

Background Paper: Addressing Climate Change

- 1.1 This paper provides the background to the overall approach taken in the Draft Local Plan in respect of addressing the challenges of climate change. It is supported by the national policy and local evidence outlined.
- 1.2 An overwhelming body of evidence now exists that the average temperatures in the global climate are rising and this global warming is caused by human activity creating greenhouse gas emissions (Intergovernmental Panel on Climate Change – www.ipcc.ch). The effects of climate change will vary around the earth. The likely effects that will be experienced in the UK include hotter, drier summers (leading to water scarcity and stress on wildlife and plants) and warmer wetter winters (leading to increased flood risk) with more frequent extreme weather events such as heatwaves, storms and very heavy rainfall. Such events are already being experienced, and the average temperatures in the UK have continued to rise over recent decades (Meteorological Office data www.metoffice.gov.uk). Successive UK Governments have signed up to international commitments to reduce greenhouse gas emissions, the most recent being the Paris Agreement, a framework within the United Nations Framework Convention on Climate Change dealing with greenhouse gas emissions mitigation, adaptation and finance starting in 2020. The current agreement is the Kyoto Protocol 1997 which was extended until 2020 with the Doha Amendment in 2012.
- 1.3 At a local level the most likely effects that will be experienced are an increased risk of surface water flooding (from rainfall) and risk of flooding from water sources, changes in air quality, and changes in conditions for agriculture leading to stress on crops as well as trees and woodland. In addition, the higher temperatures are likely to lead to more uncomfortable urban areas and the need for more shade. These effects of climate change can be managed, and the Local Plan must play its part in so doing to support existing and future communities in the District.
- 1.4 It is only possible to manage the severity of climate change by reducing greenhouse gas emissions. In the UK energy supply emits the highest proportion of greenhouse gasses at 31%, with transport at 23%, business at 17% and residential at 12%, whilst agriculture emits around 9%, waste management 4% and other activities 4% (2014).

National Planning Policy requirements

- 1.5 The 2012 Community Choices consultation sought a view on whether the Council had identified the relevant issues in relation to climate change and whether the options in terms of a policy response to the agenda were covered. A synopsis of the responses is set out below:
- 30% of the respondents agreed that the relevant issues had been identified and 57% of respondents agreed that the relevant policy options had been covered. However, there was concern expressed by many of those who disagreed that the level of development discussed was contrary to the aim of reducing impacts of climate change given the accompanying emissions, and impacts on air quality.

There was also significant concern regarding the pressure on water supply in the area;

- given the requirement to deliver the levels of development needed over the plan period, the focus of policy has to be on reducing the impact of new and existing development and building in resilience to climate change;
- support for sustainable transport choices;
- support for offsetting greenhouse gas emissions through increased tree planting on a large and small scale including along transport routes;
- provide policy for residential and commercial development to provide renewable energy infrastructure as part of initial construction design;
- encourage sustainable construction through the range of elements including layout and orientation, rainwater harvesting, green roofs, low carbon and renewable energy and passive design for energy, and sustainable drainage systems;
- support for community energy generation and sustainable use of water;
- provide green infrastructure networks to support mitigation and adaptation to climate change for humans and other species;
- address water resources, flood risk, and the water environment to achieve effective management of the impacts of climate change on the District.

National Planning Policy

- 1.6 The UK Sustainable Development Strategy – Securing the Future (2005) HM Government and international agreements set the context for national policy on climate change. The National Planning Policy Framework (NPPF) sets out the role of the planning system in responding to the climate change agenda and relates this to a range of aspects of policy from transport to flood risk management (paras 93-108, 156 and others)¹. It advises the mitigation of climate change by reducing greenhouse gas emissions, and the adaptation to climate change by building resilience into places to cope with the changes so that people, communities, infrastructure and wildlife are resilient to the unavoidable impacts e.g. to manage flood risk, provide more shade in urban areas, and space for wildlife.
- 1.7 The NPPF recognises, the importance of mitigating and adapting to climate change including moving to a low carbon economy (page 2 para 7) in the environmental role of sustainable development. It devotes a section to “Meeting the challenges of climate change, flooding and coastal change”. It notes at paragraph 93:

“Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development.”

It goes on to note that

¹ <http://planningguidance.communities.gov.uk/blog/policy/achieving-sustainable-development/delivering-sustainable-development/10-meeting-the-challenge-of-climate-change-flooding-and-coastal-change/>

“Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations” at paragraph 94. Climate change adaptation is defined as *“Adjustments to natural or human systems in response to actual or expected climatic factors or their effects, including from changes in rainfall and rising temperatures, which moderate harm or exploit beneficial opportunities”*. Climate change mitigation is defined as *“Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions”*.

It also notes (paragraph 95) that to support the move to a low carbon future, local planning authorities should:

- *plan for new development in locations and ways which reduce greenhouse gas emissions;*
- *actively support energy efficiency improvements to existing buildings; and*
- *when setting any local requirement for a building’s sustainability, do so in a way consistent with the Government’s zero carbon buildings policy and adopt nationally described standards.*

1.8 The NPPF advises (paragraph 97) that LPA’s should: take measures to help increase the use and supply of renewable and low carbon energy through a positive strategy to promote energy from renewable or low carbon sources; design of policies to maximise renewable and low carbon energy development whilst ensuring adverse impacts are addressed satisfactorily; consider identifying suitable areas for renewable and low carbon energy sources and supporting infrastructure and support community led initiatives for renewable and low carbon energy including developments outside such areas being taken forward through neighbourhood plans; and identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co locating potential heat customers and suppliers. The Council commissioned a Carbon Reduction and Renewable Energy Assessment that reported in 2013.²

1.9 Local plans are required to account for climate change over the long term including the consideration of factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. Planning of new development should be undertaken to avoid increased vulnerability to the range of impacts arising from climate change (including increased temperatures, increased rainfall, increases in extreme weather events etc). In areas which are vulnerable where new development is brought forward care should be taken to ensure risks can be managed through suitable adaptation measures including through the planning of green infrastructure.

1.10 Flood risk must be accounted for (see paragraph 100 of the NPPF), inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without

²Report from Atkins May 2013: <http://eppingforest.consultationonline.co.uk/wp-content/uploads/sites/5/2016/08/carbon-reduction-and-renewables-energy-assessment-may-2013.pdf>

increasing flood risk elsewhere. The preparation of a Strategic Flood Risk Assessment (SFRA) is advised (EFDC has a level 1 study at present³), and a sequential test applied to locating development for the purposes of steering development away from areas at highest risk of flooding, using exception testing only if there are no alternative locations for the development at lower risk of flooding.

- 1.11 Local planning authorities should set out the **strategic priorities** for the area in the Local Plan (paragraph 156 of the NPPF). This should include strategic policies to deliver climate change mitigation and adaptation.

³ AECOM prepared the SFRA level 1 report in August 2015. See <http://eppingforest.consultationonline.co.uk/wp-content/uploads/sites/5/2016/08/Level-1-Strategic-Flood-Risk-Assessment-SFRA-Update-2015.pdf>

Planning Practice Guidance

- 1.12 The Planning Practice Guidance in its 'Climate Change' section describes the potential planning measures that should be taken as:

Mitigating climate change by reducing emissions:

- *reducing the need to travel and providing for sustainable transport;*
- *providing opportunities for renewable and low carbon energy technologies;*
- *providing opportunities for decentralised energy and heating;*
- *promoting low carbon design approaches to reduce energy consumption in buildings, such as passive solar design.*

Adapting to a changing climate:

- *considering future climate risks when allocating development sites to ensure risks are understood over the developments lifetime;*
- *considering the impact of and promoting design responses to flood risk (and coastal change) for the lifetime of the development;*
- *considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality;*
- *promoting adaptation in design policies for developments in the public realm (ID 6-003-20140612).*

- 1.13 The PPG seeks integration of mitigation and adaptation e.g. through maximising summer cooling through natural ventilation in buildings and avoiding solar gain, district heat networks that include tri generation – combined cooling, heat and power, and through provision of multifunctional green infrastructure that can reduce urban heat islands, manage flooding and help species adapt to climate change as well as encouraging people to walk and cycle.

- 1.14 Climate change risk assessments at a local level are suggested by the guidance which notes the evidence such as SFRA and Water Resource Management Plan being key aspects of evidence providing information on climate change.

- 1.15 The Local Plan can therefore only manage the severity of climate change by the delivery of a policy framework that helps to reduce greenhouse gas emissions, enables mitigation against the effects of climate change and ensures adaptation to climate change through new development in the District.

Key evidence

- 1.16 The Council commissioned the Epping Forest District Council Carbon Reduction and Renewable Energy Assessment 2013 (CRREA) to support the approach of the Local Plan. The aim of the study was to investigate the potential for, and make recommendations on, reducing greenhouse gas emissions and optimising renewable energy technologies

throughout the District. A synopsis of the findings is contained at Appendix 1 of this background paper.

Energy use and carbon emissions

- 1.17 The study found that domestic electricity and gas use are both above the regional average with electricity at 9.5% above and gas at 16.6% above the regional average per household consumption. However, consumption per household had been declining for both seeing a reduction of 7.5% for electricity and 16% for gas between 2005 and 2010. 90% of electricity consumption is from non-domestic users in the District.
- 1.18 In 2010 per capita carbon emissions from commercial and industrial stock were in line with the County average, and transport emissions (excluding the motorways) 16.1% lower than the County average. Carbon emissions per capita in the District fell overall by 10.4% between 2005 and 2010.
- 1.19 Domestic properties make up the biggest proportion of carbon emissions in the District at 43% whilst industry and commerce accounted for 31% and Transport 26% (excluding motorways). The study concluded that actions to reduce carbon emissions from existing and new homes would be crucial to the District. The study was undertaken in the context of the national push to deliver homes that met the Code for Sustainable Homes Standard. Whilst the Standard still exists, the Government requirement to meet it has since been rescinded. However, the viability evidence provided by the study was based on six development appraisal case studies which tested the cost of fulfilling the Code for Sustainable Homes. The results support the principle that such measures were viable in the Districts housing markets at the time depending upon the sub market and the level of the Code applied. Such viability assessments date very quickly given changes in markets, construction costs, technology costs and so on, however, the indication from the study was positive and gives some confidence that it is not unreasonable to seek sustainable design and construction for new housing in the District. Current cost comparisons on specific construction projects appear to indicate low additional costs to design of construction using low carbon design principles from the outset. Adding installations to traditional designs can be more expensive than a low carbon design. Therefore, the prospects appear to be positive in terms of the capacity for the District to deliver sustainable construction solutions.

Potential for large scale low carbon and renewable technologies

- 1.20 The study concluded that whilst there is sufficient wind speed and solar radiation resource in the district large scale renewable energy technologies (such as wind farms or solar farms) are likely to be unsuitable due to the landscape and policy constraints of the green belt (although single wind turbines may be acceptable and small scale solar PV suitable in principle). By undertaking a sieving process, the study specifically tested locations for wind at Matching Green, Willingale, Long Green and Copthall Green. It concluded that there is a reasonable wind resource but warned against micro climate impacts. However, the study notes that the availability of land in the District for free standing wind turbines, or solar PV farms which would be compatible with green belt objectives is likely to be limited. The study

recommended a criteria based policy in the Local Plan which has been included at Draft Policy DM 20 Low Carbon and Renewable Energy.

- 1.21 The large scale biomass potential of the District is considered limited due to a lack of local feedstock and insufficient amounts of unmanaged woodland within the area.
- 1.22 In order to test the potential for the introduction of Combined Heat and Power (CHP) systems and other low carbon and renewables technologies three case studies were undertaken for the glasshouses in and around Nazeing, the Sainsbury's distribution centre and the Abbey Mead Industrial Park – south of Waltham Abbey and the Oakwood Hill Industrial Estate/ Langston Road Industrial Estate south of Loughton. The retrofit potential for Combined Heat and Power on industrial estates was currently limited due to a lack of 'anchor' tenants with high heat demand so the study concludes there to be limited current potential for this form of low carbon energy. The exception to this is seen as glasshouses where there is significant theoretical potential for carbon savings but this is deemed to be dependent on the price of gas unless feedstock is imported to fuel biomass generation. Changes to the operating environment, technology, and investment into the glasshouse industry in the Lee Valley may mean that conditions may be more advantageous for CHP in this sector since the 2013 CRREA was published. A range of fuels can be used for such schemes.
- 1.23 However, the study indicates that should there be large scale development that includes a large 'anchor' tenant with high heat demand this would make a scheme viable. In addition where large scale residential schemes are planned alongside new industrial or commercial premises there would be potential for both to be served by district energy schemes. The Council considers looking forward, that the use of Combined Heat and Power, and Combined Cooling, Heat and Power is an appropriate course of action to address matters of climate change and that there will be opportunities for the development of 'anchor' uses with respect to heat demand over the plan period.

Carbon savings from retrofit of existing domestic buildings

- 1.24 Carbon savings were estimated to be 8% of 2010 domestic carbon emissions just through the installation of standard measures such as central heating, loft insulation, cavity wall insulation, double glazing and solid wall insulation. These matters of retrofit are largely not addressed by the planning system. However, additional savings can be made from small scale low carbon electricity technologies such as PV panels or ground source heat pump installation some of which may be subject to planning control depending upon the particular case. Therefore, Policy DM 20 Low Carbon and Renewable Energy and Policy DM9 High Quality Design are particularly relevant.

Potential to reduce carbon emissions from road transport

- 1.25 Motorway traffic accounts for almost two thirds of transport emissions in the District and when removed from the calculations local transport emissions have been declining in the District. Local actions that can be promoted by EFDC include: promotion of car clubs; support for low carbon vehicles; land use planning that encourages mixed use development

(therefore reducing the number of car trips generated); and land use planning that encourages a shift to walking and cycling. The study concludes that carbon emission reductions in the order of 10% on 2010 levels could be achieved in this sector. There is further information on this aspect of carbon reduction contained in the Transport Background Paper.

Key Issues for the District

- 1.26 In light of guidance and evidence the Council concludes that the key matters that the Draft Local Plan should address are:
- reducing Greenhouse gas emissions and reducing Carbon Emissions. The Climate Change Act 2008 set targets of Greenhouse Gas reduction in the UK of at least 80% by 2050 and Carbon Dioxide of at least 26% by 2020, over baseline levels of 1990. Reductions can be achieved through sustainable design and construction, and renewable energy provision;
 - the CRREA found that carbon savings of approx. 7% of 2010 emissions per annum by 2033 could be achieved through new development, retrofit, and sustainable transport measures;
 - the UK Climate Change Strategy commits to delivering renewable energy targets of at least 15% of energy demand from renewable sources by 2020;
 - the CRREA found that there is potential for a range of low and renewable carbon energy technologies to be used in the District and therefore savings can be made in this respect;
 - managing increased flood risk;
 - managing air pollution resulting from traffic;
 - protecting and increasing biodiversity;
 - ensuring comfortable living conditions especially in urban areas;
 - protecting food security; and
 - protecting and providing the 'carbon sinks' of vegetation and woodland.

The approach to climate change in the Draft Local Plan

- 1.27 The Council considered the option of including specific policy in the Draft Local Plan that sets targets in relation to aspects of climate change. However, this is not considered to be a meaningful approach to policy given the ever changing international context, and the need to be in step with current national policy coupled with the need to demonstrate that local plan policy is deliverable whilst ensuring that the approach to addressing climate change is embedded in the Local Plan. The approach decided upon is therefore explained below.
- 1.28 The Councils strategy to meet the challenges of climate change has multiple threads that are interwoven into policy. Policy measures aimed at reducing impact on climate change and adapting to climate change appear throughout the Draft Local Plan and therefore the Council does not propose overarching policy beyond the broad presumption in favour of sustainable development provided by Draft Policy SP 1. The strategy responds to the challenge of climate change by addressing matters set out below. The approach includes both aspects of:

how the policies were developed for example factors in assessment and sustainability appraisal; and the specific intent of the development strategy and policies for development management.

- 1.29 **Transport, land use and locational policies:** The development strategy is based upon Sustainability Appraisal at the spatial level of the Strategic Housing Market Area (Draft Policy SP 2 Spatial Development Strategy). The most suitable locations have been selected for development using a host of criteria (refer Site Selection Report, Arup 2016⁴) including the protection of the highest value natural assets and selection of most accessible places to local services, and where possible, public transport services as demonstrated by Policy SP 2 Spatial Development Strategy, and site allocations found in Chapter 5. The transport strategy seeks to encourage shift to low and zero carbon forms of transport and reduce trip length of journeys for everyday needs to reduce the increase in emissions from transport and impacts on air quality. Developers of large schemes are required to undertake travel planning and focus on the lower or zero carbon choices of walking, cycling and public transport as the primary means of transport. Policies encourage extensions to the cycle network in new development and existing areas. This is demonstrated by Policies T 1 Sustainable Transport Choices and T 2 Safeguarding of routes and facilities coupled with policy DM 9 High Quality Design.
- 1.30 **Green and blue infrastructure provision:** The development strategy seeks to deliver significant improvements to the natural environment of the District alongside new development at all scales. The Plan seeks to deliver a green infrastructure strategy and network to improve the quality of open spaces for carbon capture (increasing vegetation), as well as for human and other species use for recreation and leisure. An important part of the strategy is planting more trees. This is demonstrated by Draft Policies SP 6 The Natural Environment, Landscape Character and Green Infrastructure and DM 5 Green Infrastructure Design of Development, among others.
- 1.31 **Improving Air quality:** The development strategy seeks to address air quality through Draft transport policies T 1 and T 2 together with the strategy for green infrastructure set out in Draft Policy SP 6.
- 1.32 **Managing flood risk and improving water quality:** The development strategy seeks to avoid areas of highest flood risk. Policies ensure that development incorporates the necessary measures to ensure the risk of surface water flooding is reduced, support the improvement of water quality under the Water Framework Directive (5) (through sustainable drainage solutions such as green roofs and swales) and ensure that any design measures needed to deal with a flood event are incorporated where there is development in river flood risk areas (by exception) i.e. that flood mitigation and adaptation measures are in place. These are demonstrated in Draft Policies DM 15 Managing and Reducing Flood Risk, DM 16 Sustainable drainage systems, DM 17 Protecting and enhancing watercourses and flood defences, DM 18 On site management of waste water and water supply and DM 21 Local environmental impacts, pollution and land contamination.

⁴ Site Selection Report: Arup September 2016 http://eppingforest.consultationonline.co.uk/wp-content/uploads/sites/5/2016/08/Report-on-Site-Selection_FINAL.pdf

- 1.33 **Providing low carbon and renewable energy:** Policies encourage the use of low carbon and renewable technologies and energy as a consideration in design and sustainable construction as well as co-location of facilities to develop heat and power networks i.e. Draft Policies DM 9 High Quality Design and DM 20 Low Carbon and Renewable Energy.
- 1.34 **Masterplanning, design coding and sustainable construction:** Policies require design coding, place-shaping and masterplanning on strategic sites and that development demonstrates a design process that has sought to ensure a minimal environmental impact, encourages low carbon lifestyles and has low levels of water usage. This is demonstrated in particular by Draft Policies SP 4 Place Shaping, DM 9 High Quality Design, DM 11 Waste Recycling Facilities on New Development and DM 19 Sustainable Water Use.
- 1.35 **Managing food security:** The development strategy seeks to protect the best agricultural land for food production by selecting sites that avoid this land for development and supporting the glasshouse food industry to assist in the secure supply of food (refer Site Selection Report, Arup 2016). This is demonstrated by the proposed allocations in Chapter 5 and Draft Policy E 3 Food Production and Glasshouses.

Monitoring the Plan

- 1.36 The Plan will be carefully monitored to assess the implementation of policy. The Draft Monitoring Framework is included in Appendix 3. This will be reviewed for the final publication plan and the contributions toward meeting the climate change challenge will be reported regularly.

Appendix 1

Synopsis of findings Carbon Reduction and Renewable Energy Assessment Atkins 2013

- 1.1 The Carbon Reduction and Renewable Energy Assessment, Atkins, May 2013 identified that, among other findings, domestic properties in the District make up the biggest proportion of carbon emissions at 42.7% in 2010 (with industry and commerce at 31.3% and road transport at 26% (excluding emissions from motorway traffic)). Therefore, actions to reduce carbon emissions from existing and new homes will be crucial to the District achieving carbon reductions over the plan period.
- 1.2 The study concluded that whilst there is sufficient wind and solar resource in the District, there is little potential for large scale renewable energy technologies due to the 'landscape and policy' constraints (although single wind turbines may be acceptable), potential for biomass is considered limited due to insufficient amounts of unmanaged woodland within the area, and potential for CHP is limited due to a lack of 'anchor' tenants with high heat demand. The exception is seen as glasshouses but this is deemed to be dependent on the price of gas. As a result the study does not recommend a percentage target for carbon emissions savings for large scale renewables.
- 1.3 With respect to carbon reduction in new residential development the study used the Code for Sustainable Homes and or low carbon technologies to achieve the standard, and tested viability of development against the cost of complying with the whole of the code (not just the mandatory requirements). Six case studies were appraised from 2-15 units to 500+ residential units, including other policy requirements such as affordable housing, planning obligations and density and how this would impact on the ability to comply with CSH and deliver renewable/ low carbon energy. Due to the 45% price variation across the housing market at the time Atkins divided the market into 'Hot, Moderate and Cold' markets. They found no Cold markets to be viable at any level of CSH at the time. Case studies in the Moderate and Hot markets were viable at level 4 CSH in 2013 and projected Level 5 for 2016. In the market at that time only Hot housing markets were able to achieve CSH level 5 and 40% affordable housing, whilst Moderate were able to achieve CSH level 4 and 40% affordable housing. In cold markets the 40% affordable housing provision impacted on viability when seeking to achieve CSH compliance. The case studies were tested for a selection of technologies at lowest cost and highest cost options. Whilst solar PV was the most expensive it was also the most effective in reducing carbon emissions.
- 1.4 The impact of development densities in achieving higher developer returns and carbon standards were similar for higher and lower density development but the study acknowledged that higher density schemes can be more efficient in supporting public transport and will have savings in carbon emissions as a result.
- 1.5 The study identified potential carbon savings from new build, retrofit of domestic buildings, transport emission reduction (including actions such as promotion of car clubs, support for

low carbon vehicles, mixed use development, modal shift to walking and cycling) to have the potential to reduce carbon emissions in the order of 10% on 2010 levels.

1.6 The policy recommendations made by the study were:

- Implement CSH for schemes over 15 units (where viable) and BREEAM standards for non-residential buildings over 1,000m²)
- Introduce a Green House Gas reduction target in line with the study findings - approx. 7% of 2010 emissions by 2033 could be achieved through new development, retrofit, and sustainable transport measure
- Introduction of renewable energy targets is not recommended given sustainable building standards include an element of renewable energy
- Energy hierarchy policy setting preference to use technologies at the top of the following hierarchy: non energy fabric provision (energy efficiency of the building), CHP, other low and zero carbon technology (e.g. PV, solar thermal), allowable solutions
- Decentralised energy networks and renewable energy schemes- policy that provide support where appropriate, criteria policy outlining considerations for schemes
- Carbon Budget Statement – policy that requires a statement for schemes over 15 residential units and 1000m² for other development
- Sustainable transport policy incorporating explicit reference to measures and opportunities to secure reductions in greenhouse gas emissions from the transport sector
- Identification of any infrastructure relating to allowable solutions off site.

1.7 In addition the monitoring and inclusion in the AMR of the following is recommended:

- Installed capacity of renewable energy infrastructure
- Annual electricity generation from renewable sources
- Annual heat generated from renewable sources and
- Carbon dioxide emissions in the district.

1.8 The study recommends the use of an Energy Services Company model (ESCO) and Contract Energy Management Company (CEM) as possible tools to deliver sustainable energy in large urban extensions over the plan period. This is linked to Green Deal and is likely to need reconsideration as the funding landscape has changed.