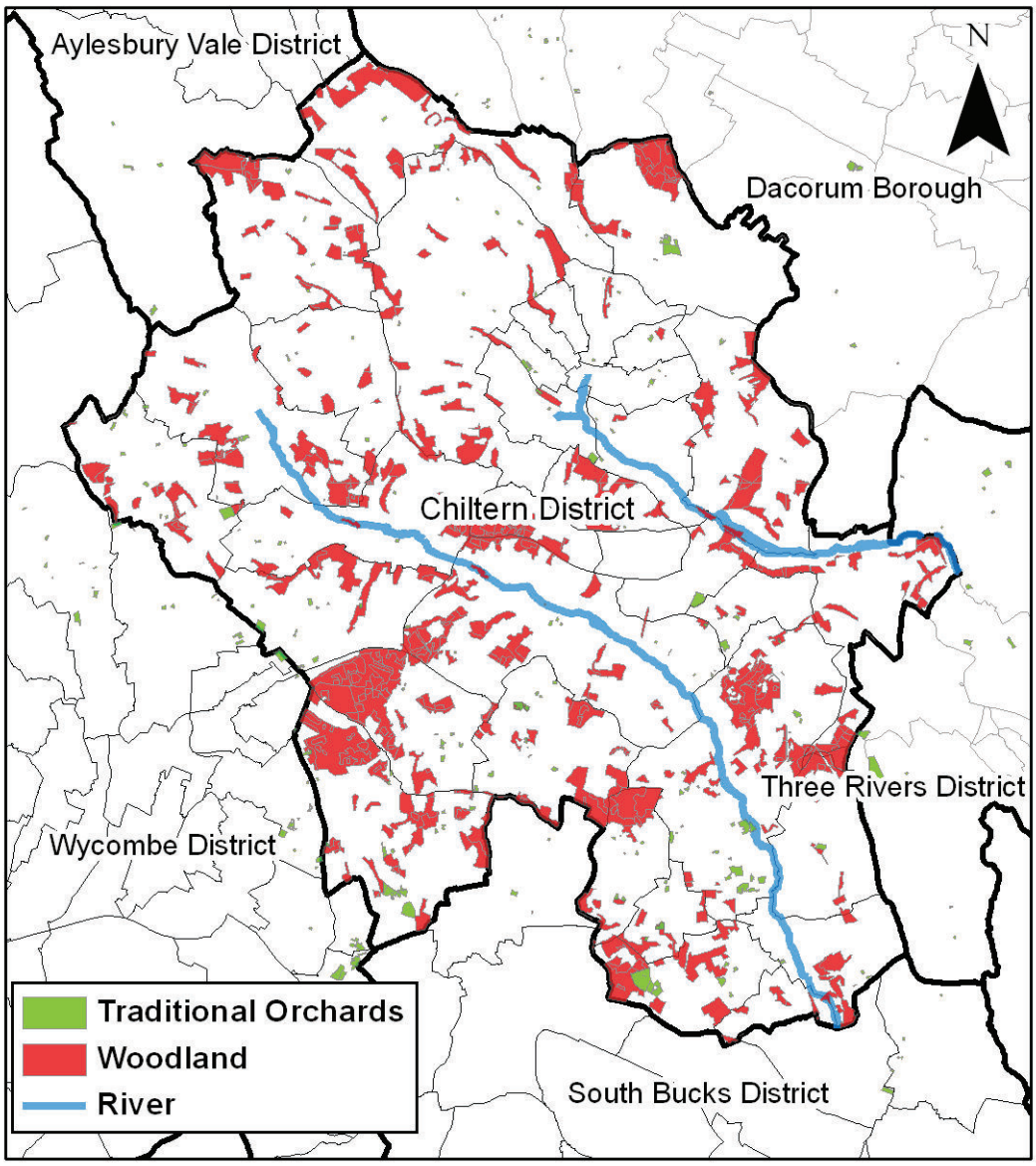
Current Position

9.10 The Council is a member of the Bucks and Milton Keynes Natural England Partnership. This has produced the Bucks Biodiversity Action Plan (BAP) which includes targets for biodiversity within the County. The BAP targets are mainly focused on delivery within the Biodiversity Opportunity Areas which are of local and regional importance, having been identified by the Partnership and the South East England Biodiversity Forum.

9.11 Biodiversity Opportunity Areas also provide opportunities for linking habitats to allow migration of species in the face of climate change. There are also biodiversity targets in the Chilterns Area of Outstanding Natural Beauty (AONB) Management Plan, which needs to be taken into account as large areas of the District fall within the AONB.

9.12 The District contains significant proportions of three habitats, Rivers, Mixed Deciduous Woodlands, and Traditional Orchards. These are shown in Figure 8. The rivers and chalk streams in the District are internationally rare and support species of water vole and other species. The District is typically wooded, characterised by the Chiltern Area of Outstanding Natural Beauty, trees and woodland provide important habitats for species within the District. These habitats also act as migratory corridors for wildlife which helps promote biodiversity not only at the local level, but throughout the county and nationwide.

Figure 8: Habitat Types in Chiltern (accurate as of January 2012)



9.13 Within Chiltern there are a number of sites designated for their importance for biodiversity, both nationally and locally. Within Chiltern there are 4 nationally designated Sites of Special Scientific Interest (SSSI). The largest SSSI in the District is Hodgemoor Wood (103 hectares) and the smallest is Froghall Brickworks (0.31 hectares). The meadows on either side of the River Chess in the valley bottom between Chenies and Sarratt comprise the remaining two SSSI's, both of which extend into Hertfordshire (1.97 hectares).

9.14 Of the SSSI's, Hodgemoor Wood is in a 'Favourable condition', Froghall Brickworks is in an 'Unfavourable - Recovering' condition, and the condition of Chenies & Sarratt Bottom continues to be 'Unfavourable'.

9.15 Under 10% of the District is identified as being of local importance for biodiversity. Core and Local Output Indicators for Biodiversity in Chiltern District for 2011, Buckinghamshire & Milton Keynes Environmental Records Centre (December 2012) indicates that the figure for Local Wildlife Sites (LWS) increased from 889 hectares (ha) in 2011 to 995.75 ha in 2012. Biological Notification Sites (BNS) total 623.5 ha and Local Nature Reserves (LNR) total 14 ha within the District. These figures do not take into account that these designations may overlap with each other as a result the total area of land within the District may be smaller than indicated by these figures.

9.16 The Green Infrastructure network also plays an important part in the protection, enhancement and creation of biodiversity. 'Green Infrastructure' is defined in the Buckinghamshire Green Infrastructure Strategy (April 2009)[43] as *"a planned network of multi-functional greenspaces and interconnecting links that contribute to high-quality natural and built environments"*. This includes natural and semi-natural, rural and urban green spaces, parks and gardens, amenity green space, allotments, city farms, suburban and rural farmland, cemeteries and churchyards, 'green corridors' (rivers, canals and cycleways), road verges and rail embankments), functional green space such as sustainable drainage schemes (SuDS) and flood storage areas, and built structures such as living roofs and walls.

Water Vole is a rare species found in Chiltern District

9.17 The Buckinghamshire Green Infrastructure Strategy (2009) aims to ensure that pressure on important natural and historic Green Infrastructure assets are minimised, and that opportunities to enhance these assets for the benefits of people and biodiversity are maximised. The Buckinghamshire Green

[43] http://www.buckscc.gov.uk/media/1470112/_Green-Infrastructure-Main-Report-April-2009.pdf

Infrastructure Delivery Plan (2012) develops the principles in the strategy further and provides more detail concerning delivery and funding of strategic green infrastructure in Buckinghamshire. Core Strategy Policy CS32 provides the policy context, which aims to protect and enhance Green Infrastructure in the District.

9.18 Within the District, existing green infrastructure links exist through woodland and alongside river beds and streams. The Buckinghamshire Green Infrastructure Delivery Plan (2013) has identified two schemes in the District which will enrich biodiversity and enhance accessibility to green infrastructure. These are between Amersham on the Hill and Little Chalfont, and the Chalfonts, Gerrards Cross and Denham (to create the Chalfont-Gerrards Cross-Colne Valley Regional Park).

Sustainable Construction

9.19 Opportunities should be sought through sustainable design and construction to preserve and where possible enhance biodiversity within new developments.

9.20 Almost all development sites will have some existing or potential value as a wildlife habitat. These should be identified and where possible opportunities taken for integrating suitable on-site habitats into new buildings and their grounds at an early stage in the design process. Developers should consider:

1. The benefit trees have on biodiversity, amenity, reducing CO_2 levels, and providing urban cooling effect. Existing mature, healthy trees and other vegetation should be kept where possible. When designing new developments developers should consider the space needed to allow for trees to grow, uninhibited to maturity. The only exception to retaining tree cover around watercourse channels would be in cases where it would be better to allow more light to reach a heavily shaded channel. This is particularly important if there is the possibility of connecting or improving water vole habitat.

2. Developers should consider making development attractive to wildlife; site specific factors may require incorporating design features aimed at sustaining and increasing the population of particular species or promote biodiversity. These can be in the form of man-made features such as bird houses or bat roosts, or be natural features such as wetlands, ponds, trees or woodlands.

3. Within landscaping, choosing plants which are beneficial to wildlife within the local context and use indigenous plants wherever possible.

4. Opportunities to improve links to existing green infrastructure, including provision of open spaces and rights of way, and promote access to natural and semi-natural areas, and the open countryside especially in areas identified for enhancement in the Green Infrastructure Delivery Plan.

5. Sustainable Drainage Systems (SuDS) such as green roofs and swales should for their multiple benefits such as wildlife habitats and migratory corridors, amenity value, contributions to flood protection, promoting non-motorised forms of transport, and improvement to townscape character.

6. In some cases, mitigation measures such as translocation of habitat where these will be required to make a development sustainable.

9.21 Adopting sustainable construction principles can help conserve and enhance biodiversity. Developers are encouraged to:

1. Adopt good site management, in order to ensure that no pollution incidents occur and to prevent harm to the surrounding environment from demolition and construction.

2. Include existing natural features within the development such as trees, hedges, log piles or other valuable habitat features, these should be properly preserved where practical during the construction phase.

3. Reuse 'waste' materials produced during construction such as materials from existing buildings, landscaping, and excavated soils where feasible and used to create features which promote biodiversity.

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Chiltern District Council Annual Monitoring Report (2011/12)
http://www.chiltern.gov.uk/CHttpHandler.ashx?id=1998&p=0

Core and Local Output Indicators for Biodiversity in Chiltern District for 2011, Buckinghamshire & Milton Keynes Environmental Records Centre (December 2012)
http://www.chiltern.gov.uk/CHttpHandler.ashx?id=1180&p=0

Environmental Records Centre

Natural England,
www.naturalengland.gov.uk
Natural England produce a range of mitigation guidelines for protected species including bats and barn owls.

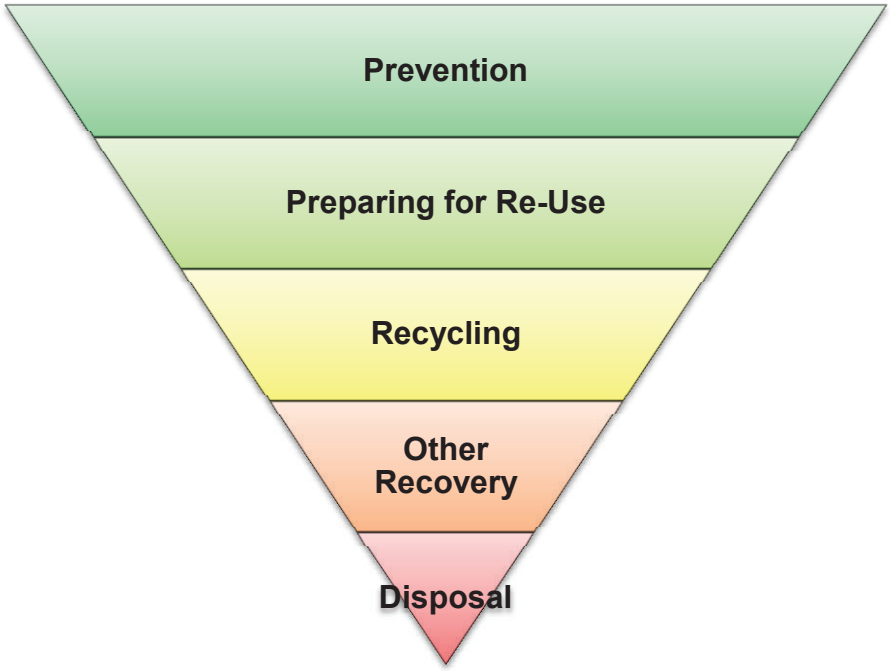
10. WASTE

Background

10.1 European Directive on Waste, 2008/98/EC[44] defines waste as *"any substance or object which the holder discards or intends or is required to discard".* This includes household, commercial, industrial, construction, demolition, excavation and hazardous wastes.

10.2 EU Directive 2008/98/EC provides the legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of waste within the European Union. The Directive states that member states should seek to minimise the negative effects of the generation and management of waste on human health and the environment and aim to reduce the use of resources, favouring the practical application of the Waste Hierarchy. This places priority on the use of waste as a resource, favouring recycling, and re-use of materials before disposal, as shown below:

Figure 9: Waste Hierarchy



Source: EU Directive 2008/98/EC

10.3 The NPPF states that one of the functions of planning is to play an environmental role, including: "the use of natural resources prudently, minimise waste and pollution". In planning terms the strategic context for waste is set out in the National Planning Policy for Waste (NPPW), adopted in October 2014 this supersedes PPS10 and sets objectives to be achieved in Local Minerals and Waste Plans. Buckinghamshire County Council's Minerals

[44] European Union Directive on Waste, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:EN:PDF

and Waste Core Strategy sets the strategic waste context locally and runs until 2026.

10.4 The Minerals and Waste Core Strategy contains a range of policies which promote new waste recovery facilities, manage wastes arising from both the private and public sectors, and for a wide range of waste materials. Policy CS8 of the Minerals and Waste Core Strategy 'Waste Prevention in New Developments' seeks new developments to utilise efficient use of resources in its design, construction and operation. Under this policy the Buckinghamshire authorities will encourage and raise awareness about:

'*Design principles and construction methods that minimise the use of primary minerals and encourage the use of recycled and reused building materials; construction and demolition methods that minimise waste produced and encourage reuse and recycling of materials; and design and layout that allows separation of waste generated on site'*.

Landfill – least preferred option (picture courtesy of 'Recycle Now Partners')

10.5 The 'National Waste Management Plan for England' was adopted by DEFRA in December 2013. Measures identified in the Plan aim to ensure that England meets EU Directive requirements for waste management. It states by 2020: (a) at least 50% by weight of waste from households is prepared for reuse or recycled, and (b) at least 70% by weight of construction and demolition waste is subjected to material recovery.

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10.6 At the local level, the four District Councils and the County Council work together in a Partnership, and have an adopted Joint Municipal Waste Management Strategy. In Buckinghamshire the collection of municipal waste is the responsibility of the district local authority. Chiltern District Council is currently working in partnership with Wycombe District Council both authorities share resources and responsibilities for the collection of waste in the two Districts. As the waste collection authority, Chiltern District Council

can encourage ways in which collection can maximise opportunities for recycling and reuse of waste, therefore reducing the need for landfill.

10.7 For the purposes of this SPD it is not necessary to go through every stage of the hierarchy or the strategic context of the waste framework, given that many of the functions are County Council matters. The SPD will focus on what measures can be implemented when constructing new developments, and through the development's lifetime in order to reduce waste created and increase opportunities for re-use and recycling.

Current Position

10.8 The table below shows the amount of household waste produced in Buckinghamshire Districts in 2011/12 and 2010/11 and how much is recycled, composted or reused (tonnes).

Table 6: Household Waste Recycled in Buckinghamshire Districts (2010-2012)

	Household Waste				Household Waste Composted, recycled or reused				Recycling rate	
	2010/11		2011/12		2010/11		2011/12		2010/11	2011/12
	Count	P/C	Count	P/C	Count	P/C	Count	P/C		
BCC HWRC	60,600		62,200		44,400		45,700		73%	73%
AVDC	55,500	0.32	54,800	0.31	12,300	0.07	11,800	0.07	22%	22%
CDC	*33,000*	0.36	*32,500*	0.35	*15,500*	0.17	*15,300*	0.17	*47%*	*47%*
SBDC	24,000	0.36	23,100	0.35	8,000	0.12	7,700	0.12	33%	33%
WDC	64,600	0.38	64,400	0.38	27,000	0.16	26,900	0.16	42%	42%
Total*	237,700		237,000		107,100		107,400		45%	45%

* Totals may not tally due to rounding

HWRC – Household Waste Recycling Centres
P/C – Per Capita: calculated by dividing the total waste produced/recycled by the population of the local authority (using 2011 Census data)

Source: Buckinghamshire County Council Authority's Monitoring Report 2011/2012[45]

10.9 The table above shows that Chiltern District consistently outperformed other Buckinghamshire authorities for recycling household waste, recycling 47% of all household waste. The amount of waste produced (per capita) is comparable to neighbouring South Bucks District. Although Buckinghamshire Districts are collectively meeting current targets, further opportunities must be taken to increase recycling, reuse and composting and reduce landfill.

[45] http://www.buckscc.gov.uk/media/891944/authoritys-monitoring-report-2011-12.pdf

10.10 It is estimated that approximately 70% of collected household waste can be recycled or composted. Chiltern recycled or composted around 47%[46] of household waste in 2011/12, ensuring that we are one of the better performing councils nationally.

10.11 There are approximately 41 Waste Recycling Centres in the District (pictured) including 2 household waste centres which allow recycling of more bulky items. There may be opportunities/ requirements for additional recycling centres in large developments or at strategic locations.

Waste Recycling Centre, adjacent to Amersham Pools

10.12 In Chiltern household waste is collected based on the type of the waste. This involves the use of various receptacles which creates an issue when trying to accommodate storage and movement areas for these in the design of new dwellings. The different types of waste collected are:

- General (non- recyclable) Waste;
- Mixed Recyclables (blue bin);
- Recyclable Paper and Cardboard (green box);
- Food Waste (brown bin and silver caddy); and
- Garden Waste (optional, stored in green bin or green reuseable bag).

[46] Chiltern District Council Annual Monitoring Report 2011/12 Technical Appendix

Taken from Chiltern Recycling Guide, (Chiltern District Council)[47]

10.13 Sorting of waste into different receptacles directly supports Policy CS8 of the adopted Minerals and Waste Core Strategy (bullet point 3) which promotes designs and layouts that allows separation, recycling and storage of waste.

10.14 Depending on the design of the development, flatted developments in the District allow provision for recycling as well as household waste collection. Further information regarding waste collection in the District and contact details for the waste team can be found at www.chiltern.gov.uk/waste

10.15 Many older properties within the District were not designed to accommodate this level of waste storage, either inside or outside of the dwelling. In some cases this may make recycling, sorting, and kerb side collection of materials inconvenient for the occupier, (as well as for waste collectors). This could discourage home owners from recycling. Despite this, as shown in Table 5, the District has a high rate of recycling when compared to neighbouring authorities.

10.16 In terms of development, waste is generated in three different ways:

1. During the construction process;
2. Through the use of buildings; and
3. From refurbishment and/ or demolition of buildings.

Sustainable Construction

10.17 This section recommends measures to help deliver Chiltern Core Strategy Policy CS4, reduce waste and encourage reuse and recycling of waste.

10.18 There is a need, and requirement, to reduce waste generation and to increase reuse and recycling of materials wherever possible, so as to reduce the amount of waste going to landfill. Opportunities to minimise the use of materials, and reuse and recycle waste and building materials can be taken in the design and construction of new developments.

10.19 Outdated or demolished buildings can also become waste. One way of preventing the demolition of buildings is to make them adaptable to change.

10.20 Lifetime Homes concept is based on five overarching principles: Inclusivity, Accessibility, Adaptability, Sustainability and Affordability. These principles can also applied to other types of buildings. The most relevant principle to consider when designing or constructing new developments in order maximise reductions in waste is Adaptability.

[47] http://www.chiltern.gov.uk/CHttpHandler.ashx?id=3089&p=0

10.21 It is important to note that through the adoption of the Housing Standards Review Department for Communities and Local Government are intending to subsume these standards into Building Regulations (see para. 3.17 above). The Housing Standards Review includes an amendment to Approved Document H (solid waste storage) introducing an assessment of impact on local amenity for external bin storage in residential development.

10.22 By making a building adaptable to the changing circumstances of the occupier it reduces the need to build new buildings or demolish existing buildings and therefore reduces the energy used and waste and pollutants produced during in these processes. Measures which help occupants reduce waste by encouraging recycling during the buildings occupation should be encouraged.

10.23 As well as during the construction of a building, measures which reduce waste and promote recycling throughout the buildings lifetime should also be encouraged.

10.24 It is important that measures are taken to minimise waste generated during the construction and prolong the life of a building. Throughout the construction of a development developers should consider:

1. Implementing good practice in terms of waste management, monitoring waste streams and utilising the maximum possible reuse of on-site construction and demolition materials. This will reduce the energy, waste and pollutants produced in the manufacture and transportation of new construction materials. Identifying resources such as, for example, demolition waste for construction material or fill will help reduce waste in construction.

2. When reuse of on-site materials is not possible, using locally produced recycled materials. This will reduce the waste, energy and pollutants produced in in the manufacture and transportation of non-recycled construction materials from non-local sources. This will also have an economic benefit locally and encourage more local materials salvage and reuse.

3. New dwellings should wherever possible be designed and built to be adaptable to meet the needs of those with disabilities and the elderly, in accordance with the 'Lifetime Homes' principles (or guidance which subsequently replaces these principles). This will reduce the need for the demolition of the building and allow it to extend its use, and therefore reduce the amount of waste generated through demolition and construction of new dwellings.

10.25 Sustainable principles which encourage recycling and reuse of waste during the life of a development should be considered at an early stage of the design process. When designing developments developers should consider:

1. Ensuring sufficient space is available both within and outside of properties for the sorting, transportation and storage of waste materials for collection. In the case of residential development, new dwellings should allow for sufficient space around the dwelling (rear, side or front of the property) in order to store the extra bins required. Occupiers should not have to transport bins unreasonable distances from their property to collection points, storage facilities, or (in the case of flats) communal storage areas where it can be avoided through good design. Storage areas are should also be accessible for waste collectors.

2. Incorporating where relevant energy from waste technologies (see page 36).

10.26 Regarding point 1, consideration should be given to any standards produced by the District Council, County Council, or National Government especially space and size requirements for bin stores. It is recommended that applicants partake in early consultation with the Council, both as a Waste Collection, and Local Planning Authority in order to ascertain the best strategy for the incorporation of household waste and recycling storage and collection.

References

Buckinghamshire Minerals and Waste Core Strategy, Buckinghamshire County Council
http://www.buckscc.gov.uk/environment/planning/minerals-and-waste-local-development-framework/development-plan-documents/core-strategy/

BS5096:2005 Waste Management in Buildings – Code of Practice
http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030050097

Chiltern District Council Annual Monitoring Report 2011/12– Technical Appendix
http://www.chiltern.gov.uk/CHttpHandler.ashx?id=1997&p=0

Chiltern District Council Waste
http://www.chiltern.gov.uk/waste

Designing out waste tool for Buildings
http://www.wrap.org.uk/content/designing-out-waste-tool-buildings

Lifetime Homes
http://www.lifetimehomes.org.uk/pages/for-professionals.html

Joint Municipal Waste Management Strategy, The Waste Partnership for Buckinghamshire
http://www.chiltern.gov.uk/CHttpHandler.ashx?id=2570&p=0

Buckinghamshire County Council Authority's Monitoring Report 2011/12, Buckinghamshire County Council

http://www.buckscc.gov.uk/media/891944/authoritys-monitoring-report-2011-12.pdf

Buckinghamshire County Council Local Development Scheme:
http://www.buckscc.gov.uk/environment/planning/minerals-and-waste-local-development-plan/development-plan-documents/local-development-scheme/

European Union Directive on Waste, 2008/98/EC
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:EN:PDF

'Recycle Now Partners' Online Photo Library
http://photolibrary.recyclenowpartners.org.uk

APPENDIX 1

Type of Information to include in a planning application for each renewable and low carbon technology selected

Table 7 below sets out the type of information required to be included as part of the planning application for each of the Renewable and Low Carbon Energy Technologies selected for inclusion in the Energy Statement (see Step 4 of the Energy Statement p. 21).

Table 7: Detailed information requirements for each type of technology

Technology	Information Required
Combined Heat and Power	• Description of technology • Capacity e.g. electrical output, heat output • Capacity as percentage of total site energy demand • Layout plan showing site size, boundary and location of infrastructure (e.g. location of boiler house, CHP units, and boilers) • Floor plans and elevations • Connection to a distribution network • Noise and visual impact • Fuel Type to be used • Details of operation and management of installations
Solar Water Heating	• The design of collector, flat plate etc. • Capacity, e.g. 8 panels, 40 tubes, total area • Capacity as a percentage of total site energy demand • Elevations to show the proposed location of the module • Orientation/ roof pitch • Detail of roof mounting arrangement, if applicable • Roof plans to show the location of the module • Potential shading i.e. trees and other buildings • Visual impact
Photovoltaics	• Description of technology • Capacity • Capacity as a percentage of total site energy demand • Calculation to show it meets the 10% requirement • The design of the module or array • Elevations to show the proposed location of the module • Orientation/ roof pitch • Detail of roof mounting arrangement, if applicable • Roof plans to show the location of the module • Potential shading i.e. trees and other buildings

	• Visual impact
Micro Wind Turbines	• Description of technology • Capacity e.g. electrical output • Capacity as a percentage of total site energy demand • Layout plan showing the site size, boundary and location of infrastructure (e.g. location of turbines, sub-station, access tracks) • Elevation plan • Roof plan to show location of wind turbine (if roof mounted) • Average site wind speed (minimum 12 months data) • Grid connection • Proximity to dwellings • Noise, vibration and visual impact
Ground source heating/ cooling	• Description of technology (horizontal or vertical) • Capacity (for heating and cooling) • Capacity as a percentage of total site energy demand • Number and location of bore holes • Location of pipework • Plan showing tree locations and their potential rooting zones • Connection details to the building
Air Source Heat Pump	• Description of technology – air-to-air, air-to-water system • Capacity e.g. kW per dwelling • Capacity as a percentage of total site energy demand • Location of equipment • Elevations to show location and design of air source heat pump • Visual impact, e.g. equipment on external wall • Noise report (should be available from the manufacturer)
Micro Biomass	• Size and description of technology • Capacity e.g. kW • Capacity as a percentage of total site energy demand • Floor plans and elevations showing the location and design of the plant, flue and storage facilities • Details of vehicle access to and from the plant • Source of fuel supply and principle transport routes to and from the supply • Landscaping and visual impact of plant • Details of noise emissions • Details of air pollution
Micro-hydro	• Layout plan showing location of turbine • Elevations of turbine • Capacity e.g. kW • Capacity as a percentage of total site energy demand

APPENDIX 2

SFRA Checklist for SPD - Assessment of localised flood risks in Areas of Critical Drainage

Background

This guidance relates to the Areas of Critical Drainage (ACD) defined in the Council's Strategic Flood Risk Assessment (2013). Any subsequent amendment to those areas will be subject to this guidance[48] and the most up-to-date maps should be used.

This checklist should help those proposing development within an ACD to consider the potential drainage issues and solutions which would be appropriate to their proposed development. The aim is to assist in the testing of whether development proposals would exacerbate localised flood risk. Of key importance in considering potential impacts is whether a proposed development will significantly increase the amount of impermeable surfacing on a site and whether it will change the means of drainage on a site.

The checklist for planning applicants to complete and submit as part of the information they provide with an application (or at pre-application stage) is set out below.

What type of development is covered by the Checklist?

The extent of information requested in the checklist is proportionate to the size, scale and likely drainage impacts of the proposed development. For example, small scale developments, such as porches on dwellings, minor alterations to the external appearance of a building, extensions within the curtilage of an existing dwelling, ancillary buildings within the curtilage of an existing dwelling, are unlikely to have a major impact, although each case would need to be assessed on its merits. This approach is acknowledged in the National Planning Practice Guidance (NPPG).

Certain types of small scale development are exempt from the need to complete a site specific Flood Risk Assessment. These are:

- Extensions to an existing dwelling (for example porches);
- Minor alterations to the external appearance of a building;
- Small scale ancillary buildings within the curtilage of an existing dwelling; and
- Means of enclosure.

(Some of these forms of development may not in fact require planning permission but the use of sustainable means of drainage for these types of proposals is still encouraged, as this will help to reduce the potential for localised flooding. Small scale improvements can have a very positive overall affect and this is supported by the NPPG http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-

[48] Refer to new EA surface water mapping from December 2013

and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-should-priority-be-given-to-the-use-of-sustainable-drainage-systems/).

What happens to the checklist once it is submitted to the Council?

The data and information provided on the checklist will be considered in terms of whether the proposed development will exacerbate existing flood risk and, if so, whether the proposed mitigation measures would satisfactorily address this risk. In doing this the Council may seek advice from relevant consultees, such as Bucks County Council's Flood Risk Management Team. (NPPG advice on LPA and the Lead Local Flood Authority (LLFA) working together): http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/how-the-local-planning-authority-should-involve-the-lead-local-flood-authority-when-determining-planning-applications-and-what-advice-should-be-given-about-local-flood-risks/).

Use of the checklist in the longer term

In considering planning applications local planning authorities should consult with the relevant lead local flood authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for on-going maintenance over the lifetime of the development. The sustainable drainage system (SuDs) should be designed to ensure that the maintenance and operation requirements are economically proportionate.

SFRA Checklist for Developers

Please complete the following sections, filling in details where prompted. The checklist should be completed in relation to the entire site, not just the part of the site which is in an Areas of Critical Drainage (ACD).

1. Checking localised flooding data records

These questions ask applicants to check published data on flooding. Flooding data can change regularly so it is important to make sure that the latest available information has been checked.

a) Have the following sources of data been checked? If so, is there anything applicable to the site? (Please indicate - check if 'yes').

	Checked?	Applicable?
Chiltern District SFRA 2013 (http://www.chiltern.gov.uk/article/3017/Flooding)	☐	☐
Environment Agency Flood Maps (http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e)	☐	☐
Flood Asset Register (Buckinghamshire County Council) (http://www.transportforbucks.net/Flooding/Flood-Asset-Register.aspx)	☐	☐
Surface Water Management plan for Chesham (Buckinghamshire County Council) (http://democracy.buckscc.gov.uk/Published/IssueDocs/8/7/0/2/I00022078/PT1911App1.pdf)	☐	☐
Preliminary Flood Risk Assessment (PFRA) (http://www.buckscc.gov.uk/environment/flooding/strategic-flood-management/asset-register/)		
Other, (please specify):	☐	☐

b) If so, what does the data show? For example, are there current risks/ likely issues with Drainage/ Flooding in this area?

Please describe briefly.

2. What is the existing means of surface water drainage to the site? (e.g. soakaway)

3. Is there a proposed change to the means of surface water drainage on the site?

Yes ☐
No ☐

If **Yes**, please state what is proposed (e.g. Sustainable Drainage Systems (SuDS)*: permeable paving, retention pond, underground water store, or other measures).

4. Amount of hardstanding within the site

This will indicate whether there is an increase in the amount of land covered by hardstanding when comparing the proposed development to what is there currently.

a) Total Site Area: (indicate in m^2 or ha)

	Existing	**Proposed**	
b) Extent of site covered in building footprint and hardstanding:			(indicate in m^2 or ha)
c) Proportion of site area covered in building footprint and hardstanding: (b ÷ a x 100)			(indicate as %)

* Further information on SuDS is available from Anglian Water: http://www.anglianwater.co.uk/developers/suds.aspx

5. Proposed Mitigation Measures

Please provide a brief description of proposed mitigation measures (e.g. SuDS, type of SuDS such as soakaway, infiltration, tanks, other storage, location of different SuDS measures:

See also Table 5 of the Supplementary Planning Document (p. 61) which sets out the Environment Agency's SuDS hierarchy.

6. Other Information Relevant to Flood Risk

a) Brief description of ground levels within the site which may affect surface water flow, e.g. slopes, ponds, hollows, depressions, ridges:

This information could be shown on a map/ diagram, (if so, please indicate).

b) Underlying geology (if known):

c) Any other information (continue on separate sheet if needed):

Separate Sheet – Provide further details if needed.