

LOCAL PLAN REGULATION 18: “ A Climate Change-led Plan”

ADDRESSING THE CLIMATE CHANGE CHALLENGE

1.0 INTRODUCTION AND POLICIES

1.1 ‘Climate Change’ is one of the most pressing issues facing humanity in the 21st century. Widely known is the imperative to limit global temperature rise to well below 2°C and preferably 1.5°C above pre-industrial levels. The Climate Change Act (2008) legislated for an 80% reduction in greenhouse gas emissions against 1990 levels by 2050 and then Parliament passed the Climate Change Act 2008 (2050 Target Amendment) Order 2019 in June 2019 committing the UK to reduce net emissions of greenhouse gases to zero by 2050. Climate change and its consequences, including local flooding, heatwaves and drought, are significant environmental challenges. Spatial planning has a vital role in moving to a climate-resilient and low carbon society and the Uttlesford Local Plan has a key role in building local resilience to the impacts of climatic changes for the built and natural environment.

1.2 The Local Plan and the local planning authority are cogs in the governance system that controls how we interact with the environment and on carbon emissions. The policies in this plan will allow for reductions in emissions to allow new development to assist the Country achieve its net zero carbon commitment. For the next iteration of the plan the Council will look at the potential for a local policy to achieve local reduction of emissions over plan period, taking into account UK commitment to net zero. This will set a relevant local target and monitoring framework.

1.3 The Local Plan is the focus for local decision making relating to development, with controls over several factors that impact the climate: the use of renewable energy and land used for its supply; building design; the location, landscaping and layout of new developments with influence on movement patterns; management of open space and biodiversity; access to employment and local services. In addition to the requirement for an Environmental Impact Assessment, the Local Plan brings forward several controls that have major impact on the ability to affect carbon and greenhouse gas emission, such as Health Impact Assessment, Energy Statements, Climate Sustainability Statement, masterplans, and Travel Plans.

1.4 With the implementation of net zero carbon policies, it is Transport emissions that are the largest factor. These impacts are strongly affected by where and what development takes place. Hence the Spatial Strategy that is worst for carbon emissions is the one that encourages most car-borne transport and sees excessive growth in rural areas without an emphasis on access to services and investment in public and active transport. Better Spatial Strategy approaches create opportunities to

reduce emissions through the potential to internalise trips by the co-location of services, employment, amenity and cultural facilities in designs for walkable, well-connected neighbourhoods. The Transport and Movement Chapter includes robust policies that seek to plan for modal shift to walking, cycling and public transport and provide opportunities for people to reduce their car use.

1.5 Beyond the Spatial Strategy, for new buildings themselves, the application of a suite of net zero policies can reduce their operational and embodied carbon and water efficiencies significantly. There is also the opportunity for net zero policies relating to the energy efficiency of the building fabric, sustainable construction, renewable energy generation, and sustainable transport. Critically they are complemented by policies for the natural environment: its protection, enhancement, management and role in biodiversity and greenhouse gas emissions, and as a location for carbon offset schemes. Quality of life and well-being underlie these aims, affected by the ‘beauty’ in designed places that the National Planning Policy Framework requires of our Local Plan.

1.6 The climate change policies will contribute to delivering the council’s Climate Emergency and Action Plan to reduce carbon emissions across the district and from the Council’s assets and estate. The focus of the Action Plan is to work with existing organisations on a wide-ranging retrofit programme, reducing energy consumption from the existing built environment. The planning process will ensure energy retrofit policy is implicit for conversion of existing buildings and heritage assets.

1.7 The most important influences planning can have on climate change and energy are in relation to the location of development through the spatial strategy, site allocations, and to provide the framework to embed climate and energy in and across development decision making. The Local Plan policy approach to climate change is through policies that focus on mitigation, adaptation, resilience, or preparedness recognising that as technology advances, and our own behaviours change, the Plan must have an inbuilt flexibility to maintain its soundness and applicability over the twenty-year plan period.

The overall ambitious aim is to ensure that growth and accessibility in the District is as sustainable as possible, to reduce emissions from Council assets and new build to net zero by 2030, and to embrace water resourcing, renewable energy public health, rural resilience and green infrastructure working towards carbon neutrality by 2050.

Climate Change Principles

1.8 New development will be sustainable and natural, historic and cultural assets will be managed wisely for future generations to:

- ❖ Contribute to minimising greenhouse gas emissions in accordance with resource efficiency, energy and waste hierarchies and ensuring minimisation of waste, reduction in embodied carbon and the prioritisation of and encouragement to community and renewable energy;
- ❖ Mitigate against and improve resilience to the effects of climate change;
- ❖ Contribute positively to the health, wellbeing and resilience of communities;
- ❖ Use and reuse land efficiently and minimise impact of development on soils through over compaction, pollution or reduction in the quality in order to conserve the capacity of soils for sustainable production of food and for the natural environment;
- ❖ Protect and enhance the water resources, rivers and chalk streams in the District in order to maintain unique chalk and riverine ecosystems and optimise circumstances for ecology and biodiversity net gain;
- ❖ Enhance the environment, minimise pollution, protect irreplaceable habitats, especially around the chalk streams, strengthening nature recovery networks, embracing multi-functional green infrastructure and ensuring a net gain for biodiversity, and carbon storage in our natural environment;
- ❖ Maximise the ability to make trips by public transport and active modes of transport in and between all developments through careful design and mix of uses including employment that support walking and cycling; and
- ❖ Conserve and enhance our historic environment, heritage and cultural activity.

1.9 The Climate Change principles translate into policies and place responsibility on developers as major players and the Council as a major decision taker by considering:

- Climate Change mitigation measures by:
 - designing new communities and buildings to be energy and resource efficient
 - incorporating renewable technologies
 - reducing existing and potential source of pollution
 - reducing transport related carbon emissions through the promotion of sustainable modes of transport and active modes of travel
- climate change adaptation measures by:
 - buildings, infrastructure and construction techniques that are designed to adapt to a changing climate
 - safe and secure environment which is resilient against the impacts of climate change stresses and extreme weather events
 - enhancing biodiversity and ecological resilience and net gain
- efficient resource management measures regarding:
 - land allocations, density of development, how buildings are designed and used, construction process

- resource consumption - water, energy, construction materials - during construction, operation and whole life carbon impact

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POLICIES ADDRESSING CLIMATE CHANGE

A Strategic Approach to Climate Change

The ethos of the preferred option for the Spatial Strategy recognises that the strongest influence on carbon emissions is travel behaviour and that this is determined by the location and co-location of land uses, building and facilities. It follows that with appropriately located development, the integration of infrastructure and services is key to support low carbon behaviour, the quality of human life and the environment. Buildings, surface transport and waste are sectors where local policy will work towards delivering emission reduction initiatives. Buildings will be required to reduce energy demand through 'fabric first' with integrated renewables or efficient heat networks. Low carbon transport will be supported by the provision of electric vehicle charging infrastructure and proposals to facilitate active transport.

In June 2022, the 2021 update to the Building Regulations Parts F and L becomes operational. *This is intended to deliver a 31% saving in carbon emissions in new residential development.* Meeting the 2021 Building Regulations can be achieved with various fabric measures. In 2025, new dwellings are to achieve a 75% to 80% reduction in CO₂ emissions. Thereafter, the government is relying on grid decarbonisation to achieve net zero in all new homes by 2050 though another update to the Building Regulations is anticipated. Nevertheless, legislation is already in place as well as the Planning and Energy Act 2008 that gives local authorities powers to adopt policies to reduce carbon emissions that are more rigorous than the government policy (including the Building Regulations).

As the Local Plan moves through its planning stages to Adoption in 2024 the rise in building standards around resource efficiency, the integrity of the natural world and its resources and the critical relationship between these factors and in creating healthy high-quality places is inescapable. It makes sense to impose, and to encourage the development sector to implement, the highest possible standards. The proposed SPD on Climate Change will underline this role. To be ready, poised, able to advance and exploit green skills and the supply chain will give a commercial advantage but more poignant is the strong role the development process will play to mitigate against climate catastrophe. The viability models must embed these principles as baseline prerequisites unless it can clearly be demonstrated how not absorbing them can achieve the same environmental outcomes. These are the goals that Uttlesford District Council, the Government, together with the growing majority of businesses and our local communities are focused.

The climate-related priorities for the Local Plan that underly the Strategy are summarised in Table 3 below.

Table 3: Local Plan Climate Change Policy Objectives

The overarching objective is to achieve carbon neutrality and climate resilience. We are working towards a net zero carbon authority area by 2050, recognising the role of planning in this by seeking to achieve net zero carbon in all new builds and Council Assets by 2030.

Topic	Key Strategic Priorities
Preferred Spatial Strategy	<p>Reduce need for and number of car-based travel</p> <p>Concentrate development, co-locate facilities and minimise need to travel</p> <p>Include access to and provision of employment opportunities in new schemes</p> <p>Maximise access to public transport and active travel</p> <p>Optimise access and provision of natural green space and climate mitigation measures</p>
Strategic Carbon Reduction	<p>Climate Sustainability Statements</p> <p>Reduce carbon impact, monitor, demonstrator projects</p>
Transport Policies	<p>Increase opportunities for walking and cycling</p> <p>Enhance public transport and progress the rapid bus transit proposals</p> <p>Enhance network for electric vehicle charging</p> <p>Install fastest highest capacity digital infrastructure to reduce travel</p> <p>All road improvements to include active travel, biodiversity, and air quality features</p>
Renewable Energy	<p>Renewable Energy networks or technologies in buildings and development schemes</p>
Water Stress and Drainage	<p>Reduce consumption per new building to maximum 110 litre per person per dwelling</p> <p>Re-use, rainwater, grey water systems</p>
Energy Use in Buildings	<p>Energy Statement</p> <p>Fabric First approach in new buildings and then energy efficiencies and PassivHaus</p> <p>Monitor energy performance</p> <p>Developers to install show home demonstrators with highest standards possible of resource conservation, and how to achieve net zero carbon</p>
Natural Environment and Biodiversity	<p>Protect air quality and water quality and ecology</p> <p>Tree and hedgerow planting</p> <p>Biodiversity enhancement</p> <p>New and improved enhanced access to public green space, allotments, parks, footpath connectivity</p>

Adaptive responses and resilience	<p>Drought mitigation and protection of chalk streams</p> <p>Limited new build from areas subject to localised flooding and protection of those areas</p> <p>Use of Sustainable Drainage Systems (SuDS)</p> <p>Maintain access to energy supplies high grid capacity, storage and measures</p> <p>Encourage renewable energy technologies</p> <p>Encourage businesses to retrofit buildings in conversion proposals and new buildings to highest standards, to protect employee well being</p> <p>Healthy access to open space with trees for cooling and sequestration</p> <p>Design of new development to encourage co-location and walkability</p>
Infrastructure	Support community energy networks
Decision making and behaviours	<p>Encourage waste recycling</p> <p>Re-use construction materials</p> <p>Collaboration with developers and engage in early sustainability assessments</p>

Developers will be required to submit technical reports to justify larger schemes in consultation and agreement with the Council and the Council may call on specialists from the County's Climate Action Team or outside sources, as necessary. These reports will cover, as appropriate to the scheme:

- Climate Change Sustainability Statement setting out the overall approach and how carbon emissions and the use of natural resources particularly water are minimised
- Transport reports including assessments, strategies, and travel plans
- Energy Statement setting out how performance targets are to be met and monitored
- Site Visions, development concepts, masterplans, site infrastructure delivery plans
- Detailed reference to the Council's District-wide Design Code that will be available from mid-2023 with illustrations as to how it has been applied to the site
- Green and Blue Infrastructure Strategy and environmental net gain.
- Proposals for carbon sequester and if off setting with biodiversity net gain off site is required

STRATEGIC POLICY CC1– ADDRESSING THE CLIMATE CHANGE CHALLENGE

The local plan's spatial strategy, allocations and policies and the associated infrastructure investment aim to mitigate and adapt to climate change as the key priority.

Climate change will be the primary consideration (subject to relevant legal considerations) when deciding planning applications which will be expected to contribute to the target of a carbon net zero Uttlesford by 2050. Development which accords with the local plan will be approved provided that it demonstrably supports an overall reduction in greenhouse gas emissions as follows:

- i. Locating development to reduce the need to travel by clustering trip origins and destinations where possible;
- ii. Providing high quality travel infrastructure to support the sustainable travel hierarchy as an integral element of new development;
- iii. Proportionate coordination and masterplanning of new development areas;
- iv. Minimising energy use by embedding the highest standards of energy efficient design in new developments and supporting retrofit of existing buildings/conversions;
- v. Accelerating the expansion of renewable and low carbon energy generation within the district;
- vi. Incorporating or providing schemes to offset any remaining carbon emissions from new development;
- vii. Promoting the efficient use of natural resources such as water;
- viii. Ensuring that new developments are provided with necessary recycling and waste disposal infrastructure;
- ix. Taking account of likely future climate change in the assessment of flood risk;
- x. Ensuring that design layout, green and blue infrastructure, (including sustainable drainage schemes) and tree planting provide opportunities for building and urban cooling; and
- xi. Ensuring that planning applications are accompanied by proportionate evidence and information to assess their energy, sustainability and climate change impacts.

Sustainable Development Accreditation Scheme'

The Council is considering a voluntary accreditation scheme to promote developments that choose to go beyond Building Regulations. We are seeking views on this in principle as part of the Regulation 18 consultation. The (energy) standards that would underpin a scheme would cover a range of areas:

Fabric Energy Efficiency

Carbon Emissions
 Energy Use Intensity (regulated and unregulated)
 Renewable/Low Carbon Energy
 Future proofing (Introducing flexibility, lowering peak energy demand, and creating an integrated energy management system)
 Smart Controls and monitoring performance
 Construction Quality

Climate Change Sustainability Statement (CCSS)

In order to provide a Framework for the consideration of climate change in development submissions it is proposed to require an overarching statement that will be required for all sites over 0.5ha, 1,000m² non-residential floorspace or with ten dwellings or more. It should be considered as part of the Vision for the site and complements the Design and Access Statement. It will answer key question areas relating to how new development addresses climate change through positive steps and measures that reflect the commitment of the council and Government to climate change objectives and targets.

The areas which the CCSS would cover are:

1. What are the characteristics of the development which will contribute to climate adaptation and mitigation? To what extent will they address carbon reduction?
2. How will the development contribute to the importance of sustainable and accessible transport options within the wider district? To what extent will travel and accessibility proposals address carbon reduction?
3. How will the development incorporate renewable energy technology and where relevant a wider energy network?
4. How will the development integrate high quality design incorporating the requirements of the (emerging) District's Design Code with more functional requirements relating to water and energy conservation and the move towards being carbon neutral? This should cover how sustainable design and construction techniques will be incorporated.
5. How will the development help to advance green and blue infrastructure strategy principles including the County's Nature Recovery Network, protect and enhance the natural environment and the chalk stream zones, provide suitable tree planting, achieve biodiversity net gain, and where relevant secure long term management funding and enablement?
6. How will the development support health and wellbeing including local employment and access to services in general in the District, and engage with the local community?

STRATEGIC POLICY CC2: CLIMATE CHANGE SUSTAINABILITY STATEMENT (CCSS)

For sites over 0.5 ha, for at least ten dwellings or for 1,000m² of non-residential floorspace the developer must submit a *Climate Change Sustainability Statement* (CCSS) setting out the overall approach to addressing climate change issues and how carbon emissions and use of natural resources including water are treated as efficiently as possible and minimised. The Climate Change Sustainability Statement will address the areas set out in the paragraph above (5.6) as well as the general principles of sustainability in Table 7, namely

- Climate change adaptation and mitigation
- Carbon footprint and energy reduction
- Water Management
- Sustainable Construction and Waste management
- Use of resources

Moreover, the CCSS will support the application should address more widely how the proposals meet all other policies relating to sustainability throughout the plan, including:

- biodiversity and ecology;
- design and construction issues
- land, water, noise, and air pollution;
- transport, mobility, and access;
- health and well-being, including provision of open space;
- culture, heritage, and the quality of built form, including efficient use of land.

Table 7 Areas to be covered in the Climate Change Sustainability Statement

Issue And Objective	Recommended Approach with Early Discussion With LPA
Climate change adaptation	
All developments should be designed to be adaptable to our changing climate in building design and landscape setting	See <i>Town and Country Planning Association's Climate Change Adaptation by Design: a Guide for Sustainable Communities (2007)</i> for adaptations at different scales. Adaptation measures can be integrated into the design of new developments and can have benefits beyond site boundaries e.g., angled facade to increase solar gain in winter, external shutters, tree canopy for shade and evaporative cooling, building overhang for shade, high performance thermal envelope.
Carbon reduction	

Issue And Objective	Recommended Approach with Early Discussion With LPA
All development should be designed to minimise carbon and other greenhouse gas emissions associated with new development	<p>Application of the energy hierarchy to reduce the need; use energy more efficiently; supply energy from renewable sources by:</p> <ul style="list-style-type: none"> • minimising the energy demand of new buildings; • utilising energy efficient supply through low carbon technologies; • supplying energy from new, renewable energy sources. <p>Consider role of masterplanning, scale, layout, building orientation and massing of developments; seek to reduce transport-related carbon emissions through location and the promotion of sustainable modes of transport.</p>
Water Management	
To introduce high levels of water efficiency in new developments in order to respond to water stress especially as it affects chalk streams	All new developments to optimise efficient water use, reuse and recycling, including integrated water management and water conservation; BREEAM standards for non-residential development; Green roof to slow down run-off.
Site waste management	
All new development should be designed to reduce construction waste, maximise recycling opportunities and reduce waste to landfill.	Developments should be designed to reduce construction waste, and maximise reuse and recycling of materials, increase internal and external storage capacity for waste as an integral design element. The Council is supportive of innovative approaches to waste management
Use of resources	
All new developments should be designed to maximise resource efficiency and to use environmentally and socially responsible materials	<p>Four considerations:</p> <ul style="list-style-type: none"> (i) Responsible sourcing – sourcing materials from known legal and certified sources through environmental management systems and custody schemes e.g., sourcing timber accredited by the Forestry Stewardship Council (FSC), or the Programme for the Endorsement of Forest Certification (PEFC) (ii) Secondary materials – reclaiming and reusing material from the demolition of existing buildings and site preparation (iii) Embodied impact of materials – have regard to BRE green Guide to specification (iv) Healthy materials - developers should specify materials with a lower risk to the health of construction workers and occupants such materials with zero or low volatile organic compound (VOC) levels.

ENERGY EFFICIENT BUILDINGS

The key requirements for a carbon net zero dwelling are:

- Ultra-low space heating demand;
- Low total energy use with efficient heating and hot water system and low energy lighting;
- No fossil fuels and low carbon heat using a low carbon heating system (e.g. heat pump), and renewable energy generation;
- Energy flexibility with reduced peak demand and ability to use energy when clean energy is available;
- Reduced performance gap - carbon net zero needs to be delivered after construction and in operation with long term durability, repair and re-usability of the building fabric, embodied and whole life carbon considerations.

For new building, the three elements are:

- i) Carbon used in the building's product and construction stages (including embodied carbon)
- ii) Operational carbon – carbon emissions associated with the building's operational energy
- iii) Whole life carbon - the carbon emissions associated with the construction, use and disposal of a building.

The Net-Zero Carbon development removes as much carbon as it emits, achieved through a combination of on-site measures and offsets/off-site measures. Operational energy is a measure of how much energy a development takes from the National Grid, calculated from the energy required to heat and light the building (regulated energy) plus the energy required to run the appliances (unregulated energy), *minus the amount of onsite renewable energy*. Net zero operational energy is achieved therefore when the amount of carbon emissions associated with the building's operational energy on an annual basis is zero or negative.



Figure 1: The component elements of achieving a net zero carbon new home
(Credit: LETI)

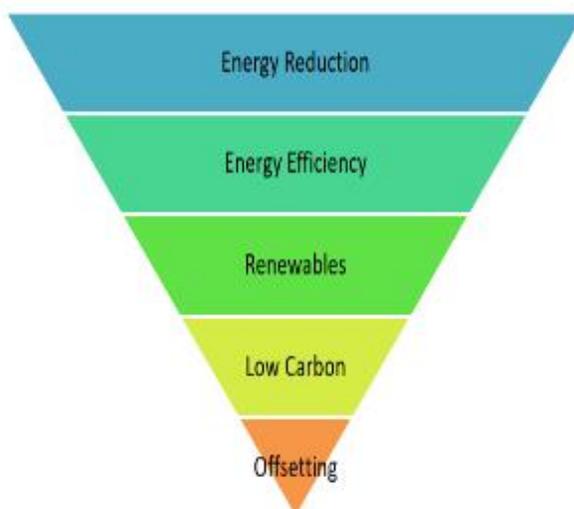
Whole life embodied carbon is when the amount of carbon emissions associated with a building's embodied and operational impacts over the life of the building, including its disposal, are zero or negative. Embodied carbon is the carbon associated with both building materials and the construction and maintenance of a building throughout its whole lifecycle. Most embodied carbon emissions occur near the start of a building project which fits with the planning system and developers are encouraged to show in the Energy Statement what actions are being taken to reduce embodied carbon and maximise opportunities for reuse: the 'circular economy'. This is appropriate for developments of ten or more dwellings or 1000 square metres of floor space. Smaller scale developments are encouraged to do so, although the need for an Energy Statement is not required.

The Energy Statement will address energy efficiency, embodied carbon, renewable energy generation, and have regard to the energy hierarchy. It will cover;

- space heating standards in homes and non-residential buildings¹
- new homes and non- domestic buildings to use heat pumps with no gas boilers
- wherever possible on-site renewable energy generation is to be used, including solar/PV
- addressing the Energy Performance gap between design specification and operation
- the minimisation of overheating risks
- appropriate measures for post occupancy evaluation

¹ 15 kWh/sqm is recommended in the *Greater Cambridge Local Plan - Strategic spatial options appraisal: implications for carbon emissions*, November 2020

The Energy Hierarchy



Fabric First

The focus of planning policy and design guidance on the reduction on energy consumption through the built fabric, orientation, and shading is the 'Fabric First' approach. It can extend to Passivhaus standards with high levels of energy efficiency. Fabric First approach means that with a higher fabric energy efficiency standard, buildings will not need to be retrofitted when more demanding regulations are introduced². It will safeguard against heat decarbonisation technologies because they need highly insulated and draught-proofed buildings to operate efficiently.

POLICY CC3: MINIMISING GREENHOUSE GAS EMISSIONS

Applicants will minimise greenhouse gas emissions and aim for all new developments to be net zero carbon. Proposals will be assessed using the 'energy hierarchy' which orders how energy issues should be addressed:

- i. BE LEAN - minimise operational energy use by using sustainable design and construction measures including the Fabric First approach
- ii. BE CLEAN - utilise any available local energy resources and supply energy efficiently and cleanly giving priority to decentralised energy supply and LOW energy solutions
- iii. BE GREEN - maximise opportunities for renewable energy by producing, storing and using renewable energy on-site

² For example were the Government to proceed with the Climate Change Committee's recent proposal that from 2028 no home should be able to be sold unless it reaches EPC Band C

In order to minimise any energy performance gap between design and construction developers should demonstrate that thermal bridging is minimised (Policy CC8).

Developers are encouraged to incorporate, heat and/or cooling mechanisms, especially where these utilise renewable energy and maximise opportunities to connect to wider heat and cooling networks where these utilise renewable energy.

Developers should ensure that new non-residential development of 1,000m² or more floorspace or with a gross site area of 1ha or more should aim to achieve the highest possible BREEAM rating for the scheme being Excellent or Very Good.

POLICY CC4: THE ENERGY STATEMENT

Developers should provide an Energy Statement for proposals 10 dwellings or over or 1000 m² non-residential floorspace, to demonstrate they have applied the Energy Hierarchy, as set out in Policy CC5. The Energy Statement should include evidence to cover:

- i. An assessment of the energy demand and carbon dioxide emissions for the proposed buildings carried out by a qualified energy assessor, including embodied carbon.
- ii. Design optimisation to consider solar gain, glazing proportions and external shading to demonstrate overheating and cooling have been addressed.
- iii. Optimisation of solar gain, glazing proportions and external shading to demonstrate overheating and cooling have been addressed.
- iv. Identification of any performance gap between design, construction, and operation and how this will be remedied including how the energy and carbon performance of the development will be monitored for five years following occupation in accordance with Policy CC8.
- v. The building fabric performance has been designed and specified to minimise energy loss.
- vi. How the scheme has incorporated renewable energy sources.
- vii. An assessment of the operational standard arising from these measures including the carbon emissions and the provision of any monitoring controls to ensure that performance standard can be maintained.

For extensions or alteration to an existing building, the applicant should show how opportunity is being taken to increase fabric energy efficiency, reduce carbon emissions or apply on-site renewable energy technology in accordance with the scale of the building alteration.

Monitoring

Notwithstanding good intentions of the development industry, standards and planning policy, there is often a gap between the approved design, building specification, as built construction and final energy performance, giving the difference between anticipated and actual as the 'performance gap'. The Climate Change Committee's 2019 report on '*UK housing – fit for the future?*' covers closing the 'performance gap' between how homes are designed and how they perform and recommends the enforcement of standards, monitoring and certification. The planning system can assist in requiring a commitment to focus on the 'as-built' performance and impose the monitoring required in the following policy.

POLICY CC5: MONITORING BUILDING PERFORMANCE

Developers will demonstrate that they are acting to minimise the potential performance gap between design aspiration and the completed development. The effectiveness of measures will be reviewed and ratified as part of the post-completion discharge of conditions. At submission, a risk assessment should be provided for areas that might contribute to the gap between designation and construction/post occupancy. The methodology should be included in the Energy Statement.

For developments of 50 units or sites of 1ha or more, applicants should prepare a monitoring framework that they will operate, maintain and report to the Local Planning Authority to allow the assessment of energy and water use including renewable or low carbon technology, indoor air quality and overheating risk and a plan to deal with any significant gap that is detected.

The Monitoring Framework will set out which features will be monitored, how and frequency, and any mitigation so arising over a minimum of a five-year period. This should apply to not less than 20% of the dwellings (with a proportionate mix between dwelling types) and floor area on non-residential buildings and ensure that the information recovered is provided to the applicable owners, building management company and the planning authority.

The cost of monitoring if not undertaken directly by the developer should be paid for by the developer through the Section 106 Agreement.

CARBON REDUCTION, DECENTRALISED AND RENEWABLE ENERGY

There are several ways to achieve carbon reduction:

- Lowering overall demand
- Increasing on-site generation and efficient systems
- Utilising renewable energy off-site generation such as solar farms
- Design layout through a Master Plan using density and orientation

- Higher building energy efficiency to reduce building operational demand
- Match building performance closely with design standards
- Lowering embodied carbon in buildings and infrastructure

The NPPF encourages the increased use of renewable energy, useable energy generated from renewable resources which are naturally replenished on a human timescale, commonly sunlight, wind, rain, tides, waves, and geothermal heat. Diversity in the nation's energy supply and the role of renewable and low carbon energy are increasingly national imperatives. In Uttlesford larger scale renewable energy is likely to be focussed on solar, potentially wind, and domestic measures such as heat pumps.

Nationally the UK Climate Change Committee has stated that in order to achieve carbon objectives we need at least a fourfold increase in renewable generation deployment by 2050, at all scales from domestic rooftop solar to large solar and wind farms. In Essex the ECAC recommendations for renewable energy are:

1. For Essex to generate 100% of its energy needs from renewable energy in County by 2040;
2. To create a network of community energy neighbourhoods to generate, store and share energy locally by 2035; and
3. To make Essex a centre of innovation for renewable energy innovation.

ECAC's 'Everyone's Essex' programme is to "work across the Authority and the County to hit our net zero targets, by ensuring that the Authority significantly reduces its own carbon footprint whilst also supporting an acceleration in the progress towards sustainable...energy", enshrined in December 2021, in the Renewable Electricity Policy committing the authority to sourcing 100% renewable.

Increasing use of electricity generated from renewable sources underpins the shift away from fossil fuels. Currently the UK uses approximately three times more energy than the electricity grid can produce with the balance being met by fossil fuels. The National Grid is however confident that using smart technology and shifting peak loads around the system there is capacity to supply national transport needs and that this increase can be provided by wind and solar power. ZebraCarbon has worked with UKPN to get as best an estimate of demand as possible for the quantum, typology, and location of the Local Plan's housing on which to base the projection of network utilisation, including electrification of heat, potential domestic electric vehicle charging, and demand from development.

In mid-2021 the renewable generation capacity in Uttlesford was 43.6 MW (electricity) from solar PV farms and an aerobic digester. The *Renewable Energy Study (2022)* states that permitting significant amounts of renewable energy is likely to be the key affordable approach to reducing Uttlesford's carbon footprint, although any

improvements to the climate impact of new energy will not reduce the emissions from existing homes, industry, and travel within the district.

The projected energy use for the end of the Plan period for Uttlesford from a base of 1,275.3 GWh has been projected for two scenarios, based on the assumptions that new dwellings will increase by 14,000 from 38,000 to 52,000 and the average floor area for a new dwelling is estimated at 93 sq m³

- Scenario A – all new dwellings and non-domestic buildings built to prevailing Building Regulations standards. This means 190.1 and 76.9 (GWh/year) respectively
- Scenario B – all new dwellings and non-domestic buildings (employment sites) built to the PassivHaus standard. This means 74.6 and 18.1 (GWh/year) respectively.

The report confirms that a significant expansion of solar energy in the form of large-scale solar farms is the most cost effective and land-efficient form of renewable energy available. Larger development will be required to provide a minimum of 10% of the predicted energy needs from renewable energy. Any shortfall would be met through funds allocated to off-site energy efficiency (Proposed Carbon Offset Fund) and energy generation initiatives or other measures required to offset the environmental impact such as natural environment gains.

In Uttlesford, to provide all energy needs in 2040 by renewables, theoretically, there would be a need for 1,654 ha of solar farms which amounts to 3% of the land in current agricultural use, along with public buildings and car park roofs, lamp posts, village hall roofs etc. By comparison, 14,094ha of agricultural land, 8.5 times as much, would be needed to generate the same renewable energy using 64 wind turbines at 4.5MW each. This is clearly not necessary, as the district already 'imports' energy from offshore windfarms and other sustainable energy sources. However, if the district wants to 'do its bit' to meet energy needs from sustainable sources, then solar farms are one of the most efficient ways of doing that.

³ This is assumes new dwellings will be constructed to high standard energy performance i.e. PassivHaus with space heating energy use of 15 kWh/m² /year and primary energy use of 120 kWh/m² /year, total energy use of 48 kWh/m² /year. The electricity used is based on median use of electricity in Uttlesford dwellings in 2019 on the gas grid and use gas for space heating and electricity for lighting and appliances. The value used is 3,700 kWh per year; Electric vehicle (EV) charging point for each dwelling gives an allowance of 2,467 kWh per year based upon typical annual mileage of 7,400 miles and 3 miles per kWh, applied to 75% of new dwellings ; for new non-domestic energy a target energy use of 55 kWh/m²/year follows the Royal Institute of British Architects (RIBA) Climate Challenge 2030 and *Uttlesford Employment Needs & Economic Development Evidence (November 2021)* predicting 69,700m² new development (offices, research and development, industrial classes, and storage/distribution); proposed developments at Stansted Northside and Chesterford Park totalling 195,000 m² and 65,000m² respectively

	Comparison (2019 energy data)	Local Plan 2040
Scenario	Supplying Uttlesford 2019 electricity use from renewable energy generation in the district	Supplying total projected Uttlesford energy demand from renewable energy generation in the district (assuming heat provision migrated to heat pumps)
	805 hectares of solar farms (2% of agricultural land - could be co-used for grazing and/or biodiversity enhancement)	1,654 hectares of solar farms (3% of agricultural land - could be co-used for grazing and/or biodiversity enhancement)
OR		
	31 x 4.5 MW wind turbines requiring 6,875 hectares (16% of available agricultural land - could be co-used for arable farming)	64 x 4.5 MW wind turbines requiring 14,094 hectares (27% of agricultural land - could be co-used for arable farming)

Table 5 - Projected impact of renewable energy strategy

Decentralised Energy

Decentralised energy is generated off the main grid, including micro-renewables, heating and cooling, combined heat and power, district heating and solar energy. It uses renewable, carbon-neutral and low-carbon sources of fuel and allows local control of electricity generation whilst reducing demand on the grid. Major developments should match their total annual energy demand through a combination of renewable generation capacity, energy storage and smart controls, along with flexibility with building orientation, spatial requirements, and roof pitch.

POLICY CC6: RENEWABLE AND DECENTRALISED ENERGY

New development is expected to be energy efficient in terms of its building fabric and use of at least 10% of operational energy from on-site renewables, in compliance with the Government's Clean Growth Strategy providing on-site renewable generation, including installed solar and ground source heat generation of electricity and heat.

Significant weight will be given to community-led energy schemes where support can be demonstrated and administrative structures are in place to ensure communities will benefit. Proposals providing decentralised, low carbon and, renewable energy initiatives will be supported. Schemes should not result in significant harm, including cumulative impacts, on:

- biodiversity, air and water quality

- visual impacts on landscapes, cultural and heritage assets
- the historic and cultural environment assets and their settings
- the Green Belt and the Countryside Protection Zone
- aviation activities and transport safety
- local community sensitivities, public health and amenity

For major development the performance, delivery, maintenance, and in-use assessment of renewable energy generation will be demonstrated through the Climate Change Sustainability and Energy statements as set out in Policy CC2 proposals for non-residential buildings. Proposals should ensure that roof design is structurally sound for and incorporates solar PV installation.

For standalone and large-scale renewable energy installations:

- i. Significant weight will be given to community led energy schemes where support is demonstrated, and administrative structures are in place to ensure communities will benefit from the project
- ii. Proposals must provide security as to how and when the site will be restored to its previous state when energy production or equipment lifetime ends or when preferable alternative technologies are introduced
- iii. Ground mounted solar energy development proposals will not be supported on productive agricultural land unless exceptionally justified and will be expected to deliver biodiversity net gain
- iv. Domestic and small-scale renewable energy installations will be supported in principle including for commercial and agricultural buildings

SUSTAINABLE CONSTRUCTION and WASTE–

Construction accounts for significant carbon emissions. Buildings that minimise embodied carbon, prioritises fabric first and reduces operational carbon to minimise the impact of new homes on the environment and achieve Net Zero Carbon are strongly encouraged. Designs should be adaptable to be Net Zero Carbon-ready. In terms of protecting natural resources overall development on previously developed land will be prioritised and this will be the case in supporting rural diversification schemes. The loss of productive agricultural land should be avoided.

Proposals for the construction of new buildings and the redevelopment and refurbishment of existing buildings need to be designed to minimise energy consumption. This requirement prioritises ‘passive’ solutions such as high standards of insulation, airtightness, and orientation. As emphasised in the previous section, new development should also be designed to facilitate the incorporation of renewable or low carbon technologies to accommodate changing standards and to respond to climate change in the future.

Sustainable design and construction issues should therefore take place at the earliest stage in the development process. Developers should consider sustainable construction issues in pre-application discussions with the Local Planning Authority and capture this in the Climate Sustainability Statement. Although the choice of sustainability measures varies from development to development the general principles of sustainable design and construction apply to all scales and types of development. Housing developers are encouraged to register for assessment under the Home Quality Mark which will show how resource efficiencies and climate change adaptation measures will be incorporated through layout of the proposed development, orientation, massing, landscaping and building materials.

Overheating

With around 2,000 heat-related deaths each year in the UK and summer temperatures in southern England predicted to rise by 4 degrees by 2080⁴, the Climate Change Act (2008) and the NPPF (2021, paragraph 153) require planning to take a proactive approach to mitigating and adapting to the risk of overheating and high temperatures in homes. High indoor temperatures can be exacerbated by building design such as glazing and increased air tightness but can be mitigated, for example, by solar shading, building orientation, solar-controlled glazing, living walls, green roofs, and landscape schemes integrating multi-functional green and blue infrastructure. Designers should refer to most up to date guidance and best practice examples such as provided by the Chartered Institution of Building Services Engineers (CIBSE).

New development should follow the cooling hierarchy and an early screening assessment of the risk of overheating using BRE's temperature reporting tool in their Home Quality Mark or the PassivHaus Planning Package would frontload consideration of overheating. The Cooling Hierarchy⁵ is:

- i. Passive design to minimise unwanted heat gain and manage heat e.g. by using building orientation, shading, a well-insulated and air tight building envelope, high levels of thermal mass and energy efficient lighting and equipment.
- ii. Passive/natural cooling using outside air to ventilate and cool without the use of a powered system e.g. by maximising cross ventilation, passive stack ventilation, night-time cooling and/or ground coupled passive cooling.
- iii. Mixed mode cooling with local mechanical ventilation/cooling to supplement the above measures using low energy mechanical cooling like a fan
- iv. Full building mechanical ventilation/cooling system using low energy mechanical cooling, and lastly air conditioning

⁴ UK Climate Impacts Programme, www.ukcip.org.uk/

⁵ For application see the London Borough of Islington's Low Energy Cooling Good Practice Guide no. 5,

POLICY CC7: SUSTAINABLE CONSTRUCTION

Non-residential development will be required to achieve a certified 'Excellent' rating under the BREEAM New Construction (Non-Domestic Buildings) 2018 scheme, or other equivalent standards, or if this cannot be achieved; to justify the reasons and to confirm that 'Very Good' will be attained.

New buildings should be designed for flexible uses throughout their lifetime and be "ready" to adapt to new energy forms and building practices to work towards achieving net zero;

- i. New buildings should minimise embodied carbon and reference the BRE Green Guide. They should re-use aggregates of demolished material from the site, and other resources; and use sustainable materials from local suppliers where feasible, thus minimising waste arising from construction sites;
- ii. Developments should incorporate decentralised energy systems, using renewable and low carbon energy;
- iii. Sustainable Drainage Systems (SuDS) and flood resilient design must be included, where feasible;
- iv. Developers should demonstrate how sustainable waste practices in new and existing developments are promoted and implemented.

Developers should sign up to the *Considerate Contractors Scheme*, the national initiative that promotes safe and considerate building practices and neighbourliness, or similar. During construction, development is required to:

- minimise levels of noise, vibration, artificial light, odour, air quality, fumes, and dust pollution;
- consider the routing, timing, and frequency of heavy goods vehicle movements to reduce their impact on amenity and congestion;
- consider the cumulative environmental impacts of other major development and work to co-ordinate the plan of timings of works, deliveries, routes, and location of equipment to reduce the cumulative impacts.
- Ensure that all good quality topsoil and subsoil on the site is reused in green infrastructure and landscaping within the development scheme or in nearby land-based activities, or on sites allocated for carbon sequestration or carbon off setting.

In order to manage heat risk, all development proposals should maximise natural light and heating, and minimise internal heat gain and the risks of overheating through design, layout, building orientation, landscaping and use of appropriate materials. Proposals should minimise internal heat gain through energy efficient design and in accordance with the cooling hierarchy:

- i. reduce the amount of heat entering a building through orientation, shading, fenestration, insulation, green roofs and walls;

- ii. manage the heat within the building through exposed internal thermal mass and high ceilings;
- iii. provide passive ventilation;
- iv. provide mechanical ventilation;
- v. provide active cooling systems.

Construction Waste Management

Nationally we are committed to the position where no waste is sent to landfill and the waste hierarchy is followed by minimising the volume of waste generated, addressing waste as a resource to re-use or recycle, and disposal as the last option.

Developments therefore should be designed to reduce construction waste and maximise the reuse and recycling of materials. Schemes should be designed for future occupants to maximise recycling and reduce waste e.g. by waste storage capacity as an integral element of the design.

Developers should therefore practise:

- Responsible sourcing – sourcing materials from legal, certified sources through environmental management systems and custody schemes including the sourcing of timber accredited by the Forestry Stewardship Council (FSC), or the Programme for the Endorsement of Forest Certification (PEFC);
- Using secondary materials – reclaiming and reusing material arising from the demolition and site preparation
- Reduce embodied carbon impact of materials - to achieve an area-weighted rating of A or B as defined in the Building Research Establishment (BRE) Green Guide to Specification
- Use locally sourced materials
- Use healthy materials that represent a lower risk to the health of both construction workers and occupants e.g. materials with zero or low volatile organic compound (VOC) levels to provide a healthy environment for residents. This should be covered as appropriate in the Health Impact Assessment.
- Explore potential to produce energy from waste.

POLICY CC8: MANAGING WASTE

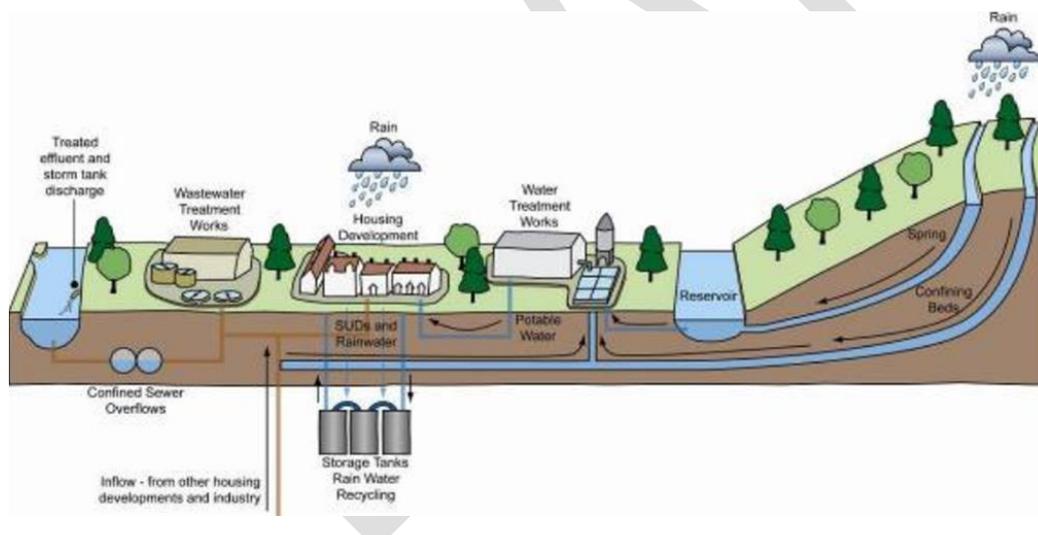
Development proposals should demonstrate how construction and disposal will maximise use of local supply chains in the sourcing / reuse / recycling of waste. On larger schemes where a Health Impact assessment is required this should address safe construction practices and the materials to be used.

Development proposals should integrate and facilitate domestic and business waste recycling facilities in the design of the scheme and buildings.

Proposed new energy recovery facilities are encouraged and should show how they make use of heat produced by the recovery process from agricultural biomass, as appropriate.

WATER EFFICIENCY, QUALITY AND MANAGEMENT OF FLOOD RISK

Climate change is placing pressure on water resources, increasing the potential for a supply-demand deficit, and for environmental damage from over abstraction of water resources. Hot and cold water and waste supply systems require high energy inputs; using water more efficiently therefore reduces energy use and carbon emissions but clearly new development requires the provision of clean water, safe disposal of wastewater and protection from flooding. The water cycle illustrated below shows how the natural and artificial processes interact to collect, store or transport water in the environment. Consultants JBA carried out the Uttlesford Water Cycle Study Phase 1 (WCS) in co-operation with the water companies, the Environment Agency (EA) and information from the neighbouring Local Planning Authorities; it has informed the policies in this chapter⁶.



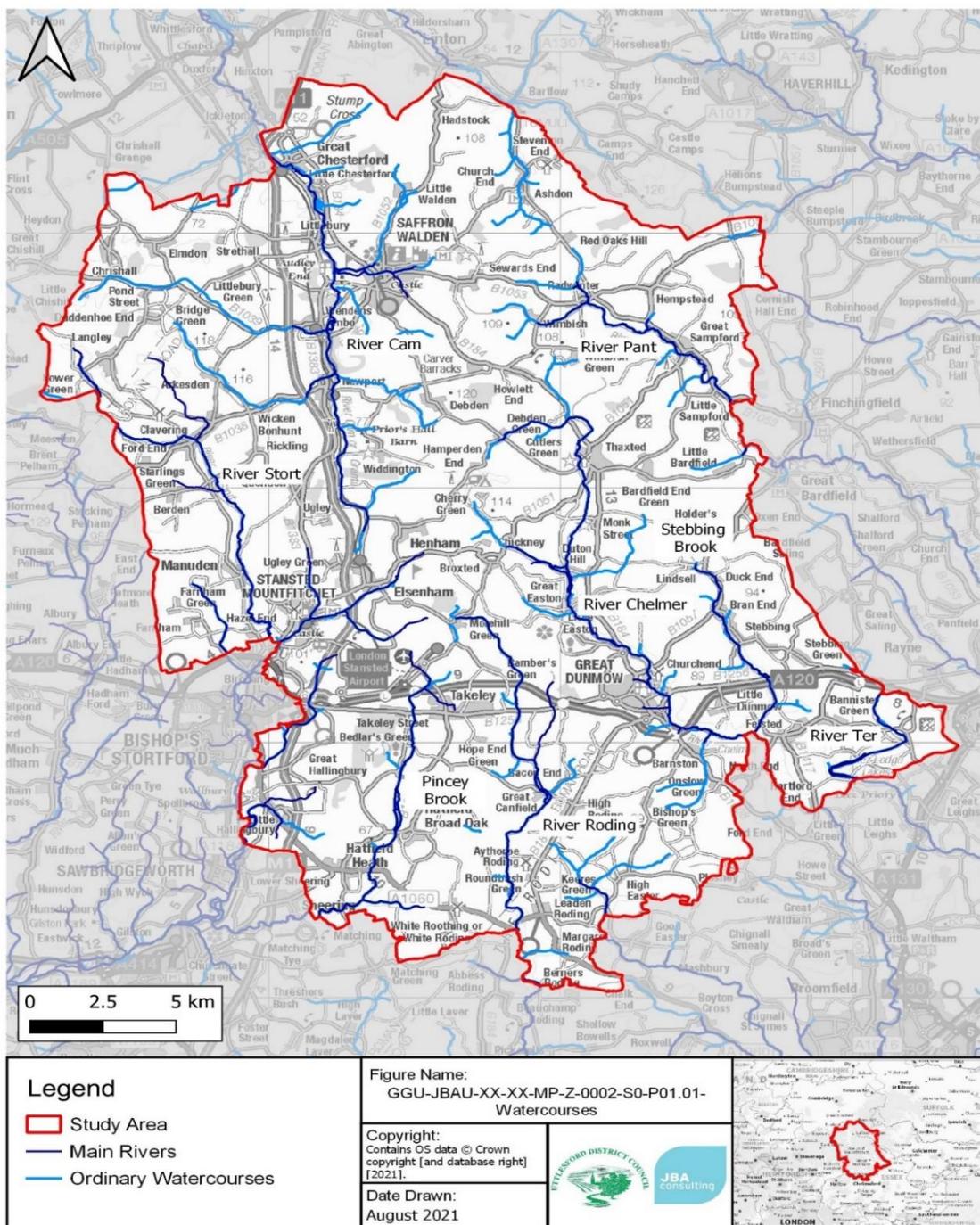
The NPPF states that “Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans” (para. 174). The Council’s interim Supplementary Planning Document on climate change recommends that: “Development should be designed to minimise consumption of water and should make adequate and appropriate provision for water recycling. Development should also protect and enhance local water quality including measures to support improvement to a water body’s Water Framework Directive status.”

⁶ <https://www.gov.uk/government/collections/environment-agency-and-climate-change-adaptation> Environment Agency and climate change adaptation -

There are several organisations engaged in the supply, recycling, management, treatment and quality of water and wastewater as summarised below:

Authority	Key Responsibilities
Environment Agency (EA)	The EA is the environmental regulator in the UK with responsibilities for water quality, flood risk and administering licences for water abstraction. They are a statutory planning consultee and advise on environmental and infrastructure capacity issues across the water cycle.
Natural England	Natural England are the Government's advisors on the natural environment, which they have a responsibility to protect and enhance. In a Water Cycle Study they may provide information on conservation objectives, and the protection of designated sites.
Affinity Water	Affinity Water as the water supplier for the district has a statutory duty under the Water Industry Act to maintain an efficient and economical system of water supply to households with a reliable and sufficient supply of water.
Anglian Water	Anglian Water is the sewerage undertaker for a large proportion of the district. Sewerage undertakers have a duty under the Water Industry Act to provide, improve and extend a system of public sewers (for both domestic and trade flows), to cleanse and maintain those sewers (and any lateral drain) to ensure that the area that they serve is effectively drained. They have a duty to make provision for the emptying of those sewers, normally through sewage treatment works or where appropriate through discharges direct to watercourses.
Thames Water	Thames Water is the sewerage undertaker broadly for the southern part of the District. Thames Water have to provide, improve and extend a system of public sewers (for both domestic and trade flows) and to make provision for the emptying of those sewers.

The main rivers are shown the map below:



Water Efficiency, Conservation and Neutrality

New development cannot rely on an unsustainable increase in water abstraction. Water efficiencies can be undertaken in several ways by reducing the water demand from new houses and achieving “water neutrality” in a region. The mandatory water efficiency standard in Building Regulations Part G⁷ states that potential water

7 The Building Regulations (2010) Part G - Sanitation, hot water safety and water efficiency, 2015 edition with 2016 amendments. HM Government (2016). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/504207/BR_PDF_AD_G_2015_with_2016_amendments.pdf on: 24/01/2022

consumption must not exceed 125 litres/person/day but permits the tighter and increasingly used target of 110 lppd. The National Water Resources Framework aims to attain an average household water efficiency of 110 lppd by 2050⁸ and the River Basin Management Plan aims to reduce the impact of abstraction. Although policies to reduce water demand from new developments can go further and achieve water neutrality, the behaviour of occupiers can affect water efficiency, as it can with energy efficiency in buildings, e.g., residents replacing low flow devices with higher flow. The application of additional conservation measures such as rainwater harvesting, and potentially grey water recycling, can help to mitigate the reduction in water efficiency in new dwellings post construction.

The Environment Agency (EA) prepares an Abstraction Licensing Strategy (ALS) for each sub-catchment within a river basin to set out how water resources are managed and contribute to implementing the Water Framework Directive (WFD). The licences require abstractions to stop or reduce when a flow or water level falls below a specific threshold, to protect the environment and manage the balance between supply and demand for water users. The licences are time limited, generally twelve-years duration, but shorter licence durations may also be granted, based on the resource assessment and environmental sustainability.

The Affinity Water Final Water Resource Management Plan 2015-2020 notes that in agreement with the Environment Agency water abstraction will be reduced by 5% by 2020, and leakages cut with investment in infrastructure to increase by more than £500 million to ensure high quality water to customers. Water use in the Uttlesford area is relatively high at around 161.27 litres per person per day (l/p/d) for existing customers, compared to a national average of 147 l/p/d and 121.92 and 126.19 in the East and Southeast Affinity Regions with higher levels of metering.

The Environment Agency assesses areas for water stress across the UK⁹, defined as where:

- “The current household demand for water is a high proportion of the current effective rainfall which is available to meet that demand; or
- The future household demand for water is likely to be a high proportion of the effective rainfall available to meet that demand.

The Affinity Water supply region is *classified as being an area of serious water stress*.

Affinity Water have identified several feasible options to balance supply and demand including:

⁸ Housing Standards Review: Cost Impacts, Department for Communities and Local Government (2014). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/353387/021c_Cost_Report_11th_Sept_2014_FINAL.pdf on: 24/01/2022, suggested meeting a standard of 110 litres per person per day would cost only £9 for a four-bedroom house

⁹ Water Stressed Areas - Final Classification, Environment Agency and Natural Resources Wales (2021). Accessed online at: <https://www.gov.uk/government/publications/water-stressed-areas-2021-classification> on: 24/01/2022

- schemes to reduce leakage,
- install more customer meters
- encourage better use of water with minimal wastage
- additional water resources from groundwater, and surface water
- water and transfers from neighbouring water companies 1

In response planning policy for all new homes will require them not to exceed the target of 110 l/p/d. All applicants are expected to demonstrate how water efficiency is to be achieved in their development e.g. water efficient dual flush toilets, spray taps and showerhead flow regulators.

The aim is to achieve water neutrality by:

- Reducing leakage from the water supply networks.
- Making new developments more water efficient with larger developments, incorporating greywater recycling and/or rainwater harvesting to reduce water demand.
- “Offsetting” new demand by retrofitting existing homes with water-efficient devices and encouraging existing commercial premises to use less water.
- Implementing metering and tariffs to encourage the wise water use.

POLICY CC9: WATER EFFICIENCY AND PROTECTION OF WATER RESOURCES

Development proposals will demonstrate they make positive progress towards achieving ‘good’ status or potential under the Water Framework Directive for surface and ground waterbodies. Water efficiency measures should be designed to minimise consumption of water, protect, and enhance water quality and protect water resources. No development will be allowed that leads to a reduction in ground water levels or reduced flows in water courses particularly the chalk streams such that their ecology is harmed.

All new residential development must achieve a water efficiency target of 110 litres per person per day. Proposals should aim to achieve 90l/p/d, particularly in the sensitive chalk catchments. Major development applications will need to demonstrate the relevant measures that the scheme will incorporate and the anticipated levels of water consumption such as metering.

Development proposals must make adequate and appropriate provision for water recycling, and this should be designed to “future-proof” to incorporate best practice techniques.

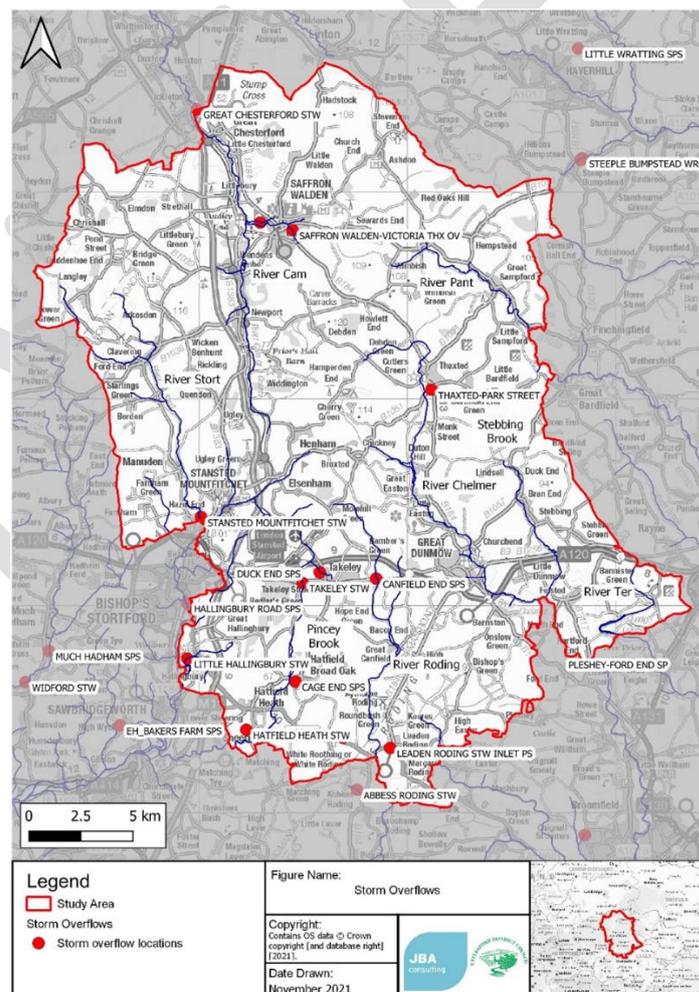
Development will not be permitted where it might cause contamination of groundwater, particularly in the Chalk Protection Zones, or contamination of surface water. If there is the potential for contamination the developer should submit details of effective

safeguards which will need to be in place prior to development taking place to prevent deterioration in current water standards.

Planning proposals which increase the demand for off-site service infrastructure will only be granted permission where sufficient infrastructure exists, or where extra capacity can be provided in time to serve the new development on first occupation.

Flood, Waste and Storm Water Control and SUDS

The Environment Act requires water companies to report and monitor storm overflows and reduce the harm caused to the rivers to which they discharge. There are twelve storm overflows. The EA have threshold of 60 operations in a year above which a storm overflow should be investigated and two storm overflows in Uttlesford in the Thames Water area have exceeded this figure, at Canfield End Sewage Pumping Station and Leaden Roding Sewage Treatment Work Inlet Pumping Station (see map).



Location of storm overflows

Thames Water refer to their wastewater processing plants as Wastewater Treatment Works (WwTW) whereas Anglian Water refer to Water Recycling Centres (WRCs). An increase in the discharge of effluent from WwTW as a result of development in the area can lead to a negative impact on the quality of the receiving watercourse. Under the Water Framework Directive (WFD) a watercourse is not allowed to deteriorate from its current WFD classification. Although small developments in rural areas may be suitable for on-site treatment and discharge, the Environment Agency will not usually permit this where there is a public sewerage system within a distance calculated as 30m per dwelling. There is a localised risk to water quality by septic tanks, especially with proposed clusters of small-scale new development. Hence opportunities should be sought to provide a public wastewater treatment solution where development is clustered particularly in the chalk stream areas in the north. These clusters of proposed development will be subject of master plans that will address environmental constraints.

Since April 2015¹⁰, management of the rate and volume of surface water has been a requirement for all major development sites, through the use of Sustainable Drainage Systems (SuDS). Essex County Council as the Lead Local Flood Authority (LLFA) is the planning statutory consultee for surface water management within major development. SuDS are drainage features which replicate natural drainage patterns, capturing rainwater at source, and releasing it slowly into the ground or a water body. Their design helps to manage flooding through controlling the quantity of surface water and improve water quality, create habitats for wildlife and green spaces for the community.

National standards on the management of surface water are outlined within the Defra Non-statutory Standards for Sustainable Drainage Systems¹¹. The CIRIA C753 SuDS Manual¹² and Guidance for the Construction of SuDS¹³ provide the industry best practice guidance for design and management of SuDS. The Essex County Council sustainable drainage systems handbook¹⁴ contains advice and sets out the minimum operating requirements as required in the National Planning Policy Framework (NPPF). In any case, for SuDS deep infiltration features (such as deep borehole soakaways, or any infiltration feature exceeding 2m in depth) pose a high risk to groundwater quality and should not be favoured unless there are no other disposal options. Depending on the depth of groundwater and source of surface water, these

10 House of Commons: Written Statement (HCWS161) Written Statement made by: The Secretary of State for Communities and Local Government (Mr Eric Pickles) on 18 Dec 2014. Accessed online at: <https://www.parliament.uk/documents/commons-vote-office/December%202014/18%20December/6.%20DCLG-sustainable-drainage-systems>.

11 Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, DEFRA (2015). Accessed online at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf on: 24/01/2022

12 CIRIA Report C753 The SuDS Manual, CIRIA (2015). Accessed online at:

https://www.ciria.org/Memberships/The_SuDS_Manual_C753_Chapters.aspx on: 24/01/2022

13 Guidance on the Construction of SuDS (C768), CIRIA (2017), Accessed online at:

<https://www.ciria.org/ItemDetail?iProductcode=C768&Category=BOOK> on: 24/01/2022

14 Sustainable Drainage Systems design guide, Essex County Council (2020). Accessed online at:

https://www.essexdesignguide.co.uk/media/2404/suds_design_guide_2020.pdf on: 24/01/2022

features may require an environmental permit. Shallow infiltration features are encouraged, and they provide an opportunity for aquifer recharge. Groundwater quality should be considered as part of the design, and design SuDS in line with CIRIA C753 as above, as well as a clearly outlined long-term maintenance plan with responsible parties identified.

Sustainable Drainage Systems Objectives and Designs:

The way that water runs off the ground surface, and locally the type of Sustainable Drainage System (SuDS) is influenced by the geology of the catchment and the permeability of the surface material and bedrock stratigraphy. Across Uttlesford this is bands of Clay, Silt, Sand and Gravel, as well as chalk in the north.

The objectives of a SuDS scheme will be:

- to improve water quality, reduce volume of surface water runoff, enhance amenity, biodiversity and reduce flood risk;
- to take account of the strategic surface water management objectives established for the site and or wider area;
- to manage water within the site and reduce flood risk; and
- to maintain greenfield run off rate from the site and ensure that the first 5mm of rainfall is retained within site to maintain water quality.

POLICY CC10: INTEGRATED SURFACE WATER MANAGEMENT

New development will regard water as a sensitive natural resource and manage the impacts of climate change primarily through:

- the design and location of development, including sustainable building design and materials, sustainable drainage, water efficiency measures, use of trees and natural vegetation and ensuring no net loss of flood storage capacity; and
- protecting the quality and hydrology of ground or surface water sources to reduce the risk of pollution and flooding, on site or elsewhere.

Planning permission will only be granted where new development takes account of the Environment Agency's flood zones, District Strategic Flood Risk Assessment, and should avoid areas of high risk of flooding and in accordance with principles in the National Planning Policy Framework. All new development will need to demonstrate that there is no increased risk of flooding to existing properties, and proposed development is (or can be made) safe and shall seek to improve existing flood risk management.

New development shall include flood mitigation measures that:

- Can demonstrate that for greenfield sites, the peak rate and volume of run off will not exceed the undeveloped site rate, and that if this is predicted to be the case the limiting volume shall be agreed for events up to 1 in 100 years in consultation with the Environment Agency.
- Waste water discharge should be planned in the priority order of infiltration to ground, discharge to a water body such as SUDs and then discharge to a surface water sewer; there shall be no discharge to a foul water or combined sewer.
- Contribute to the green infrastructure and biodiversity of the borough
- Are designed to reduce surface water run-off rates to those associated with a greenfield site by treating it at its source.

Prior to the commencement of development full details of the proposed SuDS together with implementation, long term maintenance and management of the system shall be submitted to and approved by the local planning authority. This integrated Surface Water Management Plan should minimise drainage into the public drainage and sewage network and should replicate or enable ground and surface water flow whilst decreasing surface run-off.

Development proposals should demonstrate the planning and integration of the use of water management features where multifunctionality can be accommodated including the use of:

- i. Sustainable Urban Drainage Systems
- ii. Installing green roofs on suitable roofing areas up to a 10 degree slope aiming to trap 75% rainfall, subject to appropriate structural design and access
- iii. Incorporating rainwater gardens to receive run off from hard surface which themselves should be permeable
- iv. Using natural water drainage channels and integrate with nature enhancements and green infrastructure

The SuDS shall be designed in accordance with the latest SuDS Guidance prepared by the County as Local Flood Drainage Authority¹⁵. No dwelling shall be occupied, or use commenced until the SUDs system has been implemented and design and management details submitted and approved. It shall thereafter be managed and maintained in accordance with the approved details for:

- full design and performance details
- a timetable for implementation

Development proposals on sites of 0.5ha or accommodating 10 dwellings or more should provide a long-term water management plan that incorporates an outline costed maintenance schedule and arrangements for the establishment of or agreement with a management body to be in place before occupation, together with

¹⁵ [suds | Essex Design Guide](#)

an endowment to cover the first three years of post-occupation maintenance or until 75% of the proposal has been occupied, whichever is the later.

The Chalk Streams

Chalk streams are a rare and valuable habitat and 85% of the world's chalk streams are in England with 29% of these in East Anglia. In their natural state, chalk streams are clear, with little sediment, low nutrient levels and stable temperatures at the spring sources of around 10-11°C. They derive most flow from chalk-fed groundwater, from chalk aquifers of underground water that are replenished when it rains. They are crucial water resources and support unique ecosystems during higher summer temperatures when plants are using water and rainfall is less effective at recharging the aquifer. Along with climate change this results in some stretches of chalk streams in Uttlesford becoming dry along sections of their course.

Some stretches of these watercourses do not meet 'Good' Water Framework Directive standards and the Environment Agency indicates that groundwater and surface water abstractions are reasons for this. Moreover, for growth, there is insufficient water to permit more to be abstracted and much of Affinity Water's supply area contains chalk streams. In addition to the abstraction issues, the chalk streams have been modified by being straightened, deepened, widened which has affected their ecology and water availability.

The Rivers Stort and the Cam within Uttlesford are designated as chalk streams. Latest reports indicate that the Cam has a "Poor" status under the Water Framework Directive, and the Stort is "Moderate". Pollution from wastewater treatment works (WwTW) and agricultural runoff are understood to be the reason for The Stort not achieving Good status. In the River Cam, surface water abstraction from agriculture and groundwater abstraction from agriculture and the water industry are cited as reasons for not achieving Good status. Furthermore, low river flow can exacerbate water quality issues by increasing the concentration of pollutants.

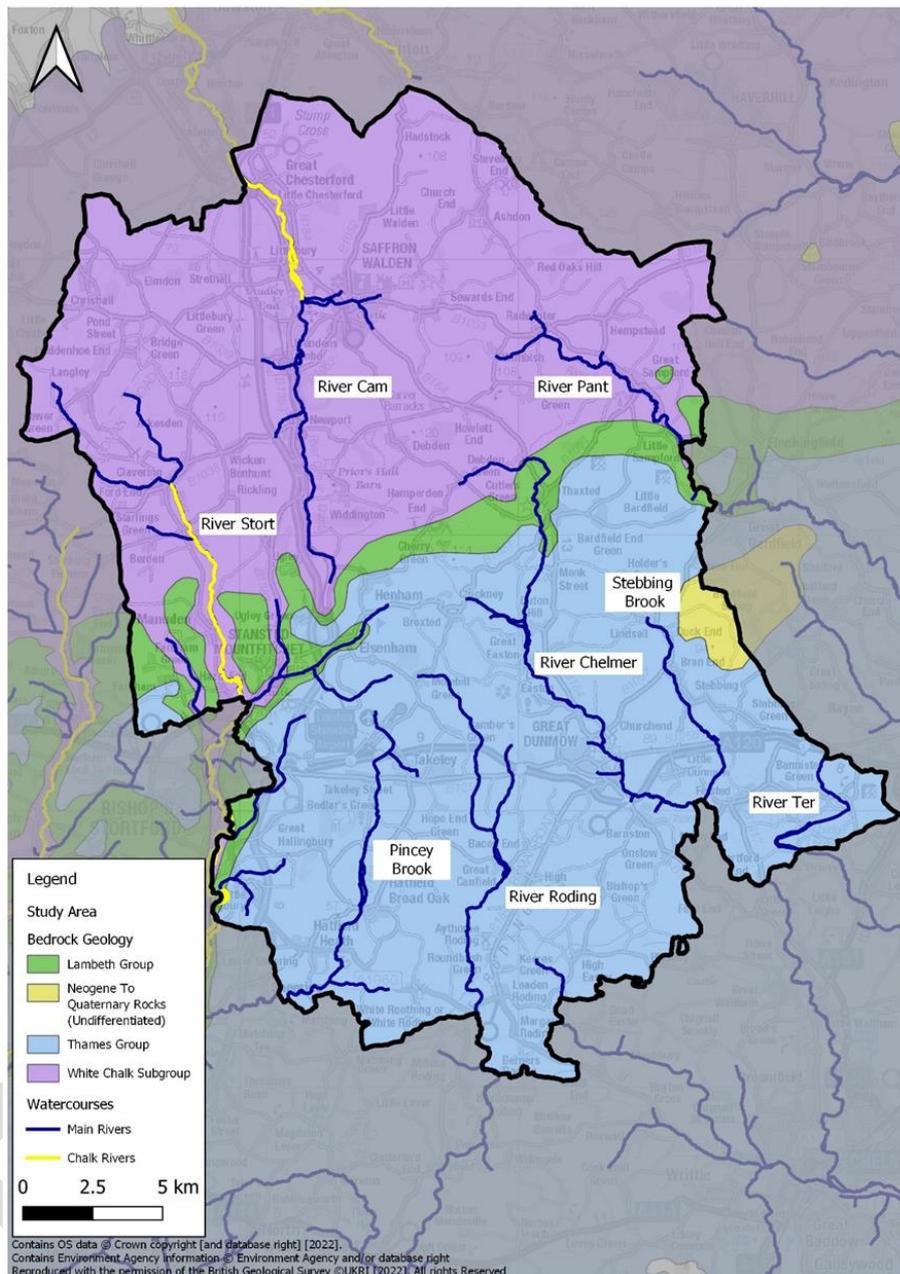
Action is needed to help preserve chalk streams and increase the biodiversity, aiming to return them to their natural physical state by removing obstructions and artificial banks. Affinity Water runs a 'Revitalising Chalk Rivers programme' to create resilient river systems by restoring the rivers and enhancing habitats. They work with the Environment Agency, landowners, and other partners to meet Water Framework Directive objectives. Chalk-stream ecological health depends on water quantity and the naturalness of the flow, water quality, physical habitat quality (the physical shape of the river and addressing biological factors). It is clear that WwTWs need to have tighter phosphorus discharge limits and roads are the primary pathway of sediment to chalk streams. Therefore roadside drainage grips should not feed directly into chalk streams use; and that there is considerable potential for chalk stream areas can be

sites for Biodiversity Net Gain and for inclusion in Nature Recovery Networks and Local Nature Recovery Strategies.

Whilst it is acknowledged that chalk streams are especially vulnerable, development proposals with water edge frontages including rivers, streams, lakes, and ponds should make provision for ecological improvement areas and buffer strips with a view to protecting and where appropriate enhancing water dependent habitats and species. Where development proposals will be on land with a culverted watercourse de-culverting and restoration to an open watercourse should be explored and are strongly encouraged as a means of creating 'blue infrastructure' and enhancing biodiversity net gain.

Protection requires focus at source, the chalk aquifer that stretches underneath East Anglian. It will be protected through landscape and green infrastructure management and improving the condition of the ecosystem by reducing pollution and contamination. The protection of chalk streams involves changes to how water is abstracted, stored and managed, reducing abstractions and potentially bringing in supplies from elsewhere. It is proposed in the wider Cambridgeshire area to work with multiple partners and cross-boundary working to develop a chalk streams strategy and for it to become a material consideration for planning. The emerging Water Resources East *Natural Capital Plan* should help to protect the water environment.

The Map below shows where the chalk streams are in the District.



Implications for the Local Plan

Population growth and demand for new housing is increasing pressure on chalk streams in terms of land use, demand for water, water quality and habitat loss. Some proposed development will be in recognised 'water-stressed' areas. To reduce the impact of development, adequate infrastructure should be in place to ensure there is no increase in unsustainable abstraction or overloading of the sewer network or sewage treatment infrastructure. Proposed development 'rules' for chalk streams might include measures such as:

- Buffer strips precluding development alongside chalk streams;
- SuDS maintenance standards;
- Water-efficiency standards;

- Ambitious water efficiency, aiming for water-neutrality, with use of grey-water;
- Building Regulations in chalk catchments protect chalk streams by setting water-efficiency targets higher than the current optional standard of 110 l/ h/d; and
- Maximising environmental net gain using the Environment Act 10% improvement on the pre-development value to target and to enhance chalk-stream habitats, and for chalk-stream habitats to feature strongly in Local Nature Recovery Strategies.

POLICY CC11 CHALK STREAMS PROTECTION AND ENHANCEMENT

In order to help protect the ecology and water quality of chalk streams a designated area for protection is proposed for the chalk stream stretches elements of the Rivers Stort and Cam comprising 15m from the top of the banks. Within this riparian buffer zone, no development will be permitted apart from domestic extensions, soft landscaping and small amenity recreational areas. The Proposed Policies Map will show a designated protected area for the riparian chalk stream stretches affected.

All development proposals within the catchment area of a chalk stream, a chalk stream impact study must be submitted (and can be included in the Climate Change Sustainability Statement) that sets out:

- i. implications for water resources and sewerage systems and impact on the chalk stream;
- ii. an assessment of impact on groundwater hydrology and flow into chalk streams; and
- iii. assessment and mitigation measures for any potential pollution arising from construction process and building materials.

Planning approval will be contingent on adequate water supply and treatment infrastructure with no additional burden on chalk aquifer abstraction. In order to achieve this, developers will be requested to make contributions to help cover the costs of addressing such impacts.

Where there is an off-site requirement for biodiversity net gain from elsewhere the chalk streams and riparian areas can be considered a suitable location subject to a design and planting plan that demonstrates sensitivity towards the ecology of the stream and environs and proposes appropriate planting or other sensitive and suitable environmental works; such a scheme will be welcomed and must be carefully implemented and its environmental impact and benefits identified, monitored and reported over ten years and be overseen by an appropriate body such as the Environment Agency.

Within these protected areas schemes to enhance the environmental quality of the zone, projects as part of a planning proposal that include biodiversity net gain or carbon offsetting with tree or vegetation planting will be encouraged. Restoration measures include restoring natural flows, floodplain reconnection, channel realignment, reconnecting rivers to groundwater, removal of barriers to fish passage, and the rewilding of degraded rivers.

NATURAL AND RURAL ENVIRONMENT – DIVERSIFICATION AND GREEN AND BLUE INFRASTRUCTURE

Rural Development and Diversification

The key role of Planning in supporting the transition to a low carbon lifestyle, and tackling climate change embraces the economy and agricultural interests of rural areas, its communities, landowners, food producers and businesses. The Plan must be sensitive to these different needs in order to tackle climate change across the District. Policies must equally address the sustainability of rural areas and support opportunities for appropriate development, agricultural diversification, regenerative environmental land management and biodiversity. There are strong links to the provision of areas for carbon sequestration, Biodiversity Net Gain offsetting, tree planting, natural water control which may provide opportunities for landowners and farmers to diversify. Landowners and farmers can provide services, including ecological good practice, to the community and policy can encourage the growth of small, and increasingly 'green' business, a characteristic of the Uttlesford economy.

Diversification proposals for agricultural and land-based rural businesses will sustain the rural economy and enhance, restore, or maintain the character of the landscape and increase soil carbon through land management techniques and reducing pollution. Whilst planning has fewer controls over agriculture, there are clear links between the practices of farms and estates that impact on wider public goods such as habitat, natural flood management, biodiversity, food and fuel, soils, and countryside access for active lifestyles. Working with landowners on 'Estate Plans' to help influence the management of estates is another opportunity that might be opened up through early discussion with landowners and promoters in the rural development process. Diversification proposals on privately managed estates will be supported where a proposal demonstrates sustainable practices and outcomes. This is preferably supported by an agreed Estate Plan that delivers and secures multiple wider public benefits such as employment and enterprise opportunities, sustainable access, social and cultural facilities, environmental enhancements, biodiversity increases, conserving and enhancing heritage assets (including a focus on saving heritage assets that are 'at risk') and improvements to land management. It is therefore important to facilitate

the reuse of buildings in the countryside but in a manner which makes a positive contribution to both the rural landscape and the rural economy.

The Local Plan has limitations because its purpose relates mostly to new development and can influence current uses of land only if permission is required to change under the planning system. Hence requirements for agricultural land area to be managed in a more environmentally sustainable manner, or for management of existing woodland to be altered to improve biodiversity, can only be achieved if this is specifically related to mitigating the impacts of planned development. Policies and potential Green Infrastructure (GI) land allocations or protections which seek to create new areas of accessible green infrastructure, green infrastructure projects and support organisations which are involved in environmental improvement, GI provision and management can be included at the next iteration of the plan.

POLICY CC12 RURAL SUSTAINABILITY AND RE-USE OF RURAL BUILDINGS

The re-use of rural buildings outside the defined development limits will be supported provided that:

- i. the development would not place unacceptable pressures on the surrounding rural network in terms of traffic levels, road safety, countryside character or amenity unless these can be satisfactorily mitigated;
- ii. the development does not lead to the loss of viable employment space;
- iii. the development does not have an adverse impact on the viability of the remaining agrarian functional unit; and
- iv. it does not result in the conversion of annexes and buildings into separate dwellings.

Such a development should not have an adverse impact on the landscape or heritage character of the countryside, amenity value and biodiversity and should not result in a significant increase in noise and light levels.

Development proposals on non-allocated sites outside settlements will be required to provide a detailed grading of soil structure and quality, and proposals on potentially productive agricultural land will only be supported where an overriding need has been demonstrated.

Proposals that include renewable energy initiatives including solar are encouraged.

Climate change: Nature and Biodiversity

The success of both the rural diversification and the natural habitat policies relies on a shared vision for agriculture and all land interests working together; the National Farmers Union supports this way of addressing climate change in an integrated approach to land management. The Local Plan has only a part to play here but can influence the enhancement to nature, biodiversity and to green infrastructure. The Council is preparing a Green Infrastructure Strategy for inclusion in the final version of the Plan and included here is its scope and approach to biodiversity.

Draft SCOPE for Green and Blue Infrastructure Strategy(GI)

GI as a well-established planning concept is defined as “a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities.” It must be central to the design of new places, creating new green spaces, but also serves the protection, enhancement, and improved connectivity of existing green and blue infrastructure assets. GI balances growth with environmental protection and net gain. It is a key theme in national planning policy and the government’s 25 Year Plan to improve the environment including through the wider Local Nature Recovery Network.

Green Infrastructure should form a multifunctional network through the creation of linear and other green and blue infrastructure features with stepping-stones or corridors within development sites to help wildlife move. Such infrastructure includes:

- Open spaces such as parks, open space and playing fields
- Wildlife areas for biodiversity net gain
- Woodlands, street trees and fields
- Allotments, private gardens, green roofs and walls
- Sustainable drainage systems and soils
- Footpaths, bridleways and cycleways
- Water bodies such as lakes, ponds, streams and rivers sometimes called ‘blue infrastructure’.

The key challenges for green infrastructure in Uttlesford include:

- Potential cooling and for carbon fixing via planting especially street trees
- Potential for carbon sequestration and offset
- Role in the Nature Recovery Network
- Establishing a new country park(s)
- Adapting and mitigating impact of pressure on Hatfield Forest
- Amenity value for increased access to the countryside and footpath network
- The north-eastern part of the District is in the ECAC Climate Focus Area

- Providing for Biodiversity Net Gain in all development schemes, aiming for 20%
- Creating a buffer zone around river habitats and water courses especially the chalk streams
- Functional roles in the Green Belt and Stansted Countryside Protection Zone
- Land management issues, such as coordination between landowners, farmers, users, and the planning system.

Essex Green Infrastructure Strategy

The Essex Green Infrastructure Strategy was formally adopted by the County Council in March 2020. It highlights a need for a coordinated approach to ensure the protection, enhancement, management, and expansion of green infrastructure in Greater Essex. A core action is the establishment of a Local Nature Partnership (LNP). Its role is part of the challenge to climate change by:

- Helping to deliver the outputs of the DEFRA 25-Year Environment Plan and Environment Act
- Producing a Local Nature Recovery Strategy
- Delivering Biodiversity Net Gain through development proposals including the national tree planting target
- Delivering multifunctional green infrastructure and sustainable land management through Environment Land Management schemes.

The Government's vision for Local Nature Partnerships is for self-sustaining strategic partnerships of a range of local organisations, businesses and people that will help the local area to manage the natural environment as a system. The LNP will help to deliver against the objectives of the Essex Climate Action Commission (ECAC); of particular relevance to the Local Plan is to arrive at:

- 30% of Essex to enhance biodiversity and the natural environment by 2040; and
- farmland in general will adopt sustainable land stewardship practices that focus on soil quality and biodiversity, water management.

The Council will be preparing a Green Infrastructure Strategy during 2022. Comments elicited through the Regulation 18 consultation will help finalise it for the next iteration of the Plan. The consultation questions are:

- i. What types of GI should it consider specifically for Uttlesford?
- ii. Do you own or are aware of land available which could be used for a strategic GI project, such as a wetland scheme, land for local food production, parkland, riverside protection areas, scope for copses or tree planting?
- iii. What uses would multifunctional green and blue spaces accommodate? Do you see any conflict? E.g. Walking, cycling, nature conservation,

- ornithology, animal grazing, play space, environmental education, active recreation
- iv. Is there locally relevant evidence to help develop the GI Strategy for Uttlesford?
 - v. What are the current GI characteristics of Uttlesford that you value and would wish to protect and enhance?
 - vi. Where do you consider there to be opportunities for improvements to or creation of green and blue infrastructure in Uttlesford?

The overall scope of the strategy will cover:

1. Map and assess the baseline local ecological network to include:
 - geological character and main landscape types
 - key natural systems
 - designated sites
 - protected habitats and species
 - irreplaceable natural habitats, such as the Chalk Streams
 - landscape features, new habitat corridors, and isolated sites that hold nature conservation value
 - open space audit
 - biodiversity and geodiversity value of previously developed land
 - potential for habitat enhancement or restoration, climate change adaptation and mitigation and for biodiversity
2. Connectivity across the District and beyond recognising that GI extends beyond administrative boundaries, and potential to enhance corridors and routes through designation, Master Plan, or policy requirements
3. Needs arising from predicted growth in the District, such as mitigating of visitor pressure on Hatfield Forest, creation of a large country park with public access; extension cycle and footpath network especially between key settlements
4. Outline Local Plan policies to guide development schemes, providing GI, enhancing biodiversity, providing SuDS, creating multifunctional spaces where this does not conflict with biodiversity sensitivities
5. Proposed establishment of a District-wide Environmental Fund to which developers will be required to contribute where GI cannot be adequately accommodated on site and which would serve as an offset fund for parish/local or larger scale projects on land areas to be identified, to include capital and revenue maintenance financing; would link to the proposed carbon offset fund.
6. Biodiversity Net Gain (BNG) principles and requirements
Local authorities have a legal duty to have regard to conserving biodiversity¹⁶ intended to make a significant contribution to the Government's commitments in

¹⁶ Section 40 of the Natural Environment and Rural Communities Act 2006

the national Environment Plan which became law in November 2021¹⁷ The Uttlesford GI Strategy will assist in delivering its aims.

With 90% of the district agricultural with suppressed biodiversity value, working with landowners on the Environmental Land Management schemes and exploring how this approach can be accommodated in larger scale developments will be an aim of the GI Strategy. Use and support for enhancing this 'natural capital is a key plank in climate mitigation. Although the requirement is for a mandatory 10% BNG on new developments, because of the relative paucity in biodiversity across the district combined with the deterioration the chalky stream ecology, and the need to create larger and connected areas for nature, the Local Plan policy will require 20% net gain.

The policy will recognise the potential for grouping development schemes' requirements for a more comprehensive off-site provision, including maintenance endowment or payments, utilising the facility of the proposed Environmental Fund, as appropriate. This may better provide more significant BNG or wider environmental gains, acknowledging that multifunctional green space may not always be compatible with biodiversity areas.

Biodiversity

The Council's declaration of a climate emergency in late 2019 was paralleled by the declaration of a biodiversity emergency. The two are linked and impact on quality of life. All development is required in the NPPF to consider the impact on ecology, habitats, species, soil, and water environments. Of considerable importance is the tree cover and woodland presence and developers will be required to plant suitable trees to support the natural regeneration of impoverished areas and to capture carbon as part of carbon sequestration, to create and extend wildlife corridors, reduce local flooding as well as providing amenity and recreational benefits. Allotments and orchards, the provision of parks and small play areas can all contribute to biodiversity. Schemes will be required to demonstrate how nature is accommodated in layouts, and how it has been enhanced and will be managed, including joint land management agreements with adjoining landowners and farmers especially around the margins and along ecological corridors.

Funding and monitoring will be required as part of community stewardship in larger schemes and/or Section 106 Agreements. The measuring of environmental enhancement and biological net gain continues to be under discussion and as yet, no clear metrics have been stipulated. Here in the Regulation 18 version of the Local Plan, an interim arrangement until the metric has been agreed suggests choice in the use of several measures, all for consultation through the Reg 18 Plan process.

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¹⁷ 25 Year Environment Plan. (Paragraph: 009 NPPG)

The 'metrics' considered include:

- The area of new land improved for biodiversity
- The area of land with an agreed scheme to enhance biodiversity either in its own right or as part of a multifunctional approach to green infrastructure
- Use of standard metrics for the quality of a river water course
- Number of trees planted and as a proportion of the existing trees cover (Policy CC14 requires 15% cover)
- The preparation of an agreed management for community access
- Increase in the number of invertebrate species over a grid over five years
- Creation of new wetland areas
- Increase in the number of healthy soil indicator species in sample areas over five years
- Creation of SuDS – area as a ratio of the site area
- Number of bat and bird boxes and bee hotels

Setting Minimum Biodiversity Net Gain at 20%

This Regulation 18 Plan seeks a requirement for a minimum of 20% biodiversity net gain (BNG) compared to the minimum 10% required by the Environment Act. The requirement for BNG leads to increasing biodiversity on a development site from that present, prior to development taking place together with, if necessary, off-site compensation. The 25 Year Environment Plan sets out the ambition that biodiversity net gain is a feature of all new development and is set out in NPPF paragraph 170.

Currently seeking a minimum of 10% BNG it was considered that it “strikes the right balance between ambition, certainty in achieving environmental outcomes, and deliverability and costs for developers” whilst the Defra impact assessment set considered that in practice this level of net gain could be achieved. Clearly, a minimum 20% net gain requirement would provide even greater benefits for biodiversity and would increase access to nature and make this available to residents in a District which has relative restricted access to natural areas because of lands use and historic ownership patterns.

More analysis will be required for the GI Strategy study to be developed. Certainly, the pressure on Hatfield Forest is acknowledged and the outcome of a mitigation study is similarly anticipated whilst acknowledging that across the District the area of land that is protected and managed for nature is relatively small compared to other areas of the country. This means less protection for habitats and wildlife, fewer opportunities for communities to interact with nature, and a greater need to restore biodiversity across the area, including where possible, through the planning and development process. A higher BNG requirement will lend strength to measures required to address this relative shortfall.

There are precedents in other Local Plans. The Biodiversity and Development supplementary planning document (SPD) to the Lichfield Local Plan sets out the 20% requirement, following consultation with the local community and stakeholders. It includes a biodiversity opportunity map, setting out the opportunities that off-site provision could provide for and securing biodiversity net gains for a period of at least 25 years through legal agreements. Warwickshire County Council's Green Infrastructure Strategy requires an assessment of development sites to ascertain their biodiversity 'distinctiveness' and losses predicted to occur due to development are offset through direct provision on site or off-site or by paying a tariff to the County Council which funds biodiversity offset schemes, along the lines of the proposed Environment Fund for Uttlesford.

Policy CC13: Biodiversity

Development proposals must demonstrate through an Ecological Statement prepared by a competent ecologist or otherwise approved by the Chartered Institute of Ecology and Environmental Management, the retention and enhancement of biodiversity following a full ecological survey of the site, and how enhancement will be achieved. The Ecological Statement should show how it has:

- a) Explored options to avoid or reduce causing harm to existing biodiversity on site;
- b) Explored the options to enhance biodiversity;
- c) Provided for the loss of on-site biodiversity that cannot be mitigated by offset proposals outside of the site boundary;
- d) Helped to deliver the county and district GI strategies; and
- e) Prepared a Biodiversity Management and Monitoring Plan.

The proposed development scheme must demonstrate how it achieves a minimum of 20% Biodiversity Net Gain. Where the full 20% Net Gain cannot be achieved on site, the developer is expected to offset by undertaking, or funding projects off-site. The developer should provide biodiversity management funding for thirty years in accordance with the management plan.

Developers are required to liaise with adjoining landowners and public authorities and with Essex County Council (Green Infrastructure) regarding the wider impacts on biodiversity when preparing development proposals and in consideration of biodiversity on adjoining and inter-connected areas. Developers must demonstrate that liaison with other authorities and cross border ecological and biodiversity impacts of the scheme have been satisfactorily incorporated and addressed.

Trees

Trees are one of the most important components of green infrastructure and have an equally important role in climate adaptation and mitigation. They contribute to cooling, shading, the microclimate around buildings and public areas, water and river management, street amenity, streamside cooling and provide habitats for a myriad of species from their canopies to their roots. Ancient Woodlands and veteran trees are irreplaceable and development proposals that cause their harm or loss will not be considered. Landscape proposals should consider the role of existing trees from the beginning with the urban design and layout designed to enhance their beneficial characteristics; the design code includes details of this required approach. The Green Infrastructure Strategy will provide more context and detail.

The NPPF 131 says that “trees make an important contribution to the character and quality of urban environments and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure that new streets are tree-lined and that opportunities are taken to incorporate the most appropriate trees elsewhere in developments (such as parks and community orchards), and that appropriate measures are in place to secure the long-term maintenance of newly planted trees, and that existing trees are retained wherever possible.

Policy CC14: Trees, Hedgerows and Woodlands

In all development proposals mature trees and hedgerows should be retained, and, along with protected and veteran trees and woodland, be incorporated into the design and layout of new schemes. Where proposed development might affect these trees an accurate assessment by a competent arboriculturist should be undertaken and protective measures put in place.

All major development will provide, through the retention of existing and or / the establishment of new, canopy coverage equal to at least 15% of the site area. New canopy should provide a mix of species that are resilient to pests, diseases and climate change and support biodiversity.

Trees in new development schemes should be used to fulfil one or more potential functions, including shading, and the selection of species, size, hedging, density and location for planting must be undertaken with care to ensure success, and in accordance with the emerging District Design Code.

In schemes 10 dwellings and over or 0.25ha applicants should make provision for the long-term management and maintenance of trees, hedgerows, green infrastructure, and biodiversity to include a maintenance plan for their establishment and ongoing management. Appropriate maintenance funding should be provided through the Planning Agreement or as part of the stewardship scheme in new communities.

CARBON SEQUESTRATION and OFFSETTING

Local Plan Policy needs to address the role of carbon sequestration as a complementary action to capture as much carbon as possible. The Plan can allocate land for this purpose for example through the new park(s) proposal or establish agreements with landowners and farmers, to identify land and impose a suitable agreement. Tree planting is one mechanism, and the Council will provide advice on the selection of species which accord with BNG objectives.

Under the Kyoto protocol, additional woodland planted since 1990 contributes to the UK's carbon dioxide emissions target. The general trend for the rate of accumulation of carbon in woodland is increasing whilst the total carbon stock in UK forests is estimated to have increased, from around 3.2 billion tonnes of CO₂ equivalent (CO₂ E) in 1990 to 4.0 billion tonnes of CO₂ E in 2020¹⁸. The Forestry Commission has suggested that carbon sequestration from woodland planting is 3.5 tonnes (CO₂ E) per hectare for 100 years, an average as sequestration levels vary depending on the age of the woodland¹⁹. A recent IPCC report estimated that “global urban trees sequester 217m tonnes of carbon annually”.²⁰

It is suggested that at least a hectare of land is allocated in the District for new tree/hedgerow species planting and which might be combined in part with land set aside for biodiversity net gain, depending on competing uses, soil suitability and inter-connections with nature networks or the Nature Recovery proposal. Because of the geography of the District it might be appropriate to allocate two sites in the north and south, potentially as adjuncts to larger development sites. Both would require a carefully structured agreement to embrace legal land ownership, planting design, establishment and management agreement to ensure perpetuity. Contributions would be derived from developers as part of their proposals. Deciduous woodland would be appropriate to the clay soils and/or thinner soil habitats associated with and as part of a programme to enhance the ecology of the chalk stream and environs overall. The Council would work in partnership also with landowners and the County Council to establish such site(s) and to co-ordinate with the Nature Recovery Partnership and proposed network.

¹⁸ Emissions and sequestration are presented as tonnes carbon or tonnes carbon dioxide (CO₂); to convert from tonnes CO₂ to tonnes carbon multiply by 12/44

¹⁹ https://www.forestresearch.gov.uk/documents/8142/Ch4_Carbon_FS2021.pdf

²⁰ Intergovernmental Panel on Climate Change (IPCC) released a new report on 4th April 2022 on how to tackle climate change. And see glossary.

Carbon offsetting

Where developers confirm that their schemes cannot meet the policy objectives to achieve the highest and viable net zero aspirations on site the attainment of the net zero standard should be explored through offsite measures. The pressing need to reduce emissions at source remains preferential as expressed in Policy CC3. A 'Carbon Offset' is defined as a unit of carbon dioxide or (CO₂E) that is reduced, avoided, or sequestered to compensate for emissions occurring elsewhere. These 'offset credits' would be a compensatory measure to help meet the carbon and greenhouse gas target. At a national or global scale many businesses and organizations are increasingly buying Green House Gas (GHG) offsets to help meet (voluntary) commitments to reduce their GHG emissions²¹. However, to meet the strategic ambition for new building developments to be net-zero carbon, this would be a combination of the highest resource efficiency standards, onsite renewable energy and financial or in-kind contributions to a proposed carbon offset fund. This may be combined with the Environment Fund to achieve biodiversity ambitions as explored in the previous section.

A Carbon Offset Fund (COF) for allocated site(s) and the cumulation of funds managed for carbon saving projects. Offsetting would only be used to meet an energy generation shortfall after onsite renewables have been maximised and not to avoid energy use targets.²²

In concept, the Fund would be 'long-term temporary' until regulatory regimes, viability economics and the development industry can deliver true carbon neutral or carbon positive developments on-site using sustainable materials, high energy efficiency standards and integrated renewables. The scope of the COF could be:

- EV Charging stations and mobility hubs
- Community energy projects or solar farms
- Carbon sequestration through woodland and hedgerow planting
- Chalk stream protection zone enhancement
- Country Park(s) special woodland creation
- Biodiversity Net / Environmental Gain
- Measures to encourage behaviour change e.g. walkways and cyclepaths and environmental education
- Grant/loan provision for energy efficiency retrofit of homes

²¹ Source – World Resources Institute).

²² for a project to be termed a 'carbon offset', it should align with recognised offset principles such as those outlined by the UK Environmental New Homes Policy Playbook which require carbon offsets to demonstrate real, measured and independently verified carbon savings to compensate for the equivalent residual emissions

POLICY CC15: CARBON SEQUESTRATION AND OFFSETTING

Proposals are required to offset carbon emissions through investment in carbon capture and sequestration sites or as contributions to projects as agreed in order to help meet the climate change policies in the Local Plan. Such sequestration projects are likely to embrace:

- Opportunities to create woodland or wetland areas
- Increase hedgerows, trees and the extent of woodland cover and biodiversity
- Ecological enhancement of the designated protected zones around and including the chalk streams and public parks or green and blue infrastructure areas

If the selected site is not currently owned, set aside, or managed specifically for this purpose, developers will be required to submit a management plan to cover the planting, creation, and maintenance of the proposed area. A financial contribution will be required, to be agreed through the Section 106 process.

In addition, IF proposals are unable to meet the policy requirements for on-site carbon reduction for energy and resource efficiency and for renewable energy, and where it is clearly demonstrated that net zero carbon cannot be achieved through on-site measures, all developers are required to contribute to carbon off-setting. This will normally be by making a financial contribution to the Council's Carbon Offset Fund proportionate to the scale of development and overall impact of the development.

ADDRESSING CLIMATE CHANGE: VIABILITY OVERVIEW-

It is important that achieving the net zero goals and meeting the policy requirements in the Plan do not impact on the viability and deliverability of quality and timely schemes. Indeed, the Planning Practice Guidance on viability states that: *"It is the responsibility of site promoters to engage in plan making, take into account any costs including their own profit expectations and risks, and ensure that proposals for development are policy compliant. Policy compliant means development which fully complies with up to date plan policies. A decision maker can give appropriate weight to emerging policies. The price paid for land is not a relevant justification for failing to accord with relevant policies in the plan. Landowners and site purchasers should consider this when agreeing land transactions."*²³ The PPG²⁴ sets out that benchmark land value should: *"be based upon existing use value; allow for a premium to landowners; reflect the*

²³ Planning Practice Guidance. Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government. Para. 002, Ref. ID: 10-002-20190509, Revision date: 9 May 2019. <http://www.gov.uk/guidance/viability-levels-of-vulnerability>

²⁴ Paragraph 014 Reference ID: 10-014-20190509 PPG

implications of abnormal costs; site-specific infrastructure costs; and professional site fees.”

The government announced in late April 2022 that it is looking into axing Section 106 of the Planning Act 1990 and to introduce an infrastructure levy aimed at helping to build more affordable housing. The aim is that the new levy will take a three-pronged approach: developing a new model to help local authorities capture value from developments more efficiently; building more affordable homes; giving local authorities the infrastructure they need to do so. How this impacts on cost and the overall viability of a scheme remains to be seen but the underlying principles of meeting climate change objectives underpin this Local Plan. It is expected that the development sector as a whole works in partnership to help their achievement.

DRAFT

GLOSSARY OF TERMS

ASHP: Air source heat pump

BCIS: Building Cost Information Service, provides cost and price data for the UK construction industry. It is a part of the Royal Institution of Chartered Surveyors

BEIS: UK national government department for Business, Energy, Innovation and Skills

BIODIVERSITY: The variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.

BUILDING ENVELOPE: The external elements of a building (external wall, roof, windows)

BUILDING REGULATIONS: Part L of the Building Regulations: Volume 1 – Dwellings; Volume 2 – Buildings other than dwellings. Most building work carried out in England must comply with the Building Regulations. The Building Regulations are made under powers in the Building Act 1984

CAPACITY FACTOR: (sometimes mistakenly referred to as 'load factor') considers the generation characteristics of a specific technology and can be defined as: The actual energy yield produced over a period expressed as a proportion of the energy yield that would have been produced if the energy plant had operated at its full generation capacity continuously over the same period. Capacity factors vary considerably between technologies; for example, solar PV may typically have a capacity factor of 0.1 whereas a large-scale wind turbine may have one of 0.25. This effectively means that, in terms of energy yield, a 1 MW wind turbine is not directly comparable with a 1 MW solar PV farm. In this case, although both can generate the same maximum instantaneous output of 1 MW in ideal conditions, the wind turbine will typically produce more energy over the course of a year as the wind tends to blow during day and night, whereas the sun only shines on the PV farm during the day. The use of energy generation yields in MWh or GWh will therefore provide a more meaningful measure of renewable energy deployment than simply using generation capacities in MW or GW

CARBON FOOTPRINT: The total greenhouse gases emissions generated directly and indirectly by human activities, which are expressed as carbon dioxide equivalent during the period of a year

CARBON INTENSITY: Amount of carbon emitted during the production of a unit of energy

CARBON NEUTRAL: A state by which the amount of greenhouse gas emissions released into the atmosphere because of an activity is balanced by an equivalent amount being taken away via "offsetting", or removing from the atmosphere, an equivalent amount of carbon. Carbon neutrality is not associated with a commitment to reduce overall greenhouse gas emissions

CARBON OFFSET: a unit of carbon dioxide or (CO₂E) that is reduced, avoided, or sequestered to compensate for emissions occurring elsewhere

CARBON OFFSET FUND (COF) Offset schemes need to save energy or carbon at the same rate that it is emitted though for tree planting there will be a long delay. To establish the rate of payment for developers most schemes rely on a fixed price in £/tCO₂ usually set as the cost of solar PV installations. The LPA collects payments into the fund to reflect the true costs to maximise onsite measures such as transportation and maintenance, and procures or manages additional new renewable energy provision and local projects

CIRCULAR ECONOMY: a non-linear model of economic development based upon elimination of waste and pollution, keeping products and materials in use, and regenerating natural systems

CLIMATE CHANGE: A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period (typically decades or longer).

CLIMATE CHANGE ADAPTATION: Adjustments to natural or human systems in response to the actual or anticipated impacts of climate change, to mitigate harm or exploit beneficial opportunities. Source: National Planning Policy Framework. Ministry of Housing, Communities and Local Government (now Department for Levelling Up, Housing and Communities), Jul. 2021
<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

CLIMATE CHANGE MITIGATION: Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions. Climate change mitigation: Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions. Source: National Planning Policy Framework. Ministry of Housing, Communities and Local Government (now Department for Levelling Up, Housing and Communities), Jul. 2021
<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

CO2 Carbon dioxide

ECAC Essex Climate Action Commission

ECOSYSTEM SERVICES: Ecosystem services describes the benefits provided to people by natural capital (ecosystems and the biodiversity they contain). Services broadly comprise:

- Provisioning services e.g. food, fibre, fuel and clean water;
- Regulating services e.g. climate control, flood regulation, carbon storage, pest control and pollination;
- Cultural services e.g. recreation, spiritual, educational, intrinsic and aesthetic value. • Supporting services (e.g. soil formation, photosynthesis, biodiversity) originally distinguished are now typically seen as functions or processes associated with natural capital 'stocks'. Ecosystem services may be described as 'flow', as explained below

EDG Essex Developers Group

EPC A, EPC B Energy Performance Certificate Ratings – from A (most efficient) to G

ENERGY PERFORMANCE GAP The difference between the predicted energy use of a building when it is designed compared to actual use. Usually occurs due to a combination of faults or changes in the construction process, modelling inaccuracies, and unanticipated user behaviours

EMBODIED CARBON Carbon emissions that already happened during the production, transport, and assembly of goods before they are used or operated (such as building materials and construction)
 Embodied carbon: the total GHG emissions and removals associated with the materials and construction processes throughout the whole lifecycle of a home

EV: Electric vehicle

FABRIC FIRST APPROACH: A 'fabric first' approach to building design involves maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building systems. Buildings designed and constructed using a fabric first approach aim to minimise the need for energy consumption through methods such as:

maximising airtightness; • increasing the levels of insulation; • optimising solar gain through the provision of openings and shading; • optimising natural ventilation; • using the thermal mass of the building fabric.

FULL LIFETIME OF DEVELOPMENT: Residential development should be considered for a minimum of 100 years, unless there is specific justification for considering a shorter period.

Source: 'Flood risk and coastal change'. Planning Practice Guidance. Ministry of Housing, Communities and Local Government (now Department for Levelling Up, Housing and Communities), Mar. 2014
<https://www.gov.uk/guidance/flood-risk-and-coastal-change>

FHS Future Homes Standard

The consultation proposed two levels of emission reductions for new dwellings from 2020: either 20% or 31% over current 2013 Part L standards, and for the 2025 Future Homes Standard a 75-80% reduction together with low carbon heating systems. Regarding *Future Homes Standard*, for 2025, the Government proposed that homes built to the Future Homes Standard would have 75-80% fewer carbon emissions than one built to current Building Regulations. This followed on from a commitment made in the 2019 Spring Statement that by 2025 the new Future Homes Standard for new build homes would require new homes to be future-proofed with low carbon heating and world-leading levels of energy.

FOREST” CARBON SEQUESTRATION: “Forest” carbon sequestration is the process of increasing the carbon content through photosynthesis. Once sequestered the carbon is stored in the woodland within living biomass, soil and leaf litter and contributes to the forest carbon stock. The Woodland Carbon Code is a voluntary standard, introduced in July 2011, for woodland creation projects set up to sequester carbon. Projects are placed on the UK Woodland Carbon Registry, validated and then verified on a regular basis to confirm the progress of carbon sequestration²⁵. A total of 708 projects were registered under the Woodland Carbon Code as at 31 March 2021, covering around 32,000ha of woodland and projected to sequester 11.1m tonnes of carbon dioxide.

FULL LIFETIME OF DEVELOPMENT: Residential development should be considered for a minimum of 100 years, unless there is specific justification for considering a shorter period. Source: 'Flood risk and coastal change'. Planning Practice Guidance. Ministry of Housing, Communities and Local Government (now Department for Levelling Up, Housing and Communities), Mar. 2014
<https://www.gov.uk/guidance/flood-risk-and-coastal-change>

GREEN ECONOMY: A model of economy where the reduction of the environmental impact of business enterprises results in economic advantages for the companies themselves.

GREEN FINANCE: Financial activity that employs financial instruments and services promoting the development of sustainable business models and mobilise investment that ensure a clean and resilient growth with environmentally positive outcome.

GREEN GROWTH: A model of economic development that promotes environmental sustainability and synergies between environment and economy.

GREEN INFRASTRUCTURE: Green infrastructure is the term used to describe the network of natural and semi-natural spaces and corridors in a given area. These include open spaces such as parks and gardens, but also allotments, woodlands, fields, hedges, lakes, ponds, playing fields, coastal habitats, footpaths, cycle routes and water courses. Crucially, GI provision is not limited to traditional green

²⁵ Information on Woodland Carbon Code projects is provided at www.woodlandcarboncode.org.uk/

spaces such as parks and other open spaces, but can involve various interventions to thread nature into streetscapes, or provide corridors of connectivity between the GI features described above, known as 'assets'. GI is defined by its multifunctionality. A single GI asset can deliver a range of benefits to people (both physical and mental wellbeing), as well as biodiversity and landscape. GI can help to create high quality, attractive and functional places that will provide a setting for day- to-day living. It can also address the negative impact of habitat loss and fragmentation by promoting habitat creation, enhancement and connectivity (on site as part of development or through biodiversity off-setting), and plays an important role in reducing local temperatures, climate change adaptation and mitigation, and alleviating flood risk and soil erosion. Green infrastructure is the tool by which ecosystem services can be planned and delivered through policy.

GREEN PUBLIC PROCUREMENT: A process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured.

GREEN SKILLS: Green skills are knowledge, experience, values, attitudes, and abilities that support carbon reduction and resource efficiency to increase climate resilience and enhance natural assets.

GHGs Greenhouse gases

GREENHOUSE GASES (GHG): the gases in the Earth's atmosphere, including carbon dioxide and methane, which have a heating effect when released into the atmosphere. GHG is often simplified to 'carbon'. These gases were set out in the Kyoto Protocol (as amended in 2015) and contribute directly to climate change owing to their positive radiative forcing effect. HFCs, PFCs, SF₆ and NF₃ are collectively known as the 'F-gases'.

Gas	Predominant UK Source	Global warming potential relative to CO ₂ (=1)
Carbon dioxide (CO ₂)	Product from combustion from fossil fuels including oil, gas, and coal in all areas – domestic, industrial, commercial and transport 1	1
Methane (CH ₄)	fermentation (livestock stomachs), methane from waste disposal	28 - 36
Nitrous oxide (N ₂ O)	The agriculture sector dominates emissions of N ₂ O. 265 - 298	. 265 - 298
F Gases		
Hydrofluorocarbons (HFCs)	Refrigeration and air-conditioning fugitive emissions, aerosols 14,800	14,800
Perfluorocarbons (PFCs)	Electronics and sporting goods manufacture	12,200
Sulphur hexafluoride (SF ₆)	Manufacture and filling of large electrical switchgear	17,200
Nitrogen trifluoride (NF ₃)	Electronics and sporting goods manufacture	22,800 9

Greenhouse Gas (GHG) trap heat in the atmosphere and contribute to climate change. This causes the greenhouse effect. As in table above, Water vapour (H₂ O), carbon dioxide (CO₂), nitrous oxide (N₂ O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the atmosphere.

kWh: Kilowatt-hours (a unit of energy)

LONDON ENERGY TRANSFORMATION INITIATIVE LETI Guidance²⁶

Following diverging views on best metrics to drive net zero carbon design, six industry bodies across the built environment came together in 2019 to establish an agreed approach that would be resilient to changes in national policy. This culminated in a summary published by LETI and has become a common goal across much of the industry, supplemented with other summary documents, all focussed on collaborative industry buy-in. The principles are reflected in acknowledged design guides including the UKGBC New Homes Policy Playbook and the RIBA 2030 Climate Challenge. The building fabric target is also reflected in the Committee on Climate Change evidence that underpins the UK's Sixth Carbon Budget. The LETI approach instead focuses on best practice energy demands limits applicable in any net zero ready building and carbon is not assessed. The LETI approach is dependent on all principles being followed as they are interrelated.

MEASURING CARBON EMISSIONS The accepted route to measuring GHG emissions is to consider a basket of these five gases and the two families of gases in proportion to their prevalence. As carbon dioxide (CO₂) is the most prevalent (being a product of combustion and several industrial processes), GHG emissions are measured as the equivalent of a 'basket' of these gases and referred to as carbon dioxide equivalent written as CO₂e and measured in SI units of mass, i.e., kilogrammes, tonnes, etc. Net Zero Carbon is therefore defined in these terms
tCO₂/y Tonnes of carbon dioxide per year

'MERTON RULE' :a planning policy, developed by Merton Council in 2003, which required new developments to generate at least 10% of their energy needs from on-site renewable energy equipment, to help reduce annual carbon dioxide emissions in the built environment. The policy then spread out nationally, but with the expectation of the commitment to zero carbon in 2016 the policy was considered redundant

MMC Modern method of construction – a process that uses off-site construction techniques, such as mass production and factory assembly, as alternatives to traditional building methods. The location of the production site may be at a distance from the development or can be on site (with large-scale developments)

MW or MWh? –megawatts (MW), refers to the generation capacity of the technology (i.e., its maximum instantaneous output or 'nameplate' rating) or megawatt-hours (MWh) refers to the generation yield of the technology (i.e., the amount of energy it is likely to produce over a specified time – normally a year). A domestic solar photovoltaic system, for example, might be rated at two kilowatts (its maximum instantaneous power output when light conditions are optimum), and over the course of a year it might typically generate 1,800 kilowatt-hours, which would provide around half the annual electricity needs of a typical UK household

MVHR Mechanical Ventilation with Heat Recovery - a continuous source of ventilation that extracts stale, moisture-laden air from a building and resupplies fresh, filtered air back in

NET BIODIVERSITY GAIN: weaving nature more effectively in and around developments, not only to improve quality of life but also to reverse wider biodiversity loss.

²⁶ The 2021 London Plan At 542 pages excluding supplementary guidance, the London Plan is the most in-depth spatial development strategy published in the UK. It contains a number of policies controlling energy and carbon limits for major developments across the city alongside detailed Energy Planning Guidance. The London Plan approach is based on a ratcheted % improvements over building regulations. This is based on the methodology adopted in the Code for Sustainable Homes in 2006 and predates recent LETI/UGBC/CCC /CIBSE/RIBA work on alternative approaches. This approach has required updates to reflect changes in carbon emission factors and will require further updates when Building Regulations are changed in 2022 and 2025. As Building Regulations do not monitor unregulated energy, this is instead reported through the London Plan's 'Be Seen' policy (see section 13). A call off contract between the GLA and consultants AECOM (supported by the BRE) is used to support and review major development policy compliance.

NET ZERO (OR NET ZERO CARBON) Carbon neutrality is a state of net-zero carbon dioxide emissions. This can be achieved by balancing emissions of carbon dioxide with its removal or by eliminating emissions from society. Source Wikipedia but note definition of net zero is further discussed in the body of the report. Net Zero carbon is also the state where there is a balance between the amount of greenhouse gases released into the atmosphere by a human activity, and the amount which is removed. A commitment to net zero carbon is associated with a commitment to reduce greenhouse gas emissions to achieve this balance.

NET ZERO CARBON – CONSTRUCTION (or net zero Carbon – Whole Life operational) When the amount of carbon emissions associated with a building's product and construction stages up to practical completion is zero When the amount of carbon emissions associated with the building's operational energy on an annual basis is zero or negative

NET ZERO CARBON – OPERATIONAL ENERGY When the amount of carbon emissions associated with the building's operational energy on an annual basis is zero or negative

NET ZERO CARBON – WHOLE LIFE When the amount of carbon emissions associated with a building's embodied and operational impacts over the life of the building, including its disposal, are zero or negative

NPPF National Planning Policy Framework (Last updated in 2021)

(N)PPG (National) Planning Practice Guidance (Updates by topic on a regular basis)

NET ZERO: The point at which the amount of greenhouse gases being put into the atmosphere by human activity in the UK equals the amount of greenhouse gases that is being taken out of the atmosphere.

Source: Powering our Net Zero Future. Energy White Paper. Department for Business, Energy, and Industrial Strategy. HM Government, Dec. 2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

OPERATIONAL CARBON: Carbon emitted during the operation of a building or vehicle.

OPERATIONAL ENERGY: the GHG emissions arising from all energy consumed by a home, in use, over its lifecycle. The operational energy comprises of regulated and unregulated energy consumption. The regulated energy is building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, and ventilation while the unregulated energy is the energy consumption that is not controlled by Building Regulations, including, but not limited to, energy consumption from IT equipment, lifts, and appliances (BRE, 2018).

PERFORMANCE GAP: a performance gap is a disparity that is found between the regulated energy use predicted and carbon emissions in the design stage of buildings and the energy use of those buildings in operation

PHPP Passivhaus Planning Package – a methodology for assessing carbon emissions for different development standards

PLANNING PRACTICE GUIDANCE: (PPG) online resource providing vital additional and detailed guidance on aspects of the NPPF. Periodically updated to include interpretations of Ministerial Statements relevant to planning. The critical sections of PPG are on 'Climate Change', 'Renewable and

low carbon energy', and 'Flood risk and coastal change'. Paragraph 011 of the 'Climate change' section directs planners to the Climate Change Committee for further information and guidance.

PV Photovoltaic – the conversion of light into electricity – and typically is in the form of 'solar panels' - solar panels generating electricity

RESILIENCE: The capacity of people and places to plan for, better protect, respond to and to recover from flooding and coastal change [or other impacts of climate change].

Source: National Flood and Coastal Erosion Risk Management Strategy for England. Environment Agency, Jul. 2020

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf

RETROFITTING: Refers to the addition of new components, technology or features to a building, to reduce carbon emissions and increase efficiency. This may include the introduction of smart meters, improved insulation, or the fitting of new windows.

RP Registered provider of affordable housing. Typically a housing association but other organisations can provide affordable housing

SCOPE EMISSIONS • Scope 1 – Direct emissions from owned or controlled sources (such as company vehicles) • Scope 2 – Indirect emissions through purchases made (such as electricity, heat and steam) • Scope 3 – All other indirect emissions from a company's supply chain and associated activities (such as business travel, transportation and distribution, and purchased goods and services)

SEQUESTERED CARBON: carbon dioxide removed from the atmosphere and incorporated in biomass such as timber

SMART HOME CONTROL SYSTEMS: Smart gas and electricity meters help to deliver accurate bills and enable pre-paying customers to track and top-up their credit. The consumption and price data recorded by smart electricity meters enables innovative smart tariffs which can vary the cost of electricity – rewarding consumers with a cheaper rate if they use electricity at off-peak times or when there is excess clean electricity available (HM Government, 2021b, p.72-73). Home energy management systems can be controlled remotely or automatically to optimise energy use and to minimise costs to consumers (HM Government, 2021b, p.73). Smart appliances, including heating appliances, can respond to price signals such as those from smart tariffs, or from national or local flexibility markets (HM Government, 2021b, p.73)

SOCIAL VALUE: Social value is defined through the Public Services (Social Value) Act 2012 which came into force in January 2013 and requires all public sector organisations (and their suppliers) to look beyond the financial cost of a contract and consider how the services they commission and procure might improve the economic, social and environmental well-being of an area. compromising the ability of future generations or populations in other locations to meet their needs

SUSTAINABLE PROCUREMENT A process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only for the organisation, but also for society and the economy, whilst minimising damage to the environment.

SUSTAINABILITY: A characteristic or state whereby the needs of the present and local population can be met without

U VALUE: The rate of transfer of heat through a structure

UKGBC: UK Green Building Council

UPFRONT CARBON: the total GHG emissions associated with materials and construction of a home up to practical completion

WHOLE LIFE CARBON: the total of all the GHG emissions and removals in the construction, operation and demolition of buildings and infrastructure

ZC Zero carbon

NATURAL CAPITAL: Natural capital (as defined by the Natural Capital Coalition) is another term for the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people. All this means is that any part of the natural world that benefits people, or that underpins the provision of benefits to people, is a form of natural capital. Natural capital is a stock, and from it flows ecosystem services or benefits. These services (where service is defined as 'a system supplying a public need') can provide economic, social, environmental, cultural and spiritual benefits. The value of these benefits can be understood in qualitative or quantitative (including economic) terms, depending on context.

PRINCIPAL REFERENCES

Title	Source	Date	Content
The Future Homes Standard	DCLG	2019	Sets out the government's plans that by 2025, a Future Homes Standard will be introduced for new build homes to be future-proofed with low carbon heating and high levels of energy efficiency
Future Buildings Standard	DCLG	2021	Sets out the options for new standards for non-domestic buildings, with a preference for a 27% reduction in carbon emissions. This consultation and response forms the basis for the changes in Building Regulations for non-domestic buildings in 2021
Draft National Policy Statement for Renewable Energy Infrastructure	DBEIS (EN-3) Strategy: Build Back Greene	2021	Provides the primary policy for decisions by the Secretary of State on applications they receive for nationally significant renewable energy infrastructure
Net Zero Strategy: Build Back Greener	HM Government	2021	The strategy sets out the government's vision for a decarbonised economy by 2050 and the long-term plan to achieve that transition. It includes an ambition that by 2035, no new gas boilers will be sold and a target of 600,000 installations of heat pumps a year by 2028.
Building the Case for net zero: A case study for low carbon residential developments	UK Green Building Council	2022	The report gives insight into some of the key considerations that developers, housebuilders, local authorities and consultants need to think about when planning new large-scale residential communities
The Climate Crisis: A Guide for Local Authorities on Planning for Climate Change	TCPA & RTPI	2021	The RTPI and the TCPA believe that climate change should be the top priority for planning across the UK. The Guide sets out how planning can act locally, by making best use of existing policy, legislation, and technology
LETI Climate Emergency Design Guide	LETI (London Energy Transformation Initiative)	2020	Proposes a set of KPI's for reducing energy consumption and GHG emissions; suggests fabric u-values and other measures to achieve these targets for a variety of buildings. Covers wide range of proposals and examples for new building and net zero, embodied energy and data feedback loop.
Net Zero And Sustainability Design Guide – Net Zero Annex	Government Property Agency	2020	The guide provides Key and optimising targets for achieving net zero Operational Energy alongside Whole Life Asset Management considerations
Net Zero Carbon Toolkit	Levitt Bernstein, Elementa, Etude	2021	by. Cotswold, West Oxfordshire and Forest of Dean District Councils (commissioning body), funded by LGA 2021. Illustrated toolkit for new

Title	Source	Date	Content
	and Passivhaus Trust		and retrofit housing, with benchmarks for net zero. and practical design for construction processes and checklists
Climate Change 2022 – Impacts, Adaptation and Vulnerability	Intergovernmental Panel on Climate Change (IPCC)	2022	The IPCC report provides an assessment of climate change impacts and risks as well as adaptation.
Net Zero: Making Essex Carbon Neutral	Essex Climate Action Commission (ECAC)	2021	The report sets out a comprehensive plan for Essex to: reduce its greenhouse gas emissions to net zero by 2050 in line with UK statutory commitments; and to make Essex more resilient to climate impacts. ECAC makes recommendations considered necessary for Essex to be net zero by 2050 as well as achievable. Many recommendations will be well underway, by 2030. Supporting technical reports to 'net zero: Making Essex Carbon Neutral'
Essex Developers Climate Action Charter	Essex Developers Group	2022	The Charter secures collaboration across the development industry to respond to climate change across the built environment sector; Action Plan being prepared