UTTLESFORD DISTRICT COUNCIL

INTERIM CLIMATE CHANGE PLANNING POLICY

Foreword

"The science is evident. Climate Change is happening now. If we fail to act, every living organism on Planet Earth will suffer. Our objective is clear. We must repair mankind's damage and protect our children's future. As the Cabinet Member for Environment and Green Issues, I am absolutely determined to press forward with an agenda based on climate change mitigation and adaptation. In 2019, the Council declared a climate and ecological emergency, which commits to achieving net-zero carbon status by 2030. The Council is also preparing a new Local Plan. This is expected to be adopted in 2024 and will shape the need for climate change mitigation and adaptation, as required under planning legislation.

There is an urgency to take action now. To bridge the gap between the Council's adopted 2005 local plan and the new one, an Interim Climate Change Planning Policy document has been produced on a non-statutory basis. The main purpose of the document is to reiterate to developers that Uttlesford District Council is resolute about climate change mitigation and adaptation measures. The Council expects to see this is taken on board, when building new developments. It should also help officers in their negotiations to bring forward more climate friendly proposals.

In developing this document, officers have worked closely with Essex County Council's Climate Change Commission and the officer team working on that important initiative. I am delighted to be able to say that the County Council has endorsed these interim policies".

Foreword by Councillor Louise Pepper, Cabinet Member for Environment and Green Issues, Equalities, Uttlesford District Council.

"Climate change is one of the biggest challenges facing our generation and future generations. If we do not act now, climate change and its associated impacts will be the single biggest risk facing our world.

As Cabinet Member for Planning at Essex County Council, I was delighted that last year the Essex Climate Action Commission was established to help develop and deliver recommendations to address the climate challenges that we are all facing on a global and local scale. One area that is being tackled as part of the Essex Climate Action Commission is the 'Built Environment' which as a whole currently contributes far too much to greenhouse gas emissions and climate change.
One particular area which will significantly improve the Built Environment's performance, is to ensure that all new development, as part of a future growth agenda for Essex, provides climate friendly proposals in terms climate change mitigation and adaptation measures. This is in recognition that all development that is built now, which does not include a high standards of climate change measures will, add to the size of the climate challenge. Robust and effective planning policies provide an excellent mechanism to ensure that such measures are delivered within new schemes and provide a basis for officers in negotiations with developers to

achieve net zero development. I, therefore, very much endorse the importance and sentiment of these interim policies in advance of an up-to-date adopted local plan as a vital step in addressing and mitigating climate change and its associated impacts.

I therefore welcome Uttlesford District Council's bold step to address the climate change challenges we face now. These policies will hopefully result in more climate friendly developments coming forward in Uttlesford which is good for the local communities, our environment and the planet."

Foreword by Councillor Tony Ball, Cabinet Member for Economic Development Essex County Council

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i) locating the development where the associated climate change impacts and carbon emissions, including those derived from transport associated with the intended use of the development can be minimised, and
ii) promoting development which minimises carbon emissions and greenhouse gas emissions and maximises the use of renewable or low carbon energy generation.

Interim Policy 2: Developers should demonstrate how site surroundings and heritage have influenced their choices over climate change mitigation and adaptation proposals.

Interim Policy 3: 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. A condition on all planning permissions for the erection of new residential development will be imposed to trigger the optional requirement under Part G of the Building Regulations for the maximum potential consumption of wholesome water of 110 litres per person per day.

Interim Policy 4: Development should be designed to provide adequate mitigation against flood risk and to embed suitable water recycling, waste water and waste management so as not to cause contamination of groundwater, particularly in recognised protection zones, of surface water or run-off to river catchments. Where there is the potential for contamination, effective safeguards should be put in place to prevent any deterioration in current standards. A maintenance plan will be required detailing who will be responsible for maintenance of suds and how they will be maintained. This to ensure that SuDS are maintained for the lifetime of the development

Interim Policy 5: Developers should demonstrate how their proposals would not lead to any material decrease in air quality or to significant adverse effects on the environment or amenity and, where relevant, how they would comply with the Saffron Walden Air Quality Action Plan to minimise effects on local air quality and reduce CO^2 emissions._

Interim Policy 6: Developers should demonstrate how their proposals prioritise the natural environment and how through the design, planning and delivery would result in a biodiversity net gain and enhances multifunctionality and multiple benefits for people, wildlife and habitats.

Interim Policy 7: Developers should demonstrate how the level of tree and/or

hedgerow planting that has been proposed is sufficient to i) contribute towards reducing the impact of the proposals on the environment, and ii) improve living conditions for residents, workers and those using any public areas.

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Interim Policy 9: Developers should demonstrate what opportunities have been taken at a neighbourhood level to design-in renewable energy infrastructure and community energy schemes for renewable energy as an integral part of the development, how they have been incorporated, or why they have been rejected.

Interim Policy 10: Developers should demonstrate how the sustainability of their proposals has been enhanced by landform and the selected landscape network.

Interim Policy 11: Developers should demonstrate how future proofing at the layout level has been catered for in their developments.

Interim Policy 12: Developers should demonstrate how green and intelligent design and green infrastructure have contributed to the sustainability of their proposals by reference to the themes in Paragraph 5.1, the general recommendations set out in Paragraph 5.3 and the energy hierarchy in Paragraph 5.37.

Interim Policy 13: Developers should demonstrate how their proposals would promote travel by sustainable transport modes in a manner and to a degree proportionate to the significance of the development proposed, particularly active travel modes (walking and cycling).

Interim Policy 14: Taking into account current national policy, new development should comply with the additional electric vehicle parking and charging standards below:

- all new parking spaces should be adaptable for electric vehicle fast charging (7-22 kW), including through local electricity grid reinforcements, substation design and ducting;
- all new homes with on-plot parking should be provided with at least one installed charging point; and
- at least 20% of parking spaces in new developments should be provided with installed fast charging points, increasing in accordance with the Road to Zero Strategy *(see main policy text).*

1 Background

1.1. In 2019, the District Council declared a climate and ecological emergency which committed to achieving net-zero carbon status by 2030 and protecting and enhancing biodiversity by (amongst other things) producing a bold plan of action that is realistic, measurable and deliverable. As part of that plan of action, the Council has begun a review of the climate change strategy that it adopted in 2018. The 2018 strategy focussed on the mitigation of and adaptation to climate change, including reducing energy consumption and carbon emissions, building to high energy efficiency standards and building in resilience to changing weather and extreme weather events. The subsequent launch of the 'ABC for Life' policy programme has seen the Council commit to tackling three environmental issues in particular: Air quality, Biodiversity and Carbon reduction.

1.2. At County level, the Essex Climate Action Commission has been established. The Commission had its first meeting on 12th May 2020, and brings together academics, politicians and business leaders to identify ways in which the County Council can mitigate the effects of climate change, improve air quality, reduce waste and increase the amount of green infrastructure and biodiversity in the county, whilst also inspiring others to do the same. The County Council has produced the Essex Green Infrastructure Strategy (signed off March 2020) which can be viewed here. The final objectives of the strategy are:

- protect existing green infrastructure, especially designated sites,
- improve existing green infrastructure so it is better functioning for people and wildlife,
- create more high-quality multi-functional green infrastructure, especially in areas of deficiency,
- improve the connectivity of green infrastructure for people and wildlife,
- increase use and inclusivity of green infrastructure across all user groups, social groups and abilities,
- provide green infrastructure facilities to promote health and wellbeing, and
- working with partners to build and secure funding, effective governance and stewardship for new and existing green infrastructure to ensure their long-term sustainability.

1.3. The Council has a duty under Section 19(1)(a) of the 2004 Planning and Compulsory Purchase Act (as amended by the 2008 Planning Act) to ensure that, taken as a whole, local plan policy is designed to secure that the development and use of land in its administrative area contributes to the mitigation of, and adaptation to, climate change. More widely, a net zero emissions target for 2050 is now UK law under the Climate Change Act 2008 (2050 Target Amendment) Order 2019. The reference point for this target is at least 100% below 1990 emission levels.

1.4. The National Planning Policy Framework (NPPF) 2019 sets out in Paragraph 8 three overarching objectives for the planning system for achieving sustainable development, one of which is an environmental one. The objective is:

"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

1.5. The NPPF requires developers to understand the design opportunities available to them to mitigate and adapt to climate change. Chapter 14 (in particular Paragraphs 148-150) provides further guidance on the way that new development should be planned to promote mitigation and adaptation. This includes the management of flood risk through the provision of green infrastructure and the reduction of greenhouse gas emissions through location, orientation and design. Furthermore, Paragraph 118 states "Planning policies and decisions should encourage multiple benefits... including through mixed use schemes and taking opportunities to achieve net environmental gains". In addition, Planning Policy Guidance on climate change (MHCLG 2019) is live, web-based guidance available to all.

1.6. The Uttlesford Local Plan was adopted in 2005. Saved general policies in the plan that are particularly significant to climate change mitigation and adaptation are GEN1 - Access, GEN2 – Design, GEN3 - Flood Protection and GEN7 - Nature Conservation. The weight that can be attached to these policies depends upon the extent to which they comply with the NPPF 2019, which will require a degree of judgment to be made. The Council's recently withdrawn Regulation 19 Plan put forward a number of draft policies designed to contribute towards the mitigation of and adaptation to climate change, in particular those aimed at:

- Sustainable, high quality design and construction
- Minimising flood risk, and
- Provision of electric charging points

1.7. Paragraph 20 of the NPPF 2019 sets out what must be in the strategic policies of local plans and this includes *"planning measures to address climate change mitigation and adaptation"* (Sub-Paragraph (d)). There seems to be no discretion to provide these measures via supplementary planning documents, as the NPPF glossary defines these as being to provide further guidance for development on specific sites, or on particular issues such as design. Similarly, Planning Policy Guidance restricts any local changes to the Building Regulations to the local plan process, therefore ensuring they are subject to independent examination, sustainability appraisal and whole-plan viability testing. The parts of the Building Regulations that mainly impact on mitigation of and adaptation to climate changes are Parts G (sanitation, hot water safety and water efficiency), L (conservation of fuel/power) and M (access/use of building).

1.8. Within Uttlesford, there are three "made" neighbourhood plans which are material considerations in the determination of planning applications. These are for Felsted, Great Dunmow and Thaxted. In drawing up proposals for development within these settlements, developers must take these plans into account. For instance, the Great Dunmow plan emphasises the importance of

street trees in climate change mitigation and adaptation, and contains a useful appendix on suitable trees. The Felsted plan comments on the link between landscape and health and the contribution to climate change mitigation that green infrastructure and green space can make by reducing run-off and flooding, by providing carbon capture and providing opportunities for wildlife. Other neighbourhood plans are at an earlier stage of preparation and so carry less weight at this stage, but should still be taken into account.

2 Purpose of the Interim Policy

2.1. Following the withdrawal of the Regulation 19 Plan, it is likely to take the Council three years to prepare and submit a new local plan for examination. Recognising its Section 19(1)(a) duty, the Council has produced this interim policy to set out how it intends to judge whether development proposals adequately mitigate and adapt to climate change, bridging the existing adopted local plan and its successor. The Council fully recognises that the interim policy will need to be applied proportionately in each case – the scope for mitigation and adaptation measures will be greater in larger schemes – and that there may be options that the guidance does not consider.

2.2. The interim policy partly relies on existing published guidance from well-known and/or established sources. Of particular note are:

National Design Guide (NDG) (MHCLG 2019): The NDG addresses how the Government recognises "well-designed places" including opportunities for climate change measures. The NDG defines what constitutes a well-designed place using ten characteristics under three themes of *climate, character* and *community.* Under the climate theme, homes and buildings should be functional, healthy and sustainable, resources should be efficient and resilient and buildings should be made to last - link here. Well-designed places are a recurring theme in this interim policy document.

The Policy Playbook: Driving sustainability in new homes – a resource for local authorities (UK Green Building Council (UKGBC) – March 2020): For the development industry, the Playbook provides consistency around the requirements expected from it across different parts of the country, which reduces potential burdens and provides stability for investment in higher standards - link here.

Essex Design Guide 2018: The latest update provides recognised design guidance with cross-over sustainability coverage. It explains the key ingredients to what makes quality places and spaces, including green infrastructure - link here.

Essex SuDS Design Guide 2020: For use by developers, designers and consultants who are seeking guidance on the Lead Local Flood Authority's standards for the design of sustainable surface water drainage in Essex. It provides guidance on the planning, design and delivery of attractive and high-quality SuDS schemes which should offer multiple benefits to the environment and community alike link - here.

2.3. This interim policy is one way that the District Council can respond to both the inspiration offered by the Essex Climate Action Commission and the objectives set out in Essex Green Infrastructure Strategy. Developers can respond as well, and they are strongly urged to engage with the Council at the pre-application stage as

encouraged in the NPPF 2019 (Paragraphs 39-46).

The zero-carbon Essex Business School in Colchester, Essex

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3 The Uttlesford Context - Enhancing Surroundings

3.1. The NDG sets out the Government's priorities for well-designed places. It defines context as the location of the development and the attributes of its immediate, local and regional surroundings. The following checklist has been compiled by the Council mainly from the NDG, but is not exclusive:

- surrounding local area;
- immediate surrounding landscape, built development including layout, built form, scale, density and appearance;
- heritage, local history and vernacular design styles;
- site features/landform/environment/flood risk, water quality, noise, air, micro climate;
- local climate issues/designations such as Air Quality Management Areas (AQMA);
- nature/biodiversity;
- appropriate innovations/opportunities for climate change measures; and
- maximising the use of sustainable transport modes.

3.2. Using the checklist, the Council highlights the following points:

Surrounding local area

3.3. Uttlesford is primarily rural with small historic towns and villages rich in sensitive heritage and complex, often quality landscape. Topography can enhance the importance of visibility and some views, both nearer and longer. Uttlesford has the lowest population density of any district or borough in Essex with high levels of car ownership and a restricted extent of public transport, especially in the more rural areas. All these are challenges to achieving sustainable development. The district has two main transport corridors (M11/West Anglia Mainline and the A120). Stansted Airport lies within the district, bringing a complex set of economic, social and environmental effects to bear, including those as a result of the Covid-19 pandemic.

3.4. Traditional Essex architecture styles are distinctive and widespread across the district. The location of a development can enhance positive qualities and mitigate negative ones.

Saffron Walden in Uttlesford
(source: Saffron Walden Tourist Information Centre)

Immediate surroundings

3.5. Well-designed development is shaped by understanding context. It identifies opportunities for design and its constraints in proportion to the nature, size and sensitivity of the site/proposal (see later sections of this interim policy). A simple analysis may be appropriate for a small site. Baseline studies covering a wide range of topics are likely to be required for a larger site. Well-designed development fits into its surroundings and takes careful account of;

- landscape character/incorporating natural features which influence siting;
- patterns of built form/precedents for routes and spaces to inform location and siting; and
- local prevalent architecture that makes character and which informs appearance

3.6. This does not mean well designed places need to copy their surroundings. Innovation can and should include measures for climate change mitigation and adaptation.

Heritage

3.7. It is important to understand the heritage of the site and how it can influence climate change mitigation and adaptation, and create new character. The significance of any designated or non-designated heritage assets including their setting should influence design and appropriate innovations. The NDG contains examples of good practice where new homes relate positively to heritage assets

and setting through proportions, openings and materials, including sloping topography while appropriately maximising density. Well-designed places contribute to local distinctiveness using local landscape or topographical features, materials, colours, and plants. More is said on this in the Green and Intelligent Design section of this interim policy.

Interim Policy 2: Developers should demonstrate how site surroundings and heritage have influenced their choices over climate change mitigation and adaptation proposals.

Water Consumption

3.8. The water (hydrological) cycle is the journey water takes from land to sea and back again:

1. *Evaporation* causes water vapour to be formed from water on land, in rivers, lakes and seas, which rises into the air,
2. *Condensation* from cooling forms clouds,
3. *Precipitation* causes water to fall back to the ground as rain or snow, and
4. *Collection* occurs as water reaches lakes or rivers, taking it back to the sea, restarting the cycle.

3.9. In relation to the water cycle and demand for water, the district is in an area of water stress where water for new development relies on efficiencies in current usage. The District's Water Cycle Study (Arcadis 2018) states that:

"The Uttlesford District is partly underlain by a chalk aquifer of regional importance and the Environment Agency currently class the surface water and groundwater resources within the District as over-licensed or over-abstracted, meaning there is no additional water available for supply. This highlights the importance of further developing policies to encourage the conservation of water in new and existing dwellings, and commercial properties".

3.10. The study further states that the Council is:

"considering a development control policy advised by the EA and partners to help mitigate impacts, requiring developers to show how, through the installation of certain components and fittings as well as rainwater harvesting where possible, water use per person per day will be limited to a lower rate than the current statutory requirements".

Interim Policy 3: 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. A condition on all planning permissions for the erection of new residential development will be imposed to trigger

the optional requirement under Part G of the Building Regulations for the maximum potential consumption of wholesome water of 110 litres per person per day.

Surface drainage, flood risk and management of waste water and waste.

3.11. Paragraph 165 of the NPPF states that major developments should incorporate sustainable drainage schemes. A requirement under Paragraph 165 is to take account of advice from the lead local flood authority, in this case Essex County Council, which has published its SuDS Design Guide with a requirement of not increasing flood risk on or off the site. It is important to use the SuDS Design Guide, as it sets out the standards expected of any SuDS scheme so that it is suitable for approval, adoption and subsequent maintenance. In accordance with the NPPF, SuDS schemes should not be used only if there is clear evidence that to use them would be inappropriate. In the Uttlesford context, it is very important that SuDS systems are designed so as not to increase the bird hazard risk to the safe operation of aircraft at Stansted Airport. Where necessary, long-term maintenance and the management of bird hazards will need to be secured by planning condition or obligation.

3.12. Surface water flood risk is an issue within the district, as is run-off to river catchments. In minimising flood risk, development needs to comply with flood risk assessment and management requirements set out in the NPPF, Planning Practice Guidance and the Uttlesford Strategic Flood Risk Assessment (May 2016) – link here to address current and future flood risks from all relevant sources. The County Council holds the locations and details of these events, and they can advise on what is best suited to the site. The role of tree planting in absorbing groundwater is important.

3.13. Appropriate SuDS measures can capture run off from new hard surfaces – these measures include;

- constructed wetlands,
- permeable surfaces/ swales, and water gardens subject to acceptable drainage
- retention ponds,
- green roofs and walls,
- bio retention areas
- woodland creations and leaky dams
- river restoration (natural meanders and bank profiles).

3.14. For example, water gardens provide 30% more retention than a lawn.

3.15. Development should embed sustainable waste management, recycling of grey water and waste water mitigation. Development proposals should demonstrate that adequate foul water treatment and disposal already exists or can be provided in time to serve the development.

Sustainable drainage at the New Hall development in Harlow, Essex

Interim Policy 4: Development should be designed to provide adequate against flood risk and to embed suitable water recycling, waste water and waste management so as not to cause contamination of groundwater, particularly in recognised protection zones, of surface water or run-off to river catchments. Where there is the potential for contamination, effective safeguards should be put in place to prevent any deterioration in current standards. A maintenance plan will be required detailing who will be responsible for maintenance of suds and how they will be maintained. This to ensure that SuDS are maintained for the lifetime of the development

Air quality

3.16. Although rural in character, the District experiences some traffic congestion and air pollution along the main access corridors and at pinchpoints, including in Saffron Walden, Great Dunmow, Newport, Thaxted, Stansted Mountfitchet, Elsenham and Stansted Airport. Saffron Walden has an Air Quality Management Area (AQMA) with an Air Quality Action Plan 2017-2022 – link here, as well as subsequent Air Quality Technical Planning Guidance (2018) here. The technical guidance provides useful information on how air quality will be factored into decision making. It also provides helpful guidance on preparing an Air Quality Assessment which is a validation requirement for many types of planning application.

3.17. The Air Quality Action Plan has three key objectives:

i. early as possible reduction in NO^2 levels to ensure national air quality objectives are not exceeded at relevant receptor locations within the life of the plan;
ii. avoidance of the displacement of emissions from one hotspot to another such that there is the potential for new exceedances at other locations; and
iii. a general reduction of vehicle emissions, and to seek to contribute to a reduction of CO^2 emissions into the atmosphere for climate change mitigation purposes.

3.18. New development should deliver high standards of sustainable design, which by definition will minimise adverse impacts on the environment, including air quality. Paragraph 181 of the NPPF makes it clear that planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of AQMAs.

Interim Policy 5: Developers should demonstrate how their proposals would not lead to any material decrease in air quality or to significant adverse effects on the environment or amenity and, where relevant, how they would comply with the Saffron Walden Air Quality Action Plan to minimise effects on local air quality and reduce CO^2 emissions.

Nature and biodiversity

3.19. Our natural environment contributes to the quality of a place, and to people's quality of life, and it is a critical component of well-designed places. Natural features are integrated into well-designed places. They include natural and green and blue infrastructure, high quality public open and green spaces, street trees, and other trees, grass, planting and water. Uttlesford has specific nature issues including;

- water bodies/headwaters in the Thames Water area – limited dry weather flow and a fragile ecology;
- Hatfield Forest Site of Special Scientific Interest - air quality
- Essex Coast Recreational disturbance Avoidance and Mitigation Strategy (RAMS)

3.20. Well-designed places can take these issues into account through:

- integrating existing, and incorporating new natural features into a multifunctional network that supports quality of place, biodiversity and water management, and addresses climate change mitigation and resilience; and
- prioritising nature so that diverse ecosystems can flourish to ensure a healthy natural environment that supports and enhances biodiversity.

3.21. Well-designed places provide usable and multifunctional green spaces, taking into account their potential to contribute to a strategic green infrastructure system, and to water management. Open spaces include public, shared and private outdoor spaces with:

- a variety of natural and designed landscapes for everyone, with different functions to suit a diverse range of needs;
- well-integrated drainage, ecology, shading, recreation and food production that achieve a biodiversity net gain as required by Defra's 25-year Environment Plan – link here; and
- well-considered maintenance and management regimes based on an understanding of the costs for occupants or users.

3.22. Water management maintains healthy water systems and is important for effective sustainable drainage systems. In well-designed places, water features form part of an integrated system of landscape, biodiversity and drainage. This includes new water features that manage drainage and also existing watercourses. Together with green and brown roofs, swales, rain gardens, rain capture and other drainage, water features create multifunctional 'green' sustainable drainage systems. They also enhance the attractiveness of open spaces and provide opportunities for play, interaction and relaxation. Alternatively, developments may be designed to adapt to flood conditions. Examples may include a terraced open space where lower levels may become a water feature, or homes with habitable rooms lifted above flood level.

3.23. Well-designed places include site-specific enhancements to achieve biodiversity net gains at neighbourhood, street and household level. Green corridors can be used to extend and enhance existing ecosystems. Existing areas of valuable biodiversity are protected and enhanced. Priority is given to rare or critical habitats and species. Biodiversity net gain delivers measurable improvements for biodiversity by creating or enhancing habitats in association with development. Paragraph 174 of the NPPF encourages measurable net gains for biodiversity. As part of well-designed places, the Council would encourage the provision of;

- tree-lined avenues (where located outside of highway land);
- bird and bat boxes;
- areas for rewilding;
- measures to prevent pavement parking; and
- allotments (where locally supported)

3.24. Biodiversity net gain can be achieved on-site, off-site or through a combination of on-site and off-site measures. Natural England has published the Biodiversity Metric 2.0 tool, which provides a way of measuring and accounting for biodiversity losses or gains resulting from development or land management change. Use of this tool is set to become a legal requirement once the Environment Bill becomes law. Information on the metric is on the Natural England website – link here.

3.25. Applicants are encouraged to submit a Biodiversity Net Gain Plan with their

applications but, if they do not, the Council can secure this information prior to commencement of the development using a planning condition. The Environment Bill as drafted will require a 10% increase in biodiversity value, so applicants are encouraged to maximise the opportunities. Use and enhancement of brownfield sites should give a particular boost to biodiversity.

Interim Policy 6: Developers should demonstrate how their proposals prioritise the natural environment and how through the design, planning and delivery would result in a biodiversity net gain and enhances multifunctionality and multiple benefits for people, wildlife and habitats.

Tree and/or Hedgerow Planting

3.26. The Council views the planting of trees and/or hedgerows with great importance, and in its Corporate Delivery Plan 2020/21 has pledged to increase the number of trees in the district. A tree planting project plan and local policies linked to its new climate change action plan will both be published in 2021. One aim is to plant more trees on public land, and another to develop policies to require developers, where appropriate, to plant trees and/or hedgerows as part of new developments.

3.27. The NDG identifies a number of functions for trees and/or hedgerows as integral parts of developments, and not as "add-ons" afterwards. These include:

- softening impact, including within car parking areas,
- absorption of CO^2,
- adding to biodiversity,
- providing shade and/or helping to manage solar gain,
- providing character to landscaped courtyards, public areas and street scenes, and
- as part of SuDS schemes.

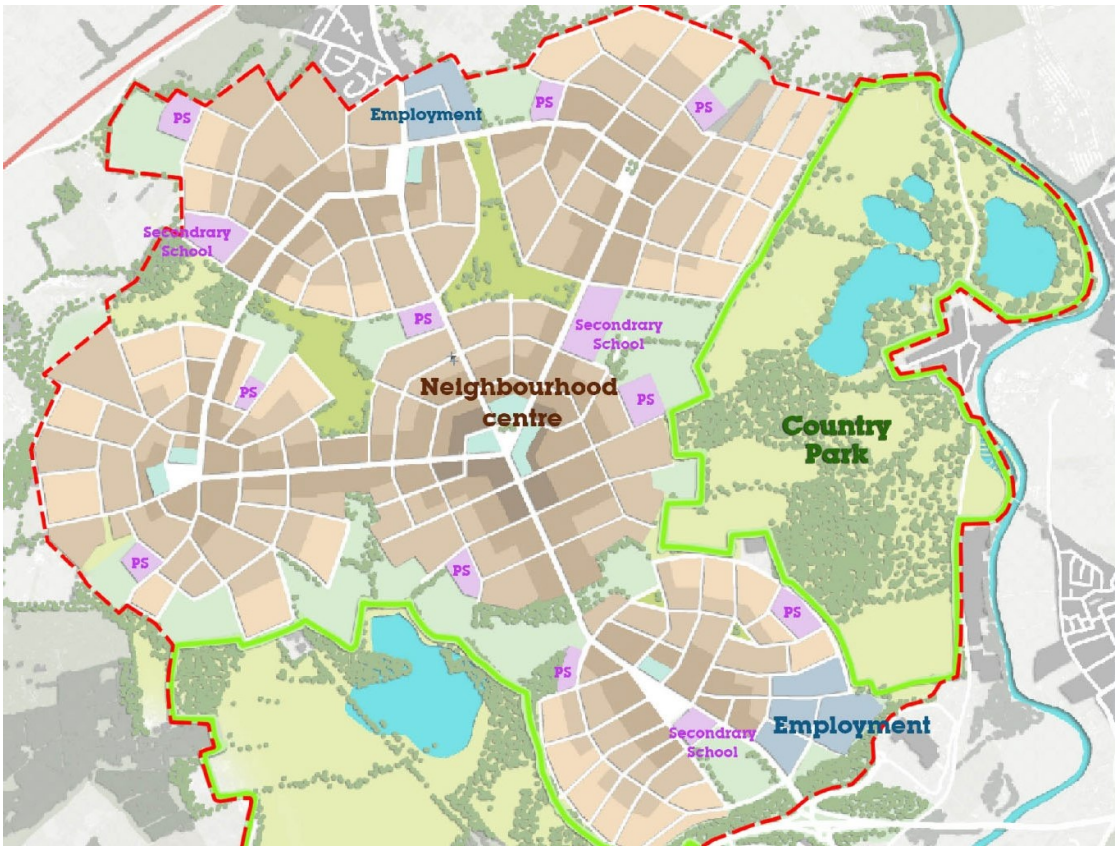
3.28. At the pre-application stage, and when assessing submitted proposals, the Council will carefully consider the contribution that the planting of appropriate trees and/or hedgerows in the right locations could make to meet the functions set out above, particularly the absorption of CO^2. The Council will seek a level of tree and/or hedgerow planting proportionate to the scheme's impact, where necessary incorporating a planting and management plan. This should include an assessment of existing trees and hedgerows on site and mitigation measures to protect the retained features and ideally these incorporated within the design of the development early on in the process. An appropriate starting point would be five trees per house. All felled trees should be replaced.

Interim Policy 7: Developers should demonstrate how the level of tree and/or hedgerow planting that has been proposed is sufficient to i) contribute towards reducing the impact of the proposals on the environment, and ii) improve living conditions

for residents, workers and those using any public areas.

4 Character, Built Form and Site Layout

4.1. This section covers a range of urban design themes relating to the general arrangement and form of an area's building blocks, corridors (e.g. streets) and spaces. It complements guidance found in the Movement section by helping set up the settlement patterns needed to support sustainable transport. It shows how energy use and pollution should be minimised translated to area-level planning and design. Other areas covered include landscape networks, landform, and futureproofing.



Uxcester garden community concept focussed on walkable centres, rapid transit stops and countryside
(source: URBED)

Development Densities

4.2. More compact forms of development are fundamental to sustainable development patterns, not least by protecting the countryside and walkable access to it from self-perpetuating car-orientated sprawl. However, it needs to be tailored and selectively applied to the local context. Highest densities are generally most

appropriate in the most sustainable locations, such as nearest large mixed use centres and those most accessible by public transport with regular services. However, and especially in relation to intensification, this approach should be moderated by the specific local context, for example relating to immediate neighbours, local character, landscape setting, visual impact and heritage. Increased densities will increase the proportion of the population within walking and cycling convenience of local amenities, employment and friends, thereby reducing motorised vehicle usage and related infrastructure, supporting local shops, services and businesses for all, improving the viability of neighbourhood scale renewable energy distribution, and providing opportunities for community forums.

4.3. The design of higher density development needs to be focussed on enhanced efficiency and place-making, to maximise the benefits of close-knit communities, whilst mitigating possible problems, ensuring quality standards are still met. Possible problem issues include a perceived lack of space and greenery, air pollution, noise, decreased privacy and reduced freedom to safely roam. The following supporting place making measures are appropriate as densities increase:

- increased experiential relief though architecture, materials and public art;
- streets with less space provided for vehicles and increased pedestrian priority, amenity and possibly greenery, such as through pedestrianisation, filtered permeability and homezone type measures such as local 20mph speed limits;
- reduced car parking provision, where it is supported by enhanced walkability, cycle infrastructure, regular public transport, and sharing of parking/vehicles;
- more discreet and less land hungry car parking arrangements, such as remote, mechanical, multi-storey, underground, podium, undercroft and integral. For example, large new car parks (100 spaces and above) should generally be stacked and/or underground;
- more sharing of uses and vertical mixing of compatible uses;
- relatively taller buildings, though still generally low rise befitting the rural context, i.e. similar to historic town cores such as Saffron Walden;
- increased usage of existing basements supported by lightwells and light pipes;
- increased provision of roof gardens and balconies if ground level gardens reduce;
- increased focus on the quality of private and public space including street space;
- increased consideration of district sustainability systems (e.g. district heating) which become more viable as densities increase; and
- where appropriate, urban waste and recycling systems which minimise detrimental impact on the public realm including space requirements.

Compact townhousing at Accordia in Cambridge

Mixed and Shared Use

4.4. Mixed use development refers to different co-located uses, which might be vertically mixed within a building (e.g. residential above retail) or neighbouring in the immediate area. Shared use refers to flexible properties which accommodate different users or uses at different times (e.g. a school which acts an out-of-school-hours community resource) and/or cooperative type arrangements which share communal facilities for greater efficiency, e.g. co-housing and co-working. Within a residential environment, there is merit in considering the juxtaposition of accommodation for elderly people and start-up houses for young people. Start-up housing could include houses for rent and well-designed affordable studio flats for first time buyers with rooftop gardens.

4.5. There is growing recognition at the national level that sprawling single use developments such as out-of-town retail and office parks servicing suburban housing estates are damaging local communities and the environment, by fostering a self-perpetuating car-dependent society. By contrast, mixed and shared use development such as typically in traditional settlement cores, offer a number of potential benefits. Mixed use development should provide more convenient walking and cycling access between homes, amenities and employment, reducing the need for motorised transport and providing a captive market for local business. It should contribute to a robust and multi-faceted place and is more flexible to change (instead of requiring replacement). The sharing of uses at different times should, subject to necessary discussion with the relevant

outside bodies, maximise the efficient use of land and potentially increase the economic viability of uses. Mixed and shared use development should also help provide a more continuous community presence, better able to self-police the public realm. Focussing on walkable centres should ensure mutually supportive synergies, convenience of custom and cross pollination.

4.6. Notwithstanding potential benefits, neighbouring uses need to be compatible and suitably designed to maximise potential synergies, minimise conflict and facilitate future change. There is an opportunity to ensure the public realm, town centres/squares, village greens etc. are welcoming and are places where people would want to meet and enjoy rather than a means to pass through and get to shops or get from A to B. To facilitate the vertical mixing of uses, it will often be appropriate for buildings in centres to be designed with separate, convenient and secure access to upper/basement floors. The Council recommends the following;

- new retail and service uses of 100m2 or more should generally only be in designated (town-local) centres or where this might positively contribute to a new/existing suitably located centre;
- new E(g) business use development of 100m2 or more should generally only be provided within or co-located to an existing or new suitably located centre;
- away from centres, new or enlarging small scale retail and E(g) Business Use of less than 100m2 could be appropriate on a case-by-case basis, with a view to promoting walkable commercially responsive enterprise though at a scale which shouldn't compete with designated centres and which would not unreasonably disturb neighbouring uses and infrastructure;
- new retail and services should generally be suitably scaled in themselves and in combination, primarily in response to the local walkable catchment population;
- other complementary uses, such as housing, need to be provided above retail wherever appropriate, contributing to the efficient use of land and spatial qualities;
- new dwellings should be within easy walking and cycling distance of designated centres, schools and employment relative to the settlement population and scale (size and range) of such non-residential uses, e.g. within 400m walking distance of a suitably scaled local/village centre and 800m of a suitably scaled town centre for settlement populations of 8,000 people and more. This means locating homes within easy walking and cycling access of existing designated centres, schools and employment, and/or providing new/additional amenities and employment within easy access as a pre-condition for residential development;
- proposals for new homeworking and co-working space are encouraged as a means of reducing commuting, subject to satisfying other planning policies;
- industrial and other such uses should be located, designed and, where appropriate buffered) to be compatible with neighbouring uses, giving the maximum opportunity for workers to arrive and depart by sustainable transport modes;
- other out-of-town amenities and workspace of more than 100m2 could be appropriate if that use couldn't be reasonably co-located to a centre due to compatibility issues (e.g. specific security issues), there is particular synergy

of use (e.g. leisure centre co-located next to a park), there are transport issues (e.g. pickup of heavy goods), the inherently low density nature of development would inappropriately reduce a designated centre's primary catchment population (e.g. schools and garden centres) and/or reasonable access is still provided by sustainable transport modes..

New mixed use centre at Buttermarket in Poundbury, Dorset

Natural Temperature and Lighting and Air Quality Control

4.7. Guidance on thermal mass, solar gain and daylighting (discussed in the Green and Intelligent Design section) also relates to layout of block form. However, at this larger scale level, it is even more important to consider against wider sustainability objectives as part of a holistic design approach. Therefore, it may be appropriate to accept lower daylighting standards for non-priority rooms (e.g. bedrooms) if necessary to provide sustainable densities in urban areas and in a way which is more consistent with the close-knit local vernacular.

4.8. In relation to air quality, conflicts of land use should be avoided or mitigated, though again also being mindful of wider place making objectives. For example, (i) it is generally preferable not to have residential areas downwind of industrial areas, and (ii) development adjoining main roads with air quality issues will often require a balanced solution considering often competing Secure by Design and townscape considerations.

Interim Policy 8: Developers should demonstrate to what extent density and the mix of uses of their developments contribute towards climate change mitigation and adaptation.

Renewable Energy

4.9. Guidance in the Green and Intelligent Design section outlines possible sources of renewable energy which could be upscaled to the neighbourhood level. However, at this larger scale level, it is even more important to not to lose sight of wider sustainability principles as part of a holistic design approach. There's also a very active community energy group in Saffron Walden https://www.swce.co.uk/

4.10. From a layout and block perspective it is important that renewable energy infrastructure is 'designed-in' or at least robustly facilitated early in the design process. For example this might involve co-locating some infrastructure, such as larger wind turbines, to adjoining industrial areas, maximising efficiencies for district heating systems, reserving space within built-up areas for a ground source heat pump and allowing for any development restrictions around such infrastructure.

Interim Policy 9: Developers should demonstrate what opportunities have been taken at a neighbourhood level to design-in renewable energy infrastructure and community energy schemes for renewable energy as an integral part of the development, how they have been incorporated, or why they have been rejected.

Landform Responsive

4.11. The design of new developments should take into account the existing landform and take advantage of any opportunities this presents to contribute to the sustainability of the development. For example, dips in the topography could be used to incorporate a natural sustainable drainage system and buildings on slopes could use split levels to increase densities.

Landscape Network

4.12. Landscaping of high ecological and carbon storage value should, where possible, surround and penetrate into and benefit settlement areas. Typically this will involve wildlife buffers to intensive farmland, wedges, corridors, links and spaces as part of a permeable wildlife network linking to and ecologically interchanging with the countryside. This will combine with and complement strategies for public amenity, foot (and cycle) paths, food production and SuDs contributing to wider sustainability objectives. The multiple benefit approach also avoids the risk of providing too much landscaping especially within settlement areas leading to dispersed populations, increased travel distances including to surrounding countryside, and, in turn, increased car usage.

The Avenue development in Saffron Walden, Uttlesford
(source: Pollard Thomas Edwards)

4.13. The network will be primarily pedestrianised (including at the edges of open space) to minimise detrimental ecological disturbance, though predominantly framed by frontage development to increase access, maximise community enjoyment and generate self-policing. The primary network should be reasonably seamless and with gaps minimised. Any necessary road crossings of pedestrianised corridors should, where possible, be narrowed and suitably treated to minimise the obstacle to wildlife, pedestrians and cyclists. Opportunities for narrowing new or existing roads more generally will be welcomed where appropriate, subject to meeting highway authority requirements. Existing landscape features of value should be retained where possible.

4.14. The secondary element of the landscape network will be landscaping to trafficked streets such as through avenue and incidental tree planting, verges and hedgerow/woodland buffers.

4.15. Materials to be used for public roads, paths and hard landscaping should be in accordance with principles outlined in the Green and Intelligent Design section alongside highways standards contained in the Essex Design Guide – link here.

Interim Policy 10: Developers should demonstrate how the sustainability of their proposals has been enhanced by landform and the selected landscape network.

Future Proofing

4.16. Layouts and block forms need to be reasonably robust and adaptable, to minimise maintenance requirements and, as appropriate, facilitate further development, redevelopment and alterations which allows buildings to be

preserved for longer and areas to evolve over time. This is particularly true for town-local centres given rapidly changing markets. For example, buildings composed of traditional materials and flexible construction techniques as characterises historic cores can often more easily be redeveloped incrementally, combined, broken-down, remodelled and converted, compared to inherently more monolithic and inflexibly constructed buildings.

4.17. In accordance with the Essex Design Guide, streets should suitably plan for and facilitate future maintenance works and the installation of emerging technological infrastructure, such as smart street lights, street furniture, cycle parking and electric vehicle charging infrastructure.

4.18. Autonomous vehicles are likely to radically change how we use cars. Most experts predict parking co-located to destinations will be largely replaced by on-demand predominantly shared autonomous vehicles, which when not in use will be parked in depots at the edges of settlement areas. The amount of space given over to car parking within residential and mixed use areas is therefore likely to reduce substantially. Instead, drop-off and pick-up areas will most likely need to be integrated into highways either immediately outside destinations or within easy walking distance for car free zones. It is impossible to accurately predict the future and therefore for now, designs should be reasonably robust and adaptable to facilitate different scenarios, including considering how old parking areas might be reused/developed.

Interim Policy 11: Developers should demonstrate how future proofing at the layout level has been catered for in their developments.

5 Green and Intelligent Design

5. Green and Intelligent Design

5.1. This section covers materials used in individual buildings and associated outdoor private areas. It firstly outlines general requirements and then looks at how this can be achieved through more detailed thematically structured advice and requirements. Themes covered, and which relate to climate change mitigation and adaptation are:

- sustainable materials;
- living walls and roofs as part of green and blue infrastructure;
- reducing waste;
- natural temperature, lighting and air quality control;
- renewable energy; and
- future proofing.

National Policy Background

5.2. The revised National Planning Policy Guidance on Climate Change (March 19) allows local authorities to set standards higher than nationally required. The Planning and Energy Act 2008 also allows local authorities to require a reasonable proportion of energy used in development to be from renewable local sources.

General Recommendations

5.3. The following recommendations will help developers meet the Council's commitment to achieve net-zero carbon status by 2030, supported and moderated by national policy and local authority guidance, for example contained in the UKGBC Policy Playbook.

1. If permitted by emerging national policy, all new homes (including conversions) should meet the Future Homes Standard and be net-zero carbon;
2. In the meantime, all new homes (including conversions) should achieve:
   (i) Code for Sustainable Homes Level 4 or equivalent;
   (ii) a 19% minimum reduction on the dwelling (carbon dioxide) emission rate (DER) against Target Emission Rate (TER) as defined in the 2013 Building Regulations, and
   (iii) future-proofing to enable all new homes to be easily and affordably upgraded to be net-zero carbon by 2030 without diminishing the overall design;
3. All new non-residential development (including conversions) providing more than 25m^2 of floor space should achieve net-zero carbon status;

4. Applicants should calculate indoor air quality (CO^2 and humidity) and overheating risk performance for all new buildings (including conversions) providing more than $25m^2$ of floor space, ensuring buildings will operate in accordance with appropriate recommended levels for that use;
5. Applicants should demonstrate how the development maximises opportunities for renewable energy but an absolute minimum of 25% renewables should be achieved;
6. Applicants should assure that performance will match design stage predictions for all new buildings (including conversions) providing more than $25m^2$ of floor space. This can be done through:

- demonstration of the development teams own internal processes and quality controls;
- demonstration of working within a third party process or system to ensure that standards are met on site, e.g. BEPIT Better Building Tool Kit or NEF's Assured Performance Toolkit;
- certification against independent assessment frameworks, e.g. Home Quality Mark (HQM), BREEAM, Passivhaus and Energiesprong; and
- energy assessment which, as a minimum should include the following:
    i. a calculation of the energy demand and carbon dioxide emissions for the proposed buildings using approved Building Regulations software and carried out by a qualified energy assessor;
    ii. evidence that, as far as practicable, the development's design has been optimised to take into account solar gain, daylighting, ventilation and air quality (Design Optimisation);
    iii. evidence that, as far as practicable, the development's fabric performance minimises energy loss (Fabric Improvement); and
    iv. evidence that renewable energy sources have been considered and incorporated into the development where appropriate.

Passivhaus affordable housing in Wimbish, Uttlesford

Sustainable Materials

5.4. This section covers materials used in both buildings and outdoor areas, including public and private realms. Selection and use of sustainable materials should balance a number of complementary/standalone/competing direct and indirect criteria:

- **A.** *Sustainable resource* – Materials which do not unreasonably deplete non-renewable natural resources or threaten environmental systems are needed to mitigate climate change and its effects;
- **B.** *Low embodied energy, greenhouse gases, pollution and water* – This describes low net amounts of energy use, pollution including greenhouse gases (notably carbon), and water usage, relating to materials during their life cycle, though extraction, manufacture, transport, installation, maintenance, replacement and end of life. It should be noted, trees, straw and other plant-based materials uniquely store carbon (accumulated when living and until the material degrades/burns);
- **C.** *Efficient use* – Avoiding excess use of materials and built footprint;
- **D.** *Minimised construction waste* – Designs and construction processes which minimise waste (including ground material), with any waste sustainably re-used or recycled where possible;
- **E.** *Passive climate, air and moisture control* **–** Materials which contribute to an effective package of (i) thermal insulation and thermal mass, and (ii) air quality including (moisture) breathability; which minimises pollution, the need for mechanical systems and risk of moisture-related degradation;
- **F.** *Cool roofs* – Roofs which are more solar reflective and heat emissive, to avoid excessive heat absorption, overheating of buildings and in turn the creation of urban heat islands. [ref: The Global Cool Cities Alliance (January 2012), A Practical Guide to Cool Roofs and Cool Pavements – link here];
- **G.** *Robust materials and sustainable maintenance* **–** Materials which can be easily maintained, replaced (including through long-term availability) and adapted, without the need for unsustainable maintenance or excessive replacement;
- **H.** *Reusable and recyclable* – Materials which can be easily and sustainably extracted, reused and recycled, to reduce demand for raw material, waste and pollution derived from demolition/extraction;
- **I.** *Inert and biodegradable* – Materials which if spilt, shed, abandoned or forming waste will not have an adverse impact on the environment or require unsustainable treatment processes;
- **J.** *Timeless quality and character* – Materials which have a timeless and locally responsive use and sensory appeal, which people are less likely to replace or cover over as times change; and
- **K.** *Cost, buildability, performance and availability* – next best sustainable solutions will be sought, if, evidently, the above sustainable materials criteria cannot be reasonably met due to viability, buildability and in use performance issues, and the issue can't be designed-out.

5.5. These criteria strongly point toward local natural materials being the best options, including:

- clay stock bricks (gault and soft red), tiles and pavers;
- native timber framing, weatherboarding, shingles, edging, boarding and fencing;
- lime render, plaster and mortar;
- limewash wall coating;
- straw/reed/flax roofs and insulation;
- earth walls such as cob, and in wattle and daub;
- flint walls and paths; and
- local gravel/hoggin tracks and paths.

5.6. Use of these natural materials is to be preferred, subject to detailed specification, sustainable sourcing, context and appropriate design. Other materials that are also favoured are those benefiting from appropriately recognised sustainability certification/endorsement, such as following the BRE's Environmental Profiles Methodology and Life Cycle Assessment – link here, subject to satisfying the above *Timeless Quality and Character* criteria.

5.7. The Council strongly recommends that materials should be specified from suppliers who participate in an applicable responsible sourcing scheme such as the BRE BES 6001:2008 Responsible Sourcing Standard. For example, all timber should be sourced from schemes supported by the Central Point of Expertise for Timber Procurement, such as Forest Stewardship Council (FSC) accreditation, which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability.

5.8. Other materials will be judged on their own merit in relation to any given scheme on the information provided (or lack of it), informed by latest technologies, current national policy and recognised research. Fake (and obviously inferior) interpretations of natural facing materials should be avoided without compelling supporting evidence. These materials include plastic (except possibly for utilities, sports pitches and facing wood composite windows), fibre-cement timber-effect cladding and slate-effect tiles, and concrete clay-effect bricks and tiles.

5.9. It is the developer's responsibility to consider materials selection early enough in the design process to ensure proposals are buildable and affordable. Paragraph 130 of the NPPF guards against the material diminution of the quality of approved development between permission and completion, for example through changes to the materials to be used.

5.10. Attention is drawn to further guidance on sustainable materials, such as:

- Green book live. Available online here;
- RICS professional standards and guidance, UK. Whole life carbon assessment for the built environment, 1st edition, November, 2017. Available online here; and
- Waste and Resources Action Programme (WRAP) Embodied Carbon Database. Available online here.

Modern Methods of Construction

Proposed custom build pre-fabricated housing for Beechwood Village in Basildon, Essex (source: Pollard Thomas Edwards)

5.11. Modern methods of construction are focussed on enhancing products and processes. They aim to improve manufacture, delivery and construction efficiencies, quality, timescale and performance. Typical methods include:

- panellised units produced in a factory and assembled on-site to produce a three-dimensional structure;
- volumetric construction to produce three-dimensional modular units in controlled factory conditions prior to transport to site; and
- floor or roof cassettes, pre-cast concrete foundation assemblies, pre-formed wiring looms, mechanical engineering composites and innovative techniques such as tunnel form or thin-joint block work.

5.12. Adopting a manufacturing process in construction has some potential advantages in terms of sustainability over traditional methods of construction:

- wastage can be more easily monitored and significantly minimised through the process of factory production, refinement and repetition of processes;
- offsite manufacturing minimises the time (and energy) spent on site thereby minimising pollution and disruption at a site level;
- a significant reduction in HGV movement at construction sites for modular construction compared against traditional construction;
- workers are likely to be more geographically concentrated around a specific factory, minimising travel around the country;
- factory conditions can give greater quality control over construction, helping close the gap between design and as-built environmental performance;
- the regular testing of products can be carried out systematically, with improvements factored into the design process on an on-going basis.

5.13. Nevertheless, modern methods of construction are also often associated with

some disadvantages. Potential issues include (significant) restrictions on design options, fixing the design earlier in the process, taking work away from local tradesman and reducing the future adaptability of buildings.

Living Walls and Roofs

5.14. Living walls and roofs describe a range of sustainability measures relating to the external building envelope.

5.15. There are two distinct types of *living walls* – green 'walls' with vertically applied growth medium, hydration and fertigation, and green 'facades' which rely on climbing plants growing up from ground level.

5.16. *Living roofs* come in various guises. Green roofs are predominantly or completely covered with vegetation, under which is growing medium and a waterproof membrane. Intensive green roofs are specifically designed for recreational amenity such as gardens and sports pitches. Brown roofs are similar to green roofs, the main difference being the choice of growing material (usually locally sourced rubble, gravel, soil etc. similar to brownfield sites), which is typically self-seeded, leading to a different type of bio-diversity and more informal outlook. Blue roofs are designed to explicitly store and gradually release or reuse water (rainwater and/or greywater), through active or passive processes which might be enclosed or openly visible. Lastly, there are predominantly hard surfaced roof gardens and terraces, which rely on contained beds or pots for planting.

5.17. The principal potential benefits of living roofs and walls which developers should consider are:

- *improved energy balance* - Greenhouse gases are reduced as vegetation stores carbon and improves thermal properties (and in-use costs) through insulation and the cooling effects of evapotranspiration;
- *outdoor amenity* - Accessible roof space can contribute to outdoor recreational amenity, with the option to drive a more compact (sustainable) pattern of development without compromising liveability standards;
- *food production* – Growing vegetables and herbs, e.g. rooftop farms and allotments on large buildings, and pots and edible walls relating to individual properties;
- *ecology* – Increased ecology and biodiversity;
- *SuDs* – Living roofs and to a lesser degree living walls, can store and slow down the passage of rainwater to help prevent flooding, with potential usage including water treatment, rainwater harvesting, greywater recycling, ecology and recreational amenity; and
- *enhanced visual impact* – Living greenery can help buildings settle into the landscape and relieve urban settings, including from upper storey windows.

Edible living wall

5.18. Living roofs and walls also provide some potential challenges in addition to those associated with flat roofs. They are heavier and increase the use of contentious materials such as plastics needed to prevent water and root egress. They also require increased maintenance.

5.19. On balance and in response to the Uttlesford context, the Council considers that the following should apply to all new developments:

- all new roofs of more than 25m^2, which are flat or have a pitch of less than 25 degrees, should be a suitable type and design of living roof, unless conflicting with the rooftop provision of solar panels; and
- living walls should be considered as a possible option on buildings, though especially if needed to help mitigate visual impact on otherwise unacceptably blank and/or architecturally unrelieved façades.

Reducing Waste

5.20. Construction and operational waste can have significant environmental impacts, not least on greenhouse gases contributing to climate change.

Construction Waste

5.21. The Sustainability Statement, submitted as part of a planning application, should outline measures for reducing construction waste, and maximising reuse and recycling. For schemes following sustainability accreditation schemes such as BREEAM, reference can be made to credits being targeted under the waste

section of the methodology. In some cases, notably for major developments, a Site Waste Management Plan may be required through a planning condition.

5.22. There are a range of methods that can be implemented to reduce construction waste. WRAP identify five key principles – link here that design teams relating to all forms of construction can use during the design process to reduce waste:

- design for reuse and recovery;
- design for off-site construction;
- design for materials optimisation;
- design for waste efficient procurement; and
- design for deconstruction and flexibility.

Operational Waste

5.23. Local waste, recycling and pickup arrangements for single houses or groups of houses need to be designed to facilitate reuse and recycling, without unreasonably dominating buildings, streets and spaces.

5.24. In most situations it will be best for refuse bins intended for collection to be stored out of public view to the rear of properties, easily accessible through individual plots (e.g. driveways) or via convenient secure communal routes. Where refuse bins are required to be within public view, they need to be discreetly and attractively integrated. Similarly, collection points need to be accessible and easy to find from both storage points and collection vehicles, but without unreasonably impacting on the street scene and efficiency of a place. The Essex Design Guide provides further guidance on highways related standards – link here to the specific section.

5.25. To facilitate segregated household recycling, new homes should be fitted with separate appropriately sized and integrated bins, corresponding with the recycling and waste collection policy for the local area. At least three separate internal bins are required with a total capacity of at least 30 litres and each with a capacity of at least 7 litres. A compost bin is also required for any ground floor private garden of 50m² or above. For further advice and guidance, please contact Uttlesford District Council's Waste Services team.

Natural Temperature, Lighting and Air Quality Control

5.26. Internal environmental conditions are affected by climate change, and can be regulated by measures aimed at climate change mitigation and adaptation:

- thermal insulation is a material's ability to resist heat transfer between internal and external temperatures, to prevent heat gain and loss. Materials with high thermal properties tend to be light for their mass, e.g. air cavities, wool and to a lesser degree wood.

- thermal mass is a material's ability to absorb, store and release heat (when surrounding temperatures decrease). Materials with a 'heavy' thermal mass include concrete, brick and rammed earth;
- solar gain is the increase in heat of a space or material as it absorbs solar radiation;
- daylighting describes the internal natural lighting of a building;
- natural ventilation is the process of air moving into and out of an indoor space without the use of mechanical systems;
- heat, moisture and pollutants derived from household occupants (including plants and pets), activities (e.g. cooking) and essential mechanical infrastructure (e.g. night-time lighting).

5.27. Night-time lighting is a key consideration, as light pollution (especially the widespread use of LED lighting) can affect many nocturnal species such as bats and owls, can severely affect dark locations and activities such as astronomy.

Thermal Insulation and Mass

5.28. In most cases the thermal insulation of the outward building envelope will be the key ingredient for passively producing favourable internal temperatures. Materials with high thermal mass can also be tactically used to reduce temperature fluctuations over the course of the day. If materials with a high thermal mass are used as part of the external building envelope (e.g. for visual appeal), these are usually combined with good insulating materials and/or cavities. However, if used in sufficient thickness some can still prevent heat transfer on their own. A good example of this is thick solid cob walls.

Solar Gain and Daylighting

5.29. Within the building, through orientation, layout, fenestration and detailed design, thermal mass is ideally placed where it can still be exposed to low-angle winter sunlight (solar gain), through windows. In the summer, the internal thermal mass should ideally be obscured from sunlight or at least higher-angle sunlight, though might be used to absorb excess internal air temperature during the day if this can be ventilated out of the building at night.

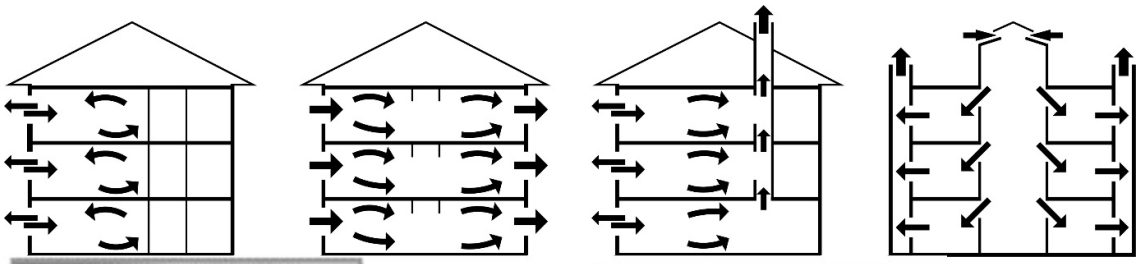
5.30. Another priority for solar design is daylighting which makes buildings more attractive, pleasant and energy-efficient, at least if avoiding glare. Site Layout Planning for Daylight and Sunlight: A guide to good (BRE 2011) provides established guidance on such matters. Whilst the Council endorses this guidance, it is important not to lose sight of other sustainability principles as part of a holistic design approach. Therefore, it may be appropriate to accept lower daylighting standards for non-priority rooms (e.g. bedrooms) if necessary to provide sustainable densities in urban areas and in a way which is more consistent with the close-knit local vernacular.

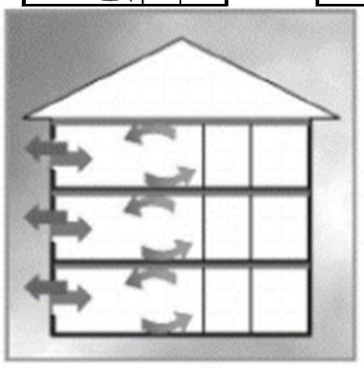
5.31. Where appropriate, daylighting can be increased by orientating windows toward the sun (south), enlarging windows and incorporating a shallow plan design. Building depths should generally be restricted to facilitate adequate light penetration and outlook. For necessarily deep plan buildings, supplementary

devices may be required, for example considering roof lights, atriums, lightwells and light pipes. Conversely, there may be a need to control excess heat and glare, for example using roof overhangs, trees, fixed or manually adjustable louvered devices such as brise solei, shutters and curtains.

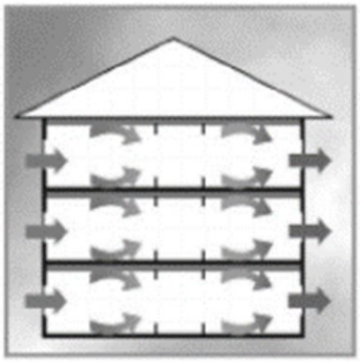
Ventilation and Air Quality

5.32. Natural ventilation has an impact on both air temperature and quality. There are two types of natural processes driving ventilation in buildings: (i) wind driven ventilation arising from wind-related air pressure differences around the building where openings permit internal access, and (ii) buoyancy-driven ventilation as a result of temperature differences.
There are four main types of ventilation systems as illustrated below:

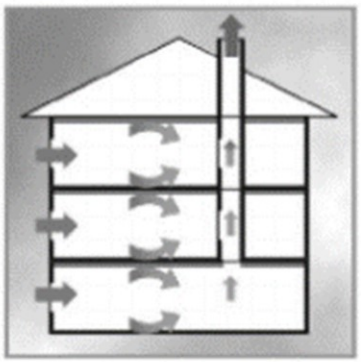




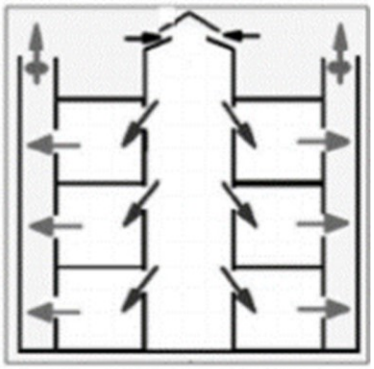
(a) Single-side ventilation



(b) Cross flow ventilation



(c) Stack ventilation



(d) Top-down ventilation

Single-side ventilation | Cross flow ventilation | Stack ventilation Top-down ventilation

5.33. *Single-side* and *crossflow* rely on passage through walls, for example through openable windows, wall vents or window/door trickle vents. Passive *stack* ventilation additionally involves a vertical duct up to a protruding rooftop vent. *Top-down* ventilation primarily relies on a wind-catcher (tower) at roof-level to draw in air and when appropriate extract out hot and stale air. Stack and top-down ventilation both provide opportunities for rooftop architectural interest.

5.34. As well as reducing excess air temperature, ventilation is increasingly necessary to reduce internal pollution (principally CO^2) and potential allergens etc. proportionate to a building's airtightness. For example for buildings adopting a highly airtight design approach, such as Passivhaus, a mechanical ventilation unit with heat recovery is considered essential for maintaining healthy CO^2 levels.

5.35. Humidity levels are also key to internal air quality. For most buildings, humidity levels of between 40-60% should be maintained. If humidity levels are too high it can facilitate the growth of fungi and bacteria that can cause respiratory problems and/or allergic reactions, accentuate the feeling of hot and cold air temperature, increase dust mite populations and result in condensation forming on colder parts of the building (e.g. windows) potentially damaging materials. Ventilation is key to controlling excess humidity. Low humidity levels are associated with dryness (e.g. skin, eyes and mouth) and increased vulnerability to cold, flu and corona viruses. Internal humidity levels can significantly reduce in winter months as cold air holds less vapour and internal heating systems push internal moisture outside or onto intervening colder building surfaces.

5.36. Good humidity levels might be naturally maintained in the winter by minimising air loss, though this usually has an adverse impact on air quality without mechanical ventilation with heat recovery and humidity control. Alternatively, unfired earth materials such as cob might be used for their unique ability for helping regulate indoor humidity levels by absorbing excess moisture when humidity levels are relatively high and releasing it when they're low.

Renewable Energy

5.37. The energy hierarchy had five priorities:

- Priority 1 – Energy conservation
- Priority 2 – Energy efficiency
- Priority 3 – Renewables
- Priority 4 – Low emission
- Priority 5 – Conventional

5.38. Priorities 1 and 2 are similar in that they focus on using less energy by changing wasteful behaviour and by the use of technology (such as the installation of more efficient gadgets and the provision of insulation). Even where energy

needs have been minimised and energy efficiency maximised, buildings will still have some energy requirements. Where possible and/or if required this should be achieved by renewable energy (Priority 3), with such options including:

Photovoltaics (PV)

5.39. PV converts light into electricity. Panels are normally on the roof, but can also be on the ground or wall mounted. Roof integrated (rather than attached) systems can mimic traditional tiles which may be required in sensitive locations. The production of PV panels is energy intensive and involves some pollutants. However, they generate no in-use pollution and are low maintenance. Perovskite solar panels are more lightweight, powerful and affordable than silicon, and come in a variety of colours. Energy output is dependent on favourable positioning (e.g. south facing roof) and weather, with most systems connected to the grid to mitigate shortages and at night. Alternatively, battery storage offers increased energy independence. PV installation costs are still quite high, though this can be recovered through energy cost savings and feed-in-tariffs. Where possible, large discreet rooftops such as flat roofs or adorning industrial-type 'sheds' should be used as rooftop solar farms actively feeding into district systems and/or the national grid.

Integrated photovoltaic clay-type roof tile
(source: Romag)

Solar Water Heating

5.40. Solar water heating systems uses clean and direct energy from the sun to provide hot water supplies. A supplementary hot water supply will be required

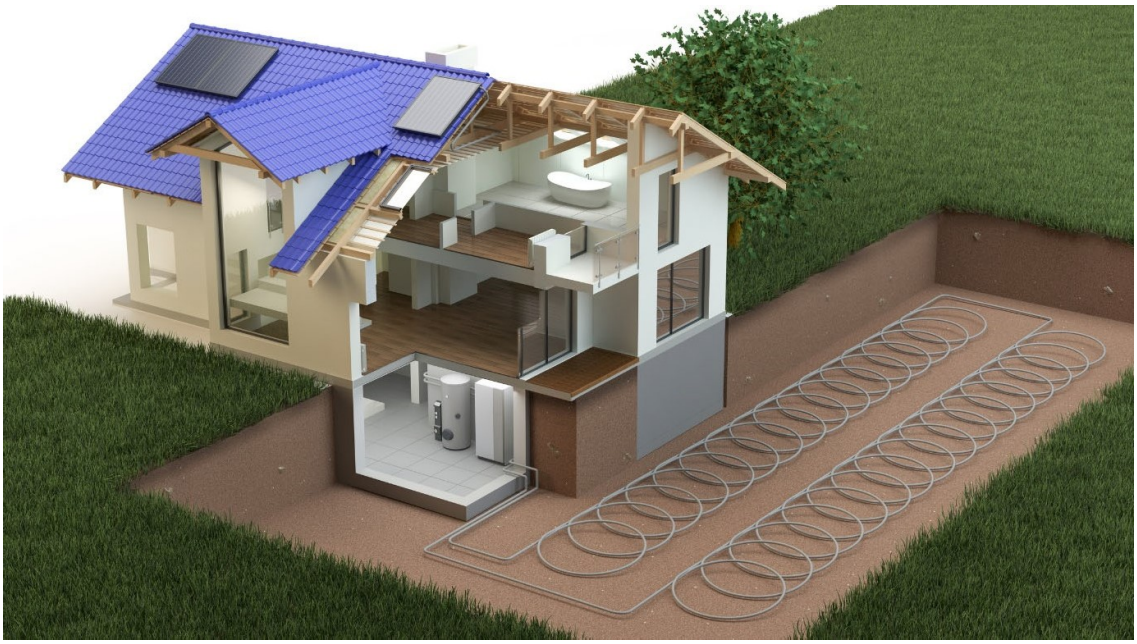
when solar energy is insufficient, for example when it's too cloudy, during winter months and to increase water temperatures. Water heating is not provided at night, though hot water can supplied by the required storage tank.

Small and Micro Wind Turbines

5.41. The UK has the biggest potential for wind power in the world. Small and micro wind turbines generate electricity the same as their larger equivalents, by using windblown rotating blades to drive a turbine. Small wind turbine blades are typically 1.5-3.5m in diameter and able to generate 1-10KW. These tend to be free-standing or on large buildings away from sensitive receptors. With their smaller blades and more disproportionately limited capacity, micro wind turbines are better suited to urban, suburban and sensitive locations, though normally only supplement energy supply even on windy days. The size, siting and design of wind turbines needs to suitably address other issues, such as visual impact, noise and vibration.

Ground Source Heat Pump (GSHP)

5.42. A GSHP is a central heating and/or cooling system which uses looped piped liquid (water mixed with anti-freeze) in the ground to transfer ground heat to or from a building via an exchanger and pump to amplify conversion. Pipes might be sunk horizontally (a metre or so beneath the ground). Where there is insufficient space, vertical boreholes can instead be drilled to extract heat from much further down, typically 90-160m deep. GSHPs take advantage of the earth's geothermal properties which absorbs and stores heat resulting in constant moderate temperatures similar to average yearly outside air temperatures. GSHPs use electricity but generally have a low environment impact.



Horizontally sunk ground source heat pump

(source: Energy Saving Trust)

Water Source Heat Pump

5.43. This operates similar to GSHP, except it utilises relatively consistent temperatures found in suitable bodies of water, such as a rivers, streams or lakes.

Air Source Heat Pump

5.44. An air source heat pump transfers heat energy between the inside and outside of a building to provide heating and cooling. It uses a refrigerant system involving a compressor and a condenser to absorb heat energy at one place and release and concentrate the energy at another. They are generally cheaper than GSHPs, but typically generate less energy and can affect the external appearance of a building.

Biomass Heating

5.45. Biomass systems burn wood, plants or other organic matter in the form of pellets, chips, logs etc. to provide warmth in a single room or to power central heating and hot water boilers. It is considered a renewable energy and low carbon option, given it can utilise waste material and there is scope for replacement tree planting (carbon storage) to mitigate carbon emissions from burning. Biomass systems produce pollutants including nitrogen dioxide, particles and sulphur dioxide, which are more than for an equivalent gas boiler, though less than for a coal or oil powered boiler.

Micro Hydroelectric Power

5.46. This typically produces 5-100kW of electricity using the natural flow of water from a river or stream, perhaps focussed on a waterfall to maximise flow pressure. Micro systems can provide power to an isolated home or small community. It is considered a green, renewable energy and doesn't release carbon dioxide or other pollutants into the air. There will be impacts on aquatic ecosystems and particularly if the hydroelectric system involves damming.

Thermal Stores

5.47. Thermal stores complement renewable energy technologies by storing excess generated thermal energy for hours, days or even seasons until it's required. Technologies vary depending on the form of renewable energy technology. Potential storage media include water or ice-slush tanks, masses of native earth or bedrock, deep aquifers, insulated gravel and water filled pits, eutectic solutions and phase-change materials.

Micro Combined Heat and Power

5.48. Combined heat and power (CHP) is a highly efficient technology, capturing and utilising the heat that is a by-product of the electricity generation process, reducing carbon emissions compared to separated generation via a boiler and

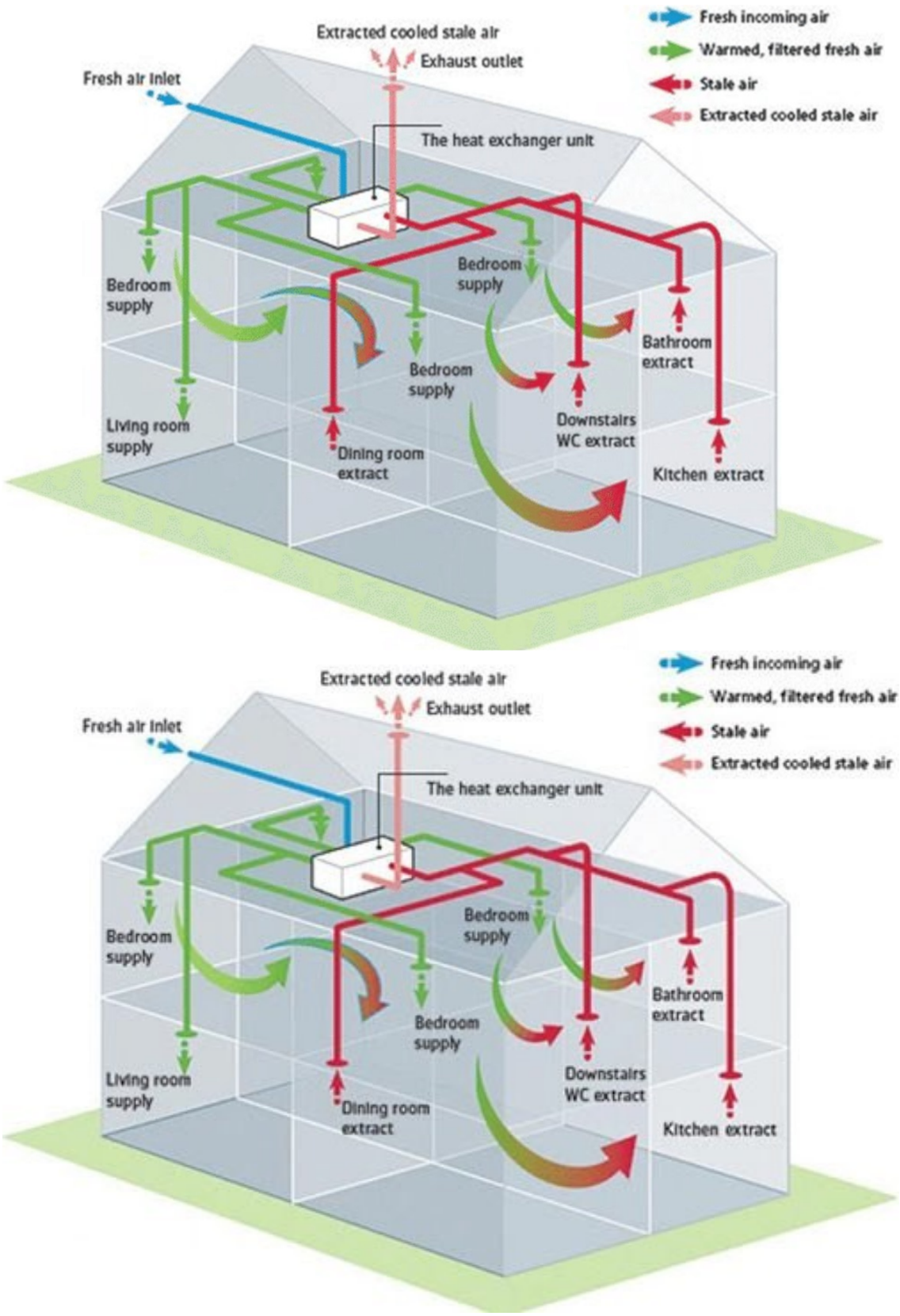
power station. It might provide for a single family home, small community or office building. Micro-CHPs currently tend to use fossil fuels such as gas and LPG, though the use of renewable energy supplies is growing, such as biomass, vegetable oil, woodgas and even solar thermal.

District Heating and Cooling

5.49. District heating systems distribute heat from a centralised source through insulated pipes to multiple residential and/or commercial properties. This centralised heat source can be generated from renewables including biomass, solar and geothermal. District heating systems can provide increased efficiencies and improved pollution control compared to single property systems. Metering is essential for fair billing and in turn control excess usage. Cooling is rarer in UK district systems, though might be considered particularly for groupings of new office buildings.

Smart Technologies

5.50. Technology can help property users respond to and exploit natural processes to reduce the net need for energy, increase the effectiveness of renewable energy and enhance building performance. The scope of smart home technologies includes lighting, outlets and power strips, heating and ventilation, window coverings, water heating and home energy management systems. For example, heating and lighting controls in response to occupancy, mechanical brise-solei in response to sunlight, tracking solar panels and mechanical ventilation with heat recovery to complement a highly airtight design approach such as Passivhaus.



Mechanical Ventilation with Heat Recovery Unit
(source: Indoor Air Quality in UK Homes and Its Impact on Health)

5.51. Priority 4 highlights the continued use of fossil fuels, but employing carbon capture and storage technology to reduce their impact, or switching from coal to natural gas as it is the cleanest fossil fuel.

Future-proofing

5.52. Buildings need to be reasonably future-proofed to minimise maintenance and, as appropriate, facilitate extensions, alterations, repairs and maintenance. For example, buildings should be future-proofed to connect/install new emerging technologies through appropriate cabling and easily accessible ducting.

5.53. The Covid-19 pandemic has helped to focus minds on how lives might change or adapt, and for how long. For instance, developers should consider (where space is available) how design and layout could cater for such things as subsequent periods of lockdown, increased homeworking and the need to isolate individual family members.

Interim Policy 12: Developers should demonstrate how green and intelligent design and green infrastructure have contributed to the sustainability of their proposals by reference to the themes in Paragraph 5.1, the general recommendations set out in Paragraph 5.3 and the energy hierarchy in Paragraph 5.37.

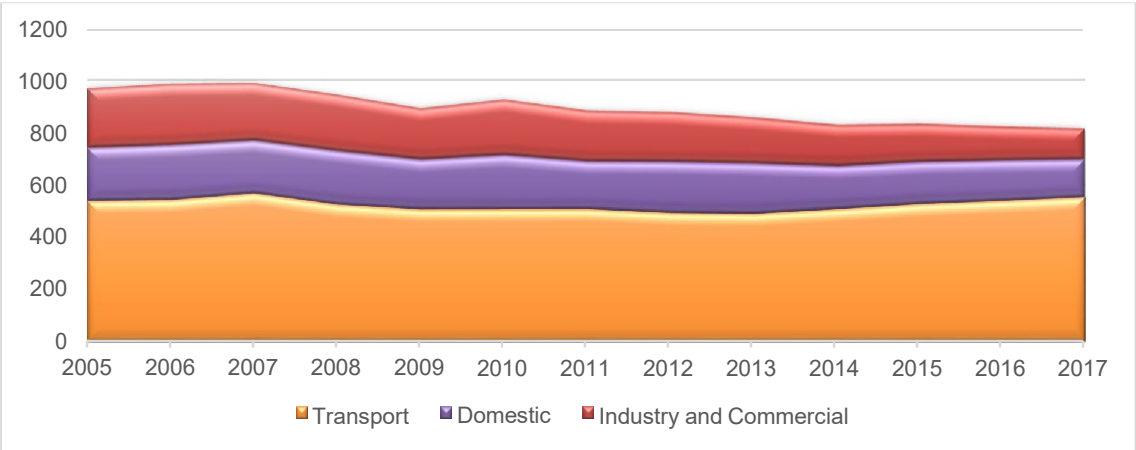
6 Sustainable Transport

Movement

6.1. Policy GEN1 of the Local Plan states that development will only be permitted if it encourages movement by means other than driving a car. Chapter 9 of the NPPF includes considerably more detail on how sustainable transport should be promoted. Paragraph 103 states that significant development (not defined) should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. However the same paragraph contains an acknowledgement that opportunities to maximise sustainable transport solutions will vary between urban and rural areas.

6.2. Paragraph 79 of the NDG also confirms that, in well-designed places, "people should not need to rely on the car for everyday journeys, including getting to workplaces, shops, schools and other facilities, open spaces or the natural environment."

6.3. The graph illustrated below uses Government statistics here to illustrate the estimated carbon dioxide emissions in the district. It emphasises the importance of addressing stubbornly-high transport emissions, which are almost exclusively from road transport and do not include aviation.



Uttlesford CO_2 emissions (kt CO_2), 2005-2017

6.4. It is the role of the plan-making process to take a strategic view of the area and direct development to certain locations. However, the site allocations in the 2005 Local Plan only addressed needs up to 2011 and a new plan is yet to be produced. This means decisions must be made on a case-by-case basis as to whether a development would be focused on a location which is or can be made sustainable. These judgments will always be based on the specific circumstances of each case. The below lists are not exhaustive but provide some examples of the factors which could be relevant;

- the scale of the proposed development compared with the existing settlement;
- the potential for additional trip generation by any mode including car, bus, rail, walking and cycling; and
- the cumulative impacts of multiple developments in the area.

6.5. Whether a location is or can be made sustainable:

- the presence of, or potential for, footpath and cycle route connections to the existing settlement and other nearby attractors e.g. employment sites and leisure;
- the presence of, or potential for, bus stops and train stations with frequent services;
- whether the proposed design prioritises the quality of the walking and cycling environment over the practicality of car use;
- whether homes are designed with space for home-working, and developments with space for co-working; and
- whether the development includes uses which would reduce the need for existing and future residents to travel elsewhere.

6.6. The NDG states that a well-designed movement network defines a clear pattern of streets that:

- is safe and accessible to all;
- functions efficiently to get everyone around, takes account of the diverse needs of all its potential users and provides a genuine choice of sustainable modes;
- limits the impacts of car use by prioritising and encouraging walking, cycling and public transport, mitigating impacts and identifying opportunities to improve air quality;
- promotes activity and social interaction, contributing to health, well-being, accessibility and inclusion; and
- incorporates green infrastructure that creates a sense of place but also an attractive environment that encourages active travel as well as acting as a green corridor, including street trees to soften the impact of car parking, help improve air quality and contribute to biodiversity.

6.7. To demonstrate compliance with Policy GEN1 and the NPPF, the Council's validation checklists require the submission of either a transport statement or transport assessment (for major applications). Also, there is a requirement for travel plan statements for schemes employing 20 or more staff or comprising over 50 residential units.

6.8. In line with Paragraph 108a of the NPPF, the Council will carefully consider whether all opportunities have been taken to promote sustainable transport, given the type of development and its location. Taking into account Paragraph 110, this will include but not be limited to:

- extending existing footpaths and cycle routes and adding new ones to ensure connectivity to the existing settlement and other nearby attractors e.g. employment sites and leisure;
- relocating existing bus stops and adding new ones to facilitate easy access to existing bus services;
- exploring with the County Council whether there is potential for increased/additional bus services; and
- ensuring that designs prioritise the quality of the walking and cycling environment over the practicality of car use

Checklist for new housing developments from Transport for New Homes

6.9. Transport for New Homes is funded by the Foundation for Integrated Transport – link here which was formed in 2014 to make transport better for people and the environment.

6.10. The Transport for New Homes Checklist can be used by local authorities, developers and neighbourhood groups alike to identify car-dependent housing plans. The Checklist will help to identify how such plans could be improved. The Checklist – link here has been developed with input from bodies representing planning and transport professionals, as well as planners, academics and neighbourhood groups. Use of the checklist is strongly recommended by the Council for all new residential or commercial development as part of transport assessments or statements.

Carefree (with remote parking) development planned for Tilehurst in Berkshire (source: U&I)

Interim Policy 13: Developers should demonstrate how their proposals would promote travel by sustainable transport modes in a manner and to a degree proportionate to the significance of the development proposed. particularly active travel modes (walking and cycling).

Electric Vehicle Charging

6.11. Policy GEN8 of the Local Plan requires development to comply with Supplementary Planning Guidance on Vehicle Parking Standards. Those standards have since been updated by the Essex-wide Parking Standards: Design and Good Practice (2009) – link here and the Uttlesford Local Residential Parking Standards (2013) – link here.

6.12. Since these standards were adopted, national policy has been updated to reflect the increasing uptake of electric vehicle technology. Paragraph 105 of the NPPF includes a requirement that local parking standards should take into account the need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles.

6.13. The electric car market is growing quickly, with more than 273,000 models on UK roads at the end of February 2020. The most recent set of figures from the Society of Motor Manufacturers and Traders shows that plug-in models made up 5.7% of total UK new car registrations.

6.14. The Government's Road to Zero Strategy – link here sets out an ambition for at least 50% and as many as 70% of new car sales to be ultra-low emission by 2030, alongside up to 40% of new vans. The strategy proposes a range of market interventions and policies which are likely to result in a steep increase in the uptake of electric vehicles. In recent announcements, the Government proposes as Step 1 that new petrol and diesel car sales will be phased out by 2030. As Step 2, all new cars and vans are to be fully zero-emission at the tailpipe from 2035. Between 2030 - 2035, new cars and vans can be sold if they have the capability to drive a significant distance with zero-emissions.

6.15. To meet this trajectory, it is therefore important that provision of charging facilities exceeds that growth to support uptake and more importantly, that there is passive provision in new developments to future-proof the installation of charging facilities.

Interim Policy 14: **Taking into account current national policy, new development should comply with the additional electric vehicle parking and charging standards below:**

- **all new parking spaces should be adaptable for electric vehicle fast charging (7-22 kW), including through local electricity grid reinforcements, substation design and ducting;**

- **all new homes with on-plot parking should be provided with at least one installed charging point; and**
- **at least 20% of parking spaces in new developments should be provided with installed fast charging points, increasing in accordance with the Road to Zero Strategy as follows:**

Year	Minimum standard
2020	20%
2021	23%
2022	26%
2023	29%
2024	33%
2025	37%
2026	42%
2027	48%
2028	55%
2029	62%
2030	70%