North Herts Council

Sustainability

Supplementary Planning Document

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Foreword

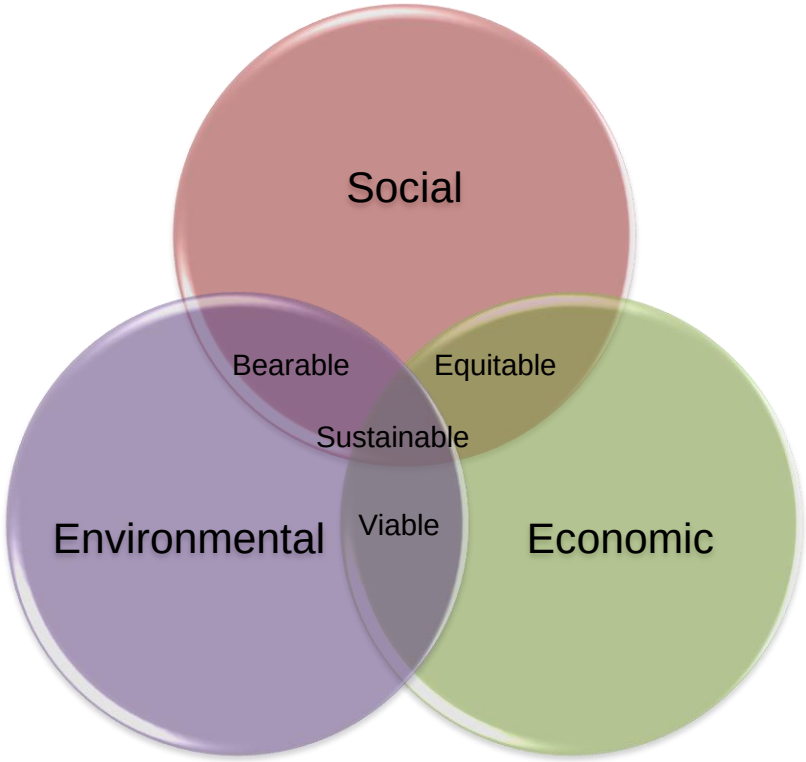
This Supplementary Planning Document sets out the standards required to meet the visions, objectives and policies of the North Herts Local Plan as sustainably as possible. It comes at a critical time in the approach to climate change and the environmental crisis by both local and national government, and after Parliament revised the 2008 Climate Change Act to bring carbon reductions to 100% by 2050.

List of Acronyms

BNG	Biodiversity Net Gain
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CO_2	Carbon dioxide
EIA	Environmental Impact Assessment
EPC	Energy Performance Certificate
EV	Electric vehicle
FRA	Flood Risk Assessment
GBI	Green and Blue Infrastructure
GHG	Greenhouse Gas
GI	Green Infrastructure
HCC	Hertfordshire County Council
HERC	Hertfordshire Environmental Records Centre
HMMP	Habitat Management and Monitoring Plan
IPCC	United Nations Intergovernmental Panel on Climate Change
LETI	London Energy Transformation Initiative
LNR	Local Nature Reserves
LNRS	Local Nature Recovery Strategies
LWS	Local Wildlife Sites
NHLP	North Herts Local Plan
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
PV	Photovoltaic
SAB	SuDS Approval Body
SAC	Special Area of Conservation
SFRA	Strategic Flood Risk Assessment
SPD	Supplementary Planning Document
SSSI	Sites of special Scientific Interest
SUDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
UNFCCC	United Nations Framework Convention on Climate Change
WLC	Whole Life Carbon

Introduction

1.1. Sustainability refers to meeting the needs of the current generation without compromising the ability of future generations to meet their own needs. In the context of planning, sustainability refers to the development of policies, programs, and projects that are environmentally sound, socially just, and economically viable.



1.2. Sustainable planning takes into account the three pillars of sustainability:

- **Environmental** - protecting the natural environment and resources;
- **Social** - ensuring that everyone has access to basic needs such as housing, food, and healthcare; and
- **Economic** - creating a strong economy that can provide jobs and opportunities for everyone.

1.3. There are many ways to incorporate sustainability into planning. Some common approaches include:

- **Conserving resources**: such as adapting existing buildings and developing new energy-efficient buildings which provide a sustainable approach to heating and lighting, recycling and composting, and reducing waste;
- **Planning for climate change**: for example planting trees to mitigate urban heat island effect, developing drought-resistant crops and building seawalls to protect coastal communities from flooding.

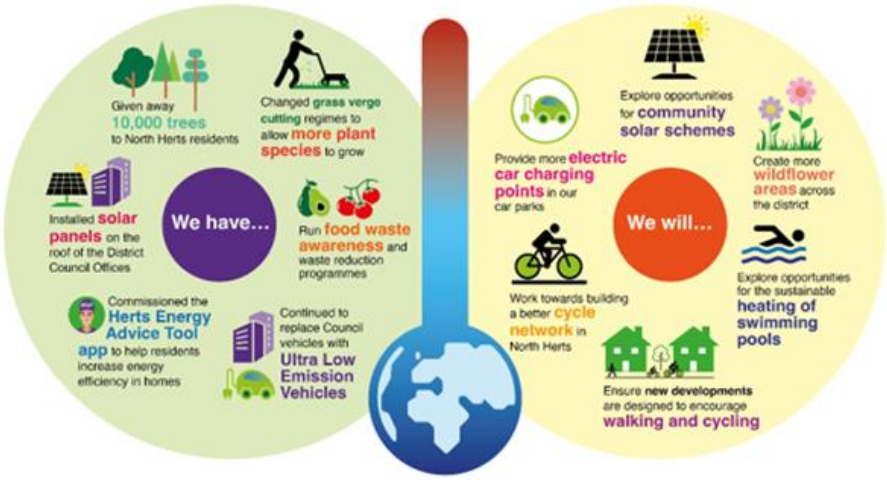
- **Creating equitable communities**: providing affordable housing, investing in public transportation, and creating jobs can reduce social inequality.

1.4. By incorporating sustainability into our plans, we can ensure that our communities are healthy, resilient, and prosperous for generations to come.

1.5. The overarching principle of the North Herts Local Plan (NHLP), adopted in November 2022, is to achieve sustainable communities. This is to be achieved through high-quality sustainable design, ensuring appropriate locations for housing and employment, improving opportunities for travel by walking, cycling and public transport, and by protecting and enhancing the natural environment. The NHLP provides guidance and policies on climate change mitigation including managing flood risk, reducing carbon emissions and managing water demand.

Climate Change Mitigation & Adaptation

1.6. On 21 May 2019, North Herts Council (NHDC) passed a climate emergency motion. The declaration asserted the Council's commitment toward climate action beyond current government targets and international agreements. In July 2023 the Council declared an ecological emergency identifying biodiversity and nature recovery as a strategic



priority for planning. The ecological emergency motion includes a pledge to identify appropriate areas for habitat restoration, biodiversity net gain and to reduce loss/harm of existing habitats.

1.7. Our Climate Strategy: 2022 – 2027 outlines the Council's key objectives toward tackling climate change:

- Achieve Carbon Neutrality for the Council's own operations by 2030;
- Ensure all Council operations and services are resilient to the impacts of climate change;
- Achieve a Net Zero Carbon District by 2040; and
- Become a District that is resilient to unavoidable impacts of climate change

1.8. This accords with the overwhelming national and international consensus that radical measures are required across the whole of society to reduce man-made greenhouse gas emissions. In late 2018, the Intergovernmental Panel on Climate Change (IPCC) issued a stark warning; it established that achieving the ambitions of the Paris Climate Agreement, by limiting warming to 1.5°C to avoid the most catastrophic impacts of climate change, will require action at an unprecedented pace and scale.

1.9. Significant reduction in greenhouse gas emissions from the global economy are required by 2030, with net zero emissions by 2050. This enormous challenge can only be tackled by governments, businesses and civil society working together to take ambitious action to radically reduce emissions.

1.10. On 24 June 2019 the UK became the first major economy in the world to pass laws to end the country's contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to net zero by 2050. Subsequently, the government published milestone targets for 2030 and 2035, relative to 1990 carbon emission levels:

- 68% reduction of greenhouse emissions by 2030 (Nationally Determined Contribution, as communicated to the United Nations Framework Convention on Climate Change); and
- 77% reduction of greenhouse emissions by 2035 (UK's Sixth Carbon Budget, enshrined in The Carbon Budget Order 2021)

1.11. The UK needs to manage the growing risks from climate change through adaption and mitigation. The Met Office has advised that the average global temperature has risen by approximately 1.0°C which means that even if current greenhouse gas emissions targets are met, further climatic changes and risks they impose are inevitable. Therefore, global measures need to be in place to prevent further temperature rise.

1.12. The UK Climate Projections 2018 report predicts hotter, drier summers; wetter winters and more extreme weather events such as storms with resultant localised heavy rainfall. Therefore, adaptation to predicted climate change, needs to encompass planning for higher risk of surface water flooding, more prolonged droughts, and more frequent heatwaves leading to adverse health impacts on the population.

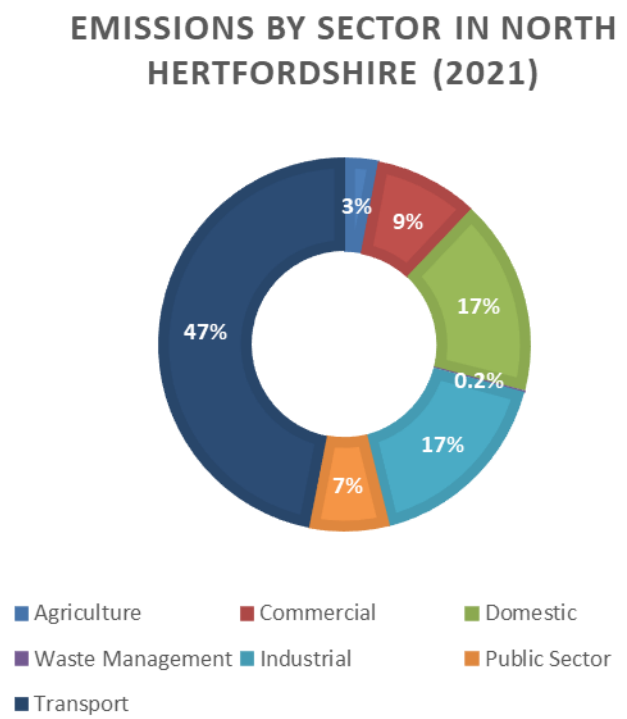
1.13. The Tyndall Centre for Climate Change Research produced an estimate of North Herts 'fair contribution' towards the

Paris Climate Change Agreement, recommending that the District:

- Stays within a maximum cumulative carbon dioxide emissions budget of 4.2 million tonnes ($MtCO_2$) for the period of 2020 to 2100 by achieving average mitigation rates of CO_2 from energy of around -13.5% (minimum) per year.
- Initiates an immediate programme of CO_2 mitigation to deliver the above emission reduction targets in order deliver a Paris aligned carbon budget.
- Reaches zero or near zero carbon no later than 2041. The report provides an indicative CO_2 reduction pathway that stays within the recommended maximum carbon budget of 4.2 $MtCO_2$.

1.14. To achieve the above, the report makes several recommendations, including that the Council:

- Prepares a strategy, in collaboration with the Government, other local authorities and Local Enterprise Partnerships, which considers how to reduce aviation and shipping emissions. Aviation and shipping emissions remain within the national UK carbon budget as a 'national overhead'. Therefore, failure to hold aviation and shipping emissions within the outlined allocation will reduce the carbon budget for UK regions, including for North Hertfordshire; and
- Promotes the deployment of low carbon electricity generation within the District.



1.15. Planning Policy provides an important mechanism for contributing to environmental sustainability in the built and

natural environment[1], including reducing carbon emissions and addressing how the environment should be developed to allow for adaptation to a changing climate (also referred to as resilience).

Scope of the SPD

1.16. The function of this SPD is to support and supplement the Local Plan policies, and national planning policy. Therefore, the adopted Local Plan policies should always be considered in conjunction with this SPD.

1.17. This document aims to provide further guidance and set out what our sustainability expectations are for different forms of development when applying the Local Plan policies (see Table 1).

1.18. The SPD identifies:

- The main sustainable construction requirements under both 'mitigation' to climate change (i.e. ways of reducing greenhouse gas emissions – mainly CO_2) and adaptation to predicted climate change;
- The design and energy-saving/efficiency measures that can result in a development minimising greenhouse gas emissions and energy use and waste. It aims to create places that are amenable to biodiversity and adaptable to a changing climate (including through the integration of green infrastructure);
- Guidance on renewable and low-carbon energy solutions, for reduced reliance on fossil fuels and finite energy sources, and for efficient use of national grid energy;
- Potential solutions to water shortages and efficiencies requirements;
- The materials and methods used in construction; and
- Clear guidance for anyone applying for planning permission, or wishing to comment upon a planning application, as well as providing a consistent approach to assessing planning applications.

The Checklists

1.19. The SPD sets three standards of sustainability: bronze, silver and gold where bronze is the baseline, representing current policy and building regulations compliance. These checklists work together across themes and will be assessed alongside each other to ensure a holistic approach to sustainability is being considered. Applicants are not expected to achieve the highest standards (gold) across all themes rather the

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

expectation is for applicants to select individual themes on which to excel (SPD gold level) depending on site context, type and scale of development.

Sustainability Themes

1.20. The SPD covers numerous sustainability topics broadly split into the following eight themes:

Optimising Passive Design & Fabric Performance

Achieving Low Carbon Energy

Minimising Carbon Footprint

Healthy Placemaking

Promoting Biodiversity

Sustainable Travel

Conserving Water

Incorporating Sustainable Drainage

Who is this SPD intended for?

1.21. This document is for anyone involved in the development process, including landowners, developers/agents, designers, and householders considering any kind of schemes/development, town/parish councils and other interested parties commenting on proposals, and Development Management Officers assessing applications. The SPD also provides guidance on renewable/low carbon developments such as wind or solar energy farms.

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

1.23. The document also provides guidance for applicants and their consultants in terms of the evidence needed to comply with Local Plan policies and some technical information on different methods of meeting those requirements.

1.24. Appendix A contains a glossary of terms used in this document.

Status of the SPD

1.25. This SPD has been prepared in accordance with the Town and Country Planning (Local Development) (England) Regulations 2012 and has undergone consultation with local groups and national organisations, in accordance with the Council's Statement of Community Involvement (SCI). It has also been subject to screening for Habitat Regulation Assessment (HRA) and Strategic Environmental Assessment.

1.26. Once adopted, the information contained within the SPD will be a material consideration in the determination of planning decisions. The advice in the Sustainability SPD will applied in different ways dependent on the scale and nature of the development:

a. For minor development (less than 10 dwellings) applicants will complete and submit a Sustainability and Energy Statement which is subject to a review by officers as part of the application process; and

b. For schemes of 10-99 dwellings, applicants are required to provide a Sustainability and Energy Statement from a qualified entity (e.g. Architect or Consultant) as a formal assessment of the sustainability credentials of the development which is examined and reported on by officers as part of the application process.

c. For major schemes of 100+ dwellings, applications should include both an Energy Statement and a Sustainability Statement from a certified assessor which will be secured, where required and appropriate, by planning conditions or other measures.

1.27. The SPD does not form part of the Development Plan and so cannot introduce new planning policies or add unnecessary financial burdens on development. Local Planning Authorities are required to review and, if necessary, update their Local Plan policies within five years of adoption, if not sooner. The NHLP was adopted in November 2022 and included a commitment to an early Local Plan review which will provide the appropriate vehicle for any comprehensive review of Local Plan policies. In the meantime, this SPD sets out the 'direction of travel' to support current adopted policies.

1.28. Whilst some of the sustainability principles contained in this SPD can be applied to all new developments regardless of size, some are only applicable to larger developments. Each sustainability theme (chapter 2) includes a checklist of requirements with benchmarks for that particular theme.

1.29. It is expected that applicants will select several sustainability themes on which to achieve higher sustainability levels (silver/ gold). This is likely to be influenced by factors such as location, scale and context of proposed development.

Development types

1.30. This SPD covers the four main types of development listed below. Whilst we strongly support the need to retrofit existing building stock to make it more energy and water efficient, the Council has very limited influence over existing building stock and consequently this document does not address this specific issue. Section 9 provides additional guidance on the retrofitting of historic buildings.

1.31. The four main types of development addressed in this SPD are:

- **Major Residential development** includes all new developments and residential conversions of ten dwellings or more.
- **Minor Residential development** includes all new developments and residential conversions of one to nine dwellings.
- **Major Non-Residential development** includes all new non-residential development which either provides additional floor space of at least 1,000sqm or is on a development site of at least 0.5ha. Also includes all new forms of both infrastructure and works associated with infrastructure projects.
- **Minor Non-Residential development** includes all new non-residential development which provides additional floor space between 250sqm to 1,000sqm of floor space and on a development site below 0.5ha.

Policy context

1.32. This SPD has been prepared in the context of national and local planning policies including the NPPF and NHLP. The Climate Change Act 2008 provides an overall framework for climate change mitigation and adaptation action across the UK. It sets a legally binding goal of reducing UK greenhouse gas (GHG) emissions by 100% from 1990 levels (Net Zero) by 2050. Table 1 lists policies and guidance of particular relevance to this SPD.

Table 1 - Policy and guidance context

Theme	*National Policy/ Guidance*	*Local Policies/ Plans*
Optimising passive design & fabric efficiency	• Climate Change Act 2008 • The Environment Act 2021 • 25 Year Environment Plan • Building Regulations • Written Ministerial Statement (WMS) on 'Planning - Local Energy Efficiency Standards Update' (23 /12/23)	• SP9 Design and Sustainability • D1 Sustainable Design • NHDC climate emergency declaration • NHDC Climate Change Strategy 2022-2027 • Hertfordshire Development Quality Charter
Achieving low carbon energy *Minimising carbon footprint*	• Building Regulations • Feed-in Tariffs Order 2021 as amended. • Modifications to Conditions 33 and 34 of the Standard Conditions of Electricity Supply Licence • Renewables Obligation Order 2015 (as amended) for England and Wales • The Government's Build Back Greener (Net Zero Strategy) (Oct. 2021) • The NPPF	• D1: Sustainable Design • NE12 Renewable and low carbon energy development
Sustainable travel	• The Transport Act 2000 (amended 2008) • The Environment Act 1995 • The National Emissions Ceiling Regulations 2018	• Hertfordshire Local Transport Plan LTP4 • SP6 Sustainable Transport • T2 Parking

	• The Environment Act 2021 • The Environmental Targets (fine particulate matter) (England) Regulations 2023 • Transport Decarbonisation Plan (2021) • Air Quality Standards Regulations (2010) • National Emissions Ceiling Regulations 2018 • The Environmental Targets (fine particulate matter) (England) Regulations 2023 • The Environment Act 2021 • UK Plan for tackling roadside nitrogen dioxide concentrations (2017) • The NPPF • Planning Practice Guidance PPG • Second cycling and walking investment strategy (CWIS2) 2021–25	• D4 Air Quality • NHDC Air Quality Action Plan
Conserving water,	• The Environment Act 2021 • Water Environment Regulations (Water Framework Directive) 2017 • UK Government's 25-year Environment Strategy • National Policy Statement for Waste Water	• SP11 Natural Resources and Sustainability • NE7 Reducing Flood Risk • NE8 Sustainable Drainage Systems

Incorporating sustainable drainage	• The NPPF • Planning Practice Guidance PPG • Water Resources Act 1991 • Construction Industry Research and Information Association (CIRIA) SuDS Manual • Sustainable Drainage Systems: Non Statutory Technical Standards • The Environment Agency's Approach to Groundwater Protection • The National Adaptation Programme (NAP3) • The flood Risk Regulations 2009 • Flood and Water Management Act 2010 • The Building Regulations • National Flood and Coastal Erosion Risk Management Strategy for England	• NE10 Water Conservation and Wastewater Infrastructure • Thames Water Drainage and Wastewater Management Plan
Healthy placemaking	• The NPPF • Natural England Green Infrastructure Guidance • Planning Practice Guidance: Healthy and safe communities (2019) • Spatial planning for health: An evidence resource for planning and designing healthier places. • Space for people: Targeting action for woodland access. • Planning for sport guidance	• SP10 Healthy Communities • HS5 Accessible and Adaptable Housing • Hertfordshire Joint Strategic Needs Assessment (JSNA) • SP12 Green Infrastructure, Landscape and Biodiversity.

	• NHS – Putting Health into Place • Health and Care Act 2022 • The Localism Act 2011 • Equalities Act 2010 • The NPPF • Digital Economy Act 2017 • Neighbourhood Planning Act 2017 • Infrastructure Act 2015	
Promoting biodiversity	• The NPPF • The Conservation of Habitats and Species Regulations 2017 • The Environment Act 2021 • Planning Practice Guidance PPG • The Environment Improvement Plan (EIP) 2023 for England	• NHDC Climate Change Strategy 2022-2027 • NHDC ecological emergency declaration • NHLP Strategic objectives (ENV3, ENV4) • SP12 Green Infrastructure, Landscape and Biodiversity. • NE1 Strategic Green Infrastructure • NE4 Biodiversity and geological sites • NE5 Protecting open space • NE6 New and improved open space

Thematic Guidance

1. Optimising Passive Design & Fabric Performance

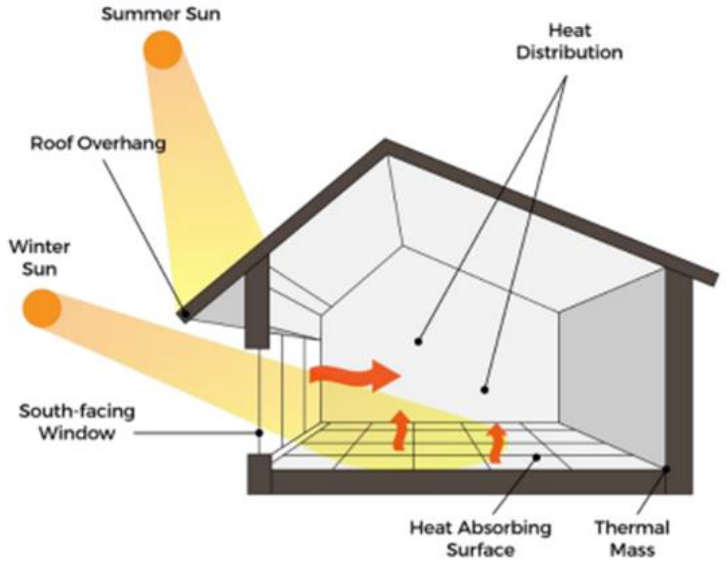
1.1. This section provides a general overview and technical guidance on how development can minimise environmental impact and create healthier, more comfortable environments for occupants through passive design, improved building fabric performance and ventilation.

1.2. Designing for passive solar heating and cooling through spatial planning and orientation can reduce the need for active heating and cooling systems. The use of energy-efficient materials helps reduce the amount of energy needed to heat, cool, and light a building.

1.3. Indoor air quality and comfort can be improved by incorporating appropriate ventilation systems.

Site Layout and Design

1.4. Passive design uses layout, fabric, and form to reduce or eliminate mechanical cooling, heating, ventilation and lighting demand. All new developments should consider optimising efficiency using passive design systems during the design phase. Whilst 'active' systems such as solar panels and other renewable energy technologies play a part in reducing carbon emissions, 'passive' measures are usually less expensive.



1.5. Where possible, taller buildings should be placed towards the northern section of a site to reduce the effect of shadowing across the site – but this should not be done in a regimented or artificial manner and should be applied where it will provide overall benefits. Similarly, parking facilities such as garages can usefully be placed towards the north of buildings for similar reasons, provided they don't harm the amenity values of neighbouring sites and land uses.

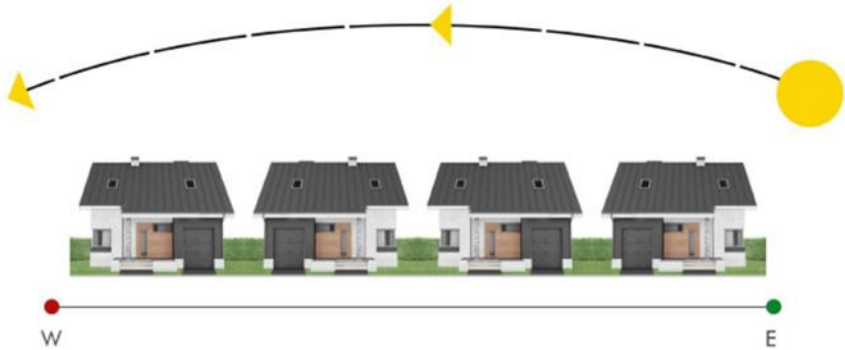
1.6. The spacing of buildings on sites should also be considered to strike a balance between gaining an optimum level of natural heat and light, including also considering efficiencies of reduced loss of heat through compact development, whilst avoiding contributing to the Urban Heat Island effect in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

1.7. Where the topography of a site allows, best use should be made of opportunities for building into slopes or into the ground, as this can offer thermal buffering and allows the exploitation of ground heat. This can also offer protection to buildings from harsher weather conditions, enhancing resilience to the effects of climate change. However, as sites are configured to allow for optimum benefit from the sun's power and for adapting to climate change, the siting of solar photovoltaic panels on buildings in the vicinity of the site also need to be taken into account (in the same way as neighbouring amenities) and this may inhibit the preferred choice of design/ layout for the development. However, achieving passive gain for a new development at the expense of the ability of established sites to run sustainably will not be acceptable, and this will need to be considered at the design stage.

Building Orientation

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

1.9. In residential developments where there is an east-west axis, the orientation of dwellings will maximise solar gain on the



south elevation. Habitable rooms are best located on the south elevation to take advantage of the sunnier/ warmer southerly aspect. Service rooms (kitchens and bathrooms) can be located with a northerly aspect. This needs to be balanced with the need to consider the risk of overheating in the summer when shading may be required (e.g. from trees,

shutters or louvres). Additional passive and mechanical ventilation may also be required.

1.10. On sites with a north-south axis, the orientation of the building will maximise heating in the morning and evening when it is most needed. This layout also helps to reduce overshadowing between buildings due to the angle of the sun's path. Habitable rooms, including living rooms and bedrooms, would best be located on the west elevation to maximise the heating and lighting effects from solar gain later in the day.

Glare

1.11. It is also important to consider the potential effects of glare at the design stage. As with overheating this can be addressed through effective layout, design and other measures such as low eaves-height, blinds, brise-soleil screening, external shutters, lighter colour palettes, and the use of photochromic/ thermochromic glass. Such measures would need to be carefully selected and implemented taking account of other factors such as local distinctiveness and character.

Thermal Mass

1.12. The choice of building materials has an important bearing on how temperatures are moderated within a building. High thermal mass materials absorb heat during the day and release it during the night, helping to regulate the temperature within the building. Materials that have a high thermal mass include brick and block with plaster finishes. In contrast lighter insulating materials such as timber (used in timber framed buildings) have lower thermal mass but may have lower embodied carbon. Thermal mass is a design feature, not a method of insulation. It can reduce the cooling

load of a building in summer and the heating load in winter, therefore reducing carbon emissions.

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

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

Insulation

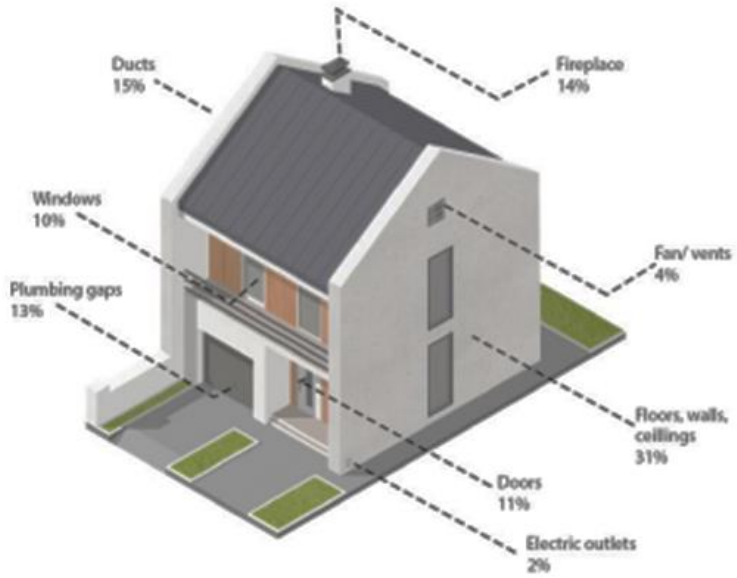
1.15. Around half of the heat loss in a typical home occurs through the walls and the roof. Increasing insulation levels significantly beyond current building regulations requirements is often the cheapest and most effective method of reducing CO2 emissions and energy needs. It requires minimal maintenance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

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

1.16. As with most measures discussed, this should be weighed against other design considerations such impacts on character and setting; for example, the use of solid wall

insulation may not be suitable where this can harm the appearance and character of traditional brickwork and tile-hangings.

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



Air Tightness

1.18. Significant reductions in heat loss can be achieved by reducing air infiltration through the building fabric and making the building airtight. Air leakage occurs in several places, particularly draughty windows, doors and joints between ceilings and walls. This can be reduced through careful construction practices to ensure that gaps in the fabric are minimised. Measures to improve airtightness include:

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

- Sealing the joint between the ceiling and the external wall; and
- Sealing the joint between the dry-lining and the skirting board.

Form Factor

1.19. A building loses heat through its surface area, therefore the more volume a building has in relation to its surface area the better. The form-factor ratio refers to the area of external envelope through which heat will escape compared to the area of usable internal building area, the lower the form factor the more energy efficient it will be. This does require keeping the building's shape simple but this can be made more appealing through use of different materials and surface treatments. A ratio of 0.3 or less is generally recommended.

Overheating, Cooling and Ventilation

1.20. Reducing energy needs by retaining as much heat as possible needs to be balanced against the risk of overheating which is becoming an increasingly important issue because of climate change. Twenty per cent of homes in England already experience overheating in the summer months[2] and with temperatures rising, this should be addressed in advance through appropriate measures. The UK's Climate Change Risk Assessment identifies overheating in buildings as a key risk for health and productivity. The Building Regulations (Part O) require overheating mitigation for all new dwellings and Approved Document O provides guidance on how new dwellings can comply with the requirements.

1.21. Buildings at higher risk of overheating include:

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

[2] The Climate Change Committee 'The hidden problem of overheating'

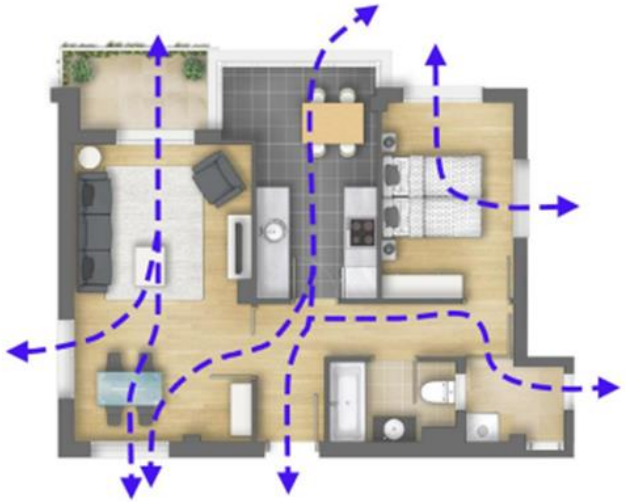
1.22. Air conditioning is commonly used to address overheating, but this is energy intensive with high associated levels of carbon emissions. It also places a cost on future occupiers in terms of both energy bills and maintenance costs. Therefore, the Council's preferred approach to overheating is that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

1.23. Development proposals are expected to incorporate passive design measures to control heat gain and deliver passive cooling following the sequential cooling hierarchy below:

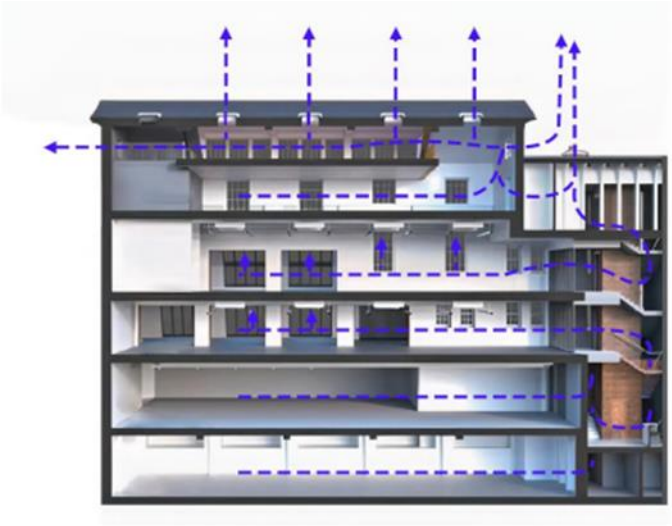
- **Passive design** - Minimise internal heat generation through energy efficient design and reduction of the amount of heat entering the building in the summer and colder months through consideration of orientation, overhangs and shading, albedo, fenestration, insulation, and green roofs. Where heat is to be managed within the building through external mass and high ceilings, provision must be made for secure night-time ventilation to enable night purge to take place.
- **Passive/ natural cooling** - Use of outside air, where possible pre-cooled by soft landscaping, a green roof or by passing it underground to ventilate and cool a building without the use of a powered system. This includes maximising cross ventilation, passive stack and wind driven ventilation and enabling night purge ventilation. Single aspect dwellings are best avoided for all schemes as effective ventilation can be difficult to achieve. Windows and/ or ventilation panels should be designed to allow effective and secure ventilation.
- **Mixed mode cooling** - Use of local mechanical ventilation/ cooling to supplement the above measures:
  - Low energy mechanical cooling (e.g. fan powered ventilation with/ without evaporative cooling or ground coupled cooling).
  - Air conditioning – this should be a last resort as these systems are energy intensive.
- **Full-building mechanical ventilation/ cooling systems** - Use this option once all other elements of the cooling hierarchy have been utilised. Consider low energy mechanical cooling first followed by air conditioning.

1.24. New builds with higher insulation and airtightness require mechanical ventilation with heat recovery systems (MVHR) to control condensation and overheating. These are available with summer bypass functionality designed to operate during hot periods. When summer bypass mode is triggered, the system will automatically divert outgoing air around the heat recovery unit so fresh air can be vented straight into the property without being preheated by a heat exchanger.

1.25. Ventilation measures can be split into mechanical or forced ventilation and natural ventilation; driven by natural pressure differences within a building. Natural ventilation can be wind-driven (wind induced) or buoyancy-driven 'stack' ventilation.



Wind driven ventilation utilises pressure differences that occur when air flows through a building. Appropriately placed ventilation openings will draw air through the openings thereby providing natural ventilation.



Passive stack ventilation relies on the difference between internal and external temperatures based on the 'stack' effect whereby warm air naturally rises and is replaced with cooler air entering at lower level(s).

Fabric first approach

1.26. The fabric first approach prioritises the energy efficiency of a building from the outset, seeking to optimise the building envelope; essentially the building's skin comprising the walls, windows, roofs, doors and floors. By focusing on the measures discussed above such as high-performance insulation, achieving airtightness, incorporating passive design features like natural ventilation and solar heat gain the fabric first approach reduces the building's energy demands from the outset. This translates to less reliance on heating and cooling systems, lowering operational carbon (and costs) and creating a more sustainable building.

Targets

1.27. The Building Regulations Part L covers the conservation of fuel and power and establishes how energy-efficient new and existing homes should be. A new dwelling must be built to a minimum standard of energy performance. This is evaluated by comparing calculations of the performance of the 'actual dwelling' against calculations of the performance of a theoretical dwelling called the 'notional dwelling'. This must be carried out both at the design stage and when work is complete. The notional dwelling is the same size and shape as the actual dwelling and has standardised properties for fabric and services. Properties of the notional dwelling are set out in the Standard Assessment Procedure (SAP) for energy rating of dwellings. The energy performance of the notional dwelling is described using the following metrics:

- Target Primary Energy Rate, in kWhPE/m2 per year: this specifies the maximum primary energy (from renewable and non-renewable sources) use for a dwelling in a year and is influenced by the fabric and fuel.
- Target Emission Rate, in kgCO2 /m2 per year: this is influenced by the fabric and fuel.
- Target Fabric Energy efficiency rate, in kWh/m2 per year: this is influenced by the fabric only. This calculated using SAP (10.2). Calculations are based on specific primary energy factors for each different type of primary fuel. Mains gas fuel, for example, has a primary energy factor of 1.13.

1.28. Compliance with the building regulations represents minimum requirements or SPD bronze level. Applicants are encouraged to seek an onsite reduction in regulated carbon emissions of at least 35% beyond the baseline of Part L of the building regulations (silver level). This is to be achieved

using energy efficiency measures alone reducing energy demand as far as possible.

1.29. The Low Energy Transformation Initiative or LETI Climate Emergency Design Guide outlines requirements for new buildings to meet climate change targets. The Climate Emergency Design Guide has been widely supported and increasingly adopted by building professionals across the UK. It includes an Energy Use Intensity (EUI) which is an annual measure of the total energy consumed in a building. This is considered a good indicator for building performance as the metric is solely dependent on how the building performs in-use; rather than carbon emissions, which also reflect the carbon intensity of the grid. The EUI can be estimated at design stage and then monitored in-use based on energy bills in kWh energy used by the building. The metric takes into consideration all energy consumed in the building, such as regulated energy (heating, hot water, cooling, ventilation, and lighting) and unregulated energy (plug loads and equipment e.g. kitchen white goods, ICT/AV equipment). It does not include charging of electric vehicles. EUI can be expressed in GIA (Gross Internal Area). The LETI guidance includes indicative design measures for fabric U-values, air tightness, thermal bridging and efficiency values for Mechanical Ventilation with Heat Recovery (MVHR). For housing LETI sets an EUI target of 35 kWh/m2.yr in GIA (excluding renewable energy) and a target for 15 kWh/m2.yr space heating demand. It also provides targets for commercial offices (55 kWh/m2.yr EUI) and schools (65 kWh/m2.yr EUI).

1.30. Another standard that is becoming increasingly popular with housebuilders is the Passive House standard. In order to reach the Passive House Standard, all components must be optimised and checked for compatibility. The Passive House Institute developed the Passive House Planning Package (PHPP) to help designers in just this regard. Passive House buildings have to meet the following criteria:

- The Space Heating Energy Demand does exceed 15 kWh per square meter of net living space (treated floor area) per year or 10 W per square meter peak demand.
- Airtightness equates to a maximum of 0.6 air changes per hour at 50 Pascals pressure.
- The Renewable Primary Energy Demand (PER, according to PHI method), the total energy to be used for all domestic applications (heating, hot water and domestic electricity) must not exceed 60 kWh per square meter of treated floor area per year.

- Thermal comfort must be met during winter and summer with no more than 10% of hours in a given year over 25°C.

1.31. Achieving SPD gold level requires that development achieves LETI, Passivhaus or RIBA 2030 standards. However, it may be more difficult to achieve the higher emissions saving targets for some non-residential and multi-residential buildings (e.g. hotels and co-living buildings) where there is significant hot water use.

Checklist 1 - Optimising Passive Design & Fabric Performance

Optimising Passive Design & Fabric Performance			
	Bronze	*Silver*	*Gold*
Minor residential schemes less than 10 dwellings	☑ Achieve an EPC rating of at least C on all dwellings ☑ Submit a Sustainability & Energy Statement showing compliance with Policy and Building Regulations (this should include the Energy Use Intensity (EUI) & the total Space Heating Demand (SHD) calculations with recommendations on methods that could be investigated during technical design to improve performance)	☑ Achieve 80% EPC ratings of at least B and 20% rating of at least C ☑ Submit a Sustainability & Energy Statement showing: • maximisation of solar gain through site layout, orientation, and design (for the purpose of energy efficiency) • measures to prevent over-heating • lower carbon alternatives to gas boilers • on-site reductions of 35% (minimum) in CO_2 emissions over and above Building Regulations Part L (including	☑ Achieve an EPC rating of B on all dwellings ☑ Submit a Sustainability & Energy Statement showing: • on-site reductions of 50% (minimum) in CO_2 emissions over and above Building Regs Part L (including at least 10% reductions through fabric first measures) • commitment to achieve Passivhaus certification and site assessment at planning stage using Passive House Planning Package (PHPP) to confirm

		at least 10% reductions through fabric first measures) (inclusive of MHVR) • EUI ≤ 60 kWh/m2/yr (inclusive of estimated unregulated energy) (RIBA 2025) • SHD ≤ 30 kWh/m2/yr (Passivhaus low energy building) or ≤ 40 kWh/m2/yr (AECB/ Energiesprong new build)	compliance against Passivhaus Classic, Plus or Premium. Or • assessment of the development using CIBSE TM54 or alternative operational energy modelling software and confirms compliance with LETI or RIBA 2030 standards: ○ EUI ≤35 kWh/m2/yr ○ SHD ≤15 kWh/m2/yr
Residential applications of 10-99 dwellings	☑ Achieve an EPC rating of at least C on all dwellings ☑ Submit a Sustainability & Energy Statement showing compliance with Policy and Building Regulations (this should include the Energy Use Intensity	☑ Achieve 80% EPC ratings of at least B and 20% rating of at least C ☑ Submit a Sustainability & Energy Statement from a qualified body showing: • maximisation of solar gain through site layout,	☑ Achieve an EPC rating of at least B on all dwellings ☑ Submit a Sustainability & Energy Statement from a qualified body showing: • on-site reductions of 75% (minimum) in CO_2

	(EUI) & the total Space Heating Demand (SHD) calculations with recommendations on methods that could be investigated during technical design to improve performance)	orientation, and design (for the purpose of energy efficiency) • measures to prevent over-heating • lower carbon alternatives to gas boilers • on-site reductions of 50% (minimum) in CO_2 emissions over and above Building Regulations Part L (including at least 10% reductions through fabric first measures) (inclusive of MHVR) • EUI ≤ 60 kWh/m2/yr (inclusive of estimated unregulated energy) (RIBA 2025) • SHD ≤ 30 kWh/m2/yr (Passivhaus low energy building) or ≤ 40 kWh/m2/yr (AECB/ Energiesprong new build)	emissions over and above Building Regs Part L (including at least 10% reductions through fabric first measures) • commitment to achieve Passivhaus certification and site assessment at planning stage using Passive House Planning Package (PHPP) to confirm compliance against Passivhaus Classic, Plus or Premium. Or • assessment of the development using CIBSE TM54 or alternative operational energy modelling software and confirms compliance with LETI or RIBA 2030 standards:

			○ EUI ≤35 kWh/m2/yr ○ SHD ≤15 kWh/m2/yr
Major residential applications of 100 or more dwellings	☑ Achieve an EPC rating of at least C on all dwellings ☑ Submit a Sustainability & Energy Statement showing compliance with Policy and Building Regulations (this should include the Energy Use Intensity (EUI) & the total Space Heating Demand (SHD) calculations with recommendations on methods that could be investigated during technical design to improve performance)	☑ Achieve 80% EPC ratings of at least B and 20% rating of at least C ☑ Submit a Sustainability Statement from a certified assessor showing: • maximisation of solar gain through site layout, orientation, and design (for the purpose of energy efficiency) • measures to prevent over-heating ☑ Submit an Energy Statement from a certified assessor showing: • lower carbon alternatives to gas boilers • on-site reductions of 50% (minimum) in CO_2 emissions over and above Building Regulations Part L (including	☑ Achieve an EPC rating of at least B on all dwellings ☑ Submit an Energy Statement from a qualified body showing: • on-site reductions of 75% (minimum) in CO_2 emissions over and above Building Regs Part L (including at least 10% reductions through fabric first measures) • commitment to achieve Passivhaus certification and site assessment at planning stage using Passive House Planning Package (PHPP) to confirm compliance against

		at least 10% reductions through fabric first measures) (inclusive of MHVR) • EUI ≤ 60 kWh/m2/yr (inclusive of estimated unregulated energy) (RIBA 2025) • SHD ≤ 30 kWh/m2/yr (Passivhaus low energy building) or ≤ 40 kWh/m2/yr (AECB/ Energiesprong new build)	Passivhaus Classic, Plus or Premium. Or • assessment of the development using CIBSE TM54 or alternative operational energy modelling software and confirms compliance with LETI or RIBA 2030 standards: ○ EUI ≤35 kWh/m2/yr ○ SHD ≤15 kWh/m2/yr
Minor non-residential development	☑ Submit a Sustainability & Energy Statement showing compliance with Policy and Building Regulations (this should include the Energy Use Intensity (EUI) & the total Space Heating Demand (SHD) calculations with recommendations on methods	☑ Submit a Sustainability Statement showing: • maximisation of solar gain through site layout, orientation, and design (for the purpose of energy efficiency)	In addition to silver level requirements ☑ Submit an Energy Statement from a qualified body showing: • on-site reductions of 50% (minimum) in CO_2

	that could be investigated during technical design to improve performance)	• measures to prevent over-heating ☑ Submit an Energy Statement from a certified assessor showing: • lower carbon alternatives to gas boilers • on-site reductions of 35% CO_2 emissions over and above Building Regulations Part L (including 10% through fabric first measures, inclusive of MHVR) unless justifiably difficult to achieve. ☑ Submit an Energy Use Intensity and Space Heating Demand Report showing: • EUI ≤ 75 kWh/m2/yr (inclusive of estimated unregulated energy) (RIBA 2025) • SHD ≤ 30 kWh/m2/yr (Passivhaus low energy building) or ≤ 40 kWh/m2/yr	emissions over and above Building Regs Part L • commitment to achieve Passivhaus certification and site assessment at planning stage using Passive House Planning Package (PHPP) to confirm compliance against Passivhaus Classic, Plus or Premium. Or • assessment of the development using CIBSE TM54 or alternative operational energy modelling software and confirms compliance with LETI or RIBA 2030 standards: ○ EUI ≤35 kWh/m2/yr ○ SHD ≤15 kWh/m2/yr

		(AECB/ Energiesprong new build)	
Major non-residential development	☑ Submit an Energy Statement and a Sustainability Statement showing compliance with national and local Policy and Building Regulations	☑ Submit a Sustainability Statement from a certified assessor showing: • maximisation of solar gain through site layout, orientation, and design (for the purpose of energy efficiency) • measures to prevent over-heating ☑ Submit an Energy Statement from a certified assessor showing: • lower carbon alternatives to gas boilers • on-site reductions of 35% (including 10% through fabric first measures) in CO_2 emissions over and above Building Regulations Part L unless it is justifiably difficult to achieve	In addition to silver level requirements ☑ Submit an Energy Statement from a certified assessor showing: • on-site reductions of 50% (minimum) in CO_2 emissions over and above Building Regs Part L unless it is justifiably difficult to achieve, in which case a saving of >35% will be required • commitment to achieve Passivhaus certification and site assessment at planning stage using Passive House Planning Package (PHPP) to confirm compliance against

		• EUI ≤ 75 kWh/m2/yr (inclusive of estimated unregulated energy) (RIBA 2025)
		• SHD ≤ 30 kWh/m2/yr (Passivhaus low energy building) or ≤ 40 kWh/m2/yr (AECB/ Energiesprong new build)
		
		Or
		
		• Evidence that the scheme achieves BREEAM 'Excellent'
			Passivhaus Classic, Plus or Premium.
			
			Or
			
			• assessment of the development using CIBSE TM54 or alternative operational energy modelling software and confirms compliance with LETI or RIBA 2030 standards:
			  ○ EUI ≤35 kWh/m2/yr
			  ○ SHD ≤15 kWh/m2/yr
			
			Or
			
			• Evidence that the scheme achieves BREEAM 'Outstanding'

2. Achieving Low Carbon Energy

2.1. Renewable and low carbon energy is pivotal in the drive towards net zero. Besides reducing carbon footprint, such technologies also reduce household energy costs. Development proposals are expected to move away from the use of gas boilers for space heating, towards lower carbon alternatives, such as electric heat pumps and heat networks.

Solar Photovoltaic Panels

2.2. Solar photovoltaic (PV) technology converts energy from the sun into electricity. The greater the intensity of light, the greater the generation of electricity, meaning that solar panels are often located on south facing roofs[3] or mounted on flat roofs. While solar panels can be visually intrusive, careful placement can avoid or limit the impact. It is also possible to source solar panels which mimic the design of roofing tiles.

2.3. By connecting a PV system to the National Grid, any surplus daytime electricity generated can be sold to the local utility provider. Generally at least 10 sqm of PV are needed. PV products can be used on all types of roofs - including flat ones, though the optimal roof angle in the UK is 30° to 40°. A north facing PV roof will generate around 60% of the amount of electricity that a south facing roof would.

2.4. Solar panel installations (both PV and thermal) are often sited on the roof of a property, garage or outbuilding but can also be free-standing (e.g. in the garden) as long as the location is not subject to regular overshadowing.

2.5. Recent technological advancements in this field have led to the development of solar roof tiles (solar slates) and transparent solar PV. These are more discreet and more aesthetically appealing options than traditional solar PV making them particularly relevant to installations within historic buildings or conservation areas.

2.6. Solar tiles are currently more costly than solar panels but may be cost effective when compared to the combined cost of regular roof tiles and solar panels. It is anticipated that costs will eventually come down. Local schemes such as

[3] While overshadowing will reduce energy production only daylight is required to generate electricity and not direct sunlight, meaning that it will continue to operate throughout the year and on cloudy days.

Solar Together aim to alleviate some of the costs through group-buying.

2.7. Solar panels do not generate any noise, have no moving parts and in general have a long life with low maintenance making them an ideal approach in most urban and rural locations. The economic viability is however only realised over a long period.

Solar thermal heating

2.8. Solar thermal systems use sunlight to heat a fluid (depending on the application, it can be water or a water/glycerol mixture). They connect to the building's hot water system via a heat exchanger or co-location and operate by harnessing sunlight to heat a fluid in a solar panel. The fluid circulates through the heating system and heats the water in the water tank reducing the amount of energy needed from other sources to heat.

2.9. Two main types of solar hot water collector are available: Flat plate and evacuated tube. In both systems water or an antifreeze mixture travels through the collector picking up heat from the sun and then passing through a copper coil in the hot water tank. Solar panels work best when located in direct sunlight on a sloping roof. Care needs to be taken to make sure that the panels are not overshadowed.

2.10. The equipment does not generate noise and requires little maintenance but does require an area of south facing roof where it is possible to access the existing water heating system. Solar water heating systems can often be designed discretely into new buildings.

2.11. Solar Water Heating systems are most effective in large family homes and large building complexes where large quantities of hot water are needed.

Relevant legislation

2.12. Whilst the installation of solar panels on residential buildings may fall under 'permitted development.' In certain circumstances, wildlife legislation still applies as follows:

- All species of bat and their roosts are protected under both the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended).
- All wild birds are protected by the Wildlife and Countryside Act 1981 (as amended), which protects the birds themselves, their eggs and nests whilst being built.

2.13. Raised slates/ tiles provide suitable opportunities for roosting bats as well as nesting birds, fitting solar panels may cause harm or disturbance to them. Other retrofitting options such as cavity wall insulation, solar thermal, externally applied solid wall insulation, roof insulation at rafter level and timber casement window draught proofing may also affect ecology, as such the potential presence of protected species requires careful consideration. If retrofitting is planned within or adjacent to known nesting swift sites, then extra caution will be required.

2.14. To avoid breaching wildlife legislation, a bat scoping and nesting bird inspection should be undertaken. These surveys should inform the timing of works to avoid disturbing roosting bats (if present) and necessary licensing requirements. Further advice can be sought from the Bat Conservation Trust which is free of charge or if planning consent is required, from the Council's planning advice/pre-application service. In addition, the broad location of known swift nesting sites can be found on Swift Mapper.

Heat pumps

2.15. Heat pumps work by extracting heat from a source outside the building and concentrating it to heat the home. This heat can come from the ground, the outside air or even a nearby body of water. Heat pumps are electrically driven and are normally most efficient when the increase in temperature is minimised. They work well with underfloor heating systems which operate at lower temperatures. Heat pumps are best used with a well-insulated new build property or an existing dwelling undergoing major refurbishment. They are particularly well suited to homes in areas that do not have access to mains gas.

Ground sources heat pumps

2.16. Ground source heat pumps (GSHP) uses the stable high volume / low level warmth of the earth and converts it into low volume/high level heat. The recovered heat can then be used to heat water or spaces.

2.17. There are two basic forms of ground source heat pump:

- The first comprises a bore hole where a long pipe is driven vertically down deep into the ground (15m to 150m depending on ground conditions and the size of the system).
- The second is a trench system, in which a loop or coil is laid out horizontally at a shallow depth (approximately 2m).

2.18. In both systems, heat is transferred by water running through the pipe into a compressor which raises it to a usable higher temperature. Being almost entirely underground, ground source heat pumps produce little or no visual impact. Note that on larger schemes involving a large density of GSHPs there may be some environmental impacts due to temperature changes within the ground. In open loop systems, where there is direct contact with groundwater these temperature changes can cause groundwater mounding and changes in groundwater flow which could negatively impact areas of high groundwater level. The Environment Agency has published Guidance on this issue.

Air source heat pumps

2.19. Air source heat pumps work by converting the temperature of the outside air into heat for the building and supplying energy for the hot water system. The only outside space required is an external wall, making this system ideal for providing space heating and domestic hot water. They are cheaper to install than ground source heat pumps but these lower costs may be offset by the variability in air temperature.

Biomass

2.20. Biomass refers to the use of organic material such as wood and waste to generate heat and electricity. It can be categorised into two types: dry biomass and wet biomass. The use of dry biomass involves combustion, whereas the use of wet biomass involves fermentation or digestion.

2.21. The most common source of dry biomass material is wood from forests, urban tree pruning, farmed coppices or wood waste from farms. The raw material is normally processed into pellets or wood chips. Dry biomass is considered carbon neutral as the CO2 emitted during burning is balanced with the CO2 absorbed in growing the organic material. To ensure that the benefits of biomass are not outweighed by the impact of transporting the material, it is essential that there is a local and adequate supply.

2.22. Wood burning stoves and boilers are available in any size depending on whether they are required to heat one room or the whole building. They can achieve efficiencies of 80-90% and can be used in homes and commercial buildings. Some types of appliances can be fed automatically from an external store. Biomass can be burnt directly to heat water and/or spaces or be used in more efficient combined heat and

power systems to generate both heat and electricity. The ash produced can be returned to the soil as fertiliser.

2.23. The payback for biomass can be shorter than other renewable technologies. However, it requires higher maintenance and monitoring to ensure compliance with legislation such as the Clean Air Act 1993.

2.24. Wet biomass involves the fermentation or digestion of waste to provide a gas which is then burned to produce heat and/ or electricity. The process has the benefit of using materials which are otherwise difficult to dispose of, including agricultural, household, and industrial residues and sewage sludge. Due to the nature of wet biomass, plants need to be carefully sited to mitigate for transport (to/ from site) and potential odour issues.

Wind energy

2.25. Wind turbines convert the power of the wind into electricity using rotating blades to drive a generator. To be effective the turbine must be sited where it would benefit from adequate wind and where the blades would be free to rotate without interference or turbulence. There are two types of wind turbine: horizontal blade turbines and vertical blade turbines.

2.26. There are three categories of turbine:

- Large: A collection of large-scale wind turbines located in countryside locations (hub height can be as much as 100m). These are often referred to as wind farms. Electricity is provided for use in the national grid.
- Small: Individual Free Standing: often smaller turbines than within a wind farm but can still be significant structures (hub height typically 6m to 25m). Usually located in non-residential areas. Generally provides electricity to nearby properties.
- Micro: small turbines mounted on buildings so that the blades extend above the roof of a building. Provides on-site electricity generation.

2.27. Turbines can be effectively integrated into the design of buildings; however, local wind speed should be monitored for at least 6 months to ensure the viability of the location. Due to their size and prominent appearance consideration must be given to their visual impact. Issues of noise also need to be considered if in proximity to houses and other sensitive activities or designations.

2.28. The electricity generated can be linked to the National Grid or can be used to charge batteries. Modern wind turbine designs tend to be very near silent in operation such that the wind in the leaves on trees can be louder.

Energy storage

2.29. Home energy storage systems store generated electricity or heat (e.g. solar, PV, wind, or hydroelectric systems) and can in the form of electrical batteries or heat storage systems. Such systems are useful for households generating their own renewable energy as it allows them to store surplus energy and use it as when required. This is particularly helpful in planning electricity usage for charging Electric vehicles or domestic heat pumps.

Energy saving measures

2.30. Other energy saving measures include:

- Mechanical ventilation with heat recovery (MHVR) systems help maintain a healthy internal environment and recycle heat from expelled air then reuses the heat captured to heat incoming fresh air, helping reduce the need for heating. The Building Regulations Approved Document L provides further guidance.
- Wastewater heat recovery (WWHR) systems are heat recovery devices that extract heat from the water from showers or baths as it goes down the drain. This heat is then used to preheat mains cold water and sends the preheated water to the shower and/or water heater reducing energy required for hot water. The Building Regulations Approved Document L provides further guidance.
- Energy efficient domestic appliances, for example an AA+ rated washing machine can use up to 70% less energy than a G rated one.
- Energy saving light bulbs can use up to 80% less electricity and are longer lasting.

Renewable Energy developments

2.31. NHDC North Herts is responsible for determining planning applications for renewable development of 50 megawatts or less installed capacity. Domestic installations are discussed elsewhere in this document and schemes above 50 megawatts are determined by the Secretary of State for Energy.

2.32. NHLP's policies NE12 and SP11 support renewable and low carbon energy development in appropriate locations subject to assessment of the impacts on the landscape, environment, heritage assets, transport, air quality, aviation and amenity. The policy also supports decentralised energy schemes associated with strategic development allocated in the plan. Applications are likely to be refused where proposed schemes are considered to give rise to significant adverse impacts which outweigh the wider benefits of

renewable energy development identified above. However, the Council will consider to what extent any adverse impacts can be mitigated through the design and siting of proposals or by applying appropriate planning conditions. The Council will take the views of local communities into consideration when determining applications.

Siting principles

2.33. Solar/ PV developments should be sited where they would have the least adverse impacts. Proposals which would contribute towards reducing greenhouse gas emissions will be permitted subject to an impact assessment demonstrating that proposed schemes:

- Do not harm the role and purposes of the Green Belt unless they can demonstrate very special circumstances;.
- Minimise impacts on the landscape character and locally sensitive features, particularly in relation to the Chilterns Area of Outstanding Natural Beauty;.
- Do not produce adverse impacts on:
    - Biodiversity sites;
    - Air quality;
    - The historic environment;
    - The transport networks;
    - Aviation interests;
    - Landscape quality, landscape character and visual amenity, including consideration of cumulative impacts of development; and
    - The amenity of residents

2.34. The Hertfordshire Renewable and Low Carbon Energy Technical Study (2010) assessed the potential for renewable energy generation schemes in the District and identified opportunity areas within the District. More recently research by Friends of the Earth and Exeter university produced a map showing the potential for wind and solar energy across the country.

2.35. Proposals for solar farms involving the best and most versatile agricultural land and proposals for wind turbines will be determined in accordance with Policy NE12 of the NHLP and national policy.

2.36. When assessing renewable and low carbon energy proposals against the above criteria the Council will give significant weight to their local and wider benefits, particularly the potential to reduce greenhouse gas and other harmful

emissions, and the social benefits of community owned schemes where this is relevant.

2.37. Proposals for decentralised energy schemes associated with development of the strategic sites allocated in the Plan will be encouraged subject to an assessment of the impacts above.

2.38. In all cases, end of life/redundant plant, buildings, apparatus, and infrastructure must be removed and the site restored to its former state or a condition agreed with the Council.

The application process

2.39. Typically the application process involves the following steps:

- Contact NHDC Planning team for initial advice/ guidance
- Pre application stage: consult HCC, Natural England, Historic England, the Environment Agency, the Highways Agency, MoD and Internal Drainage Boards.
- Obtain Environmental Impact Assessment (EIA) Screening Opinion from NHDC. An Environmental Statement (ES) will be required is the development is screened-in for EIA.
- Provide a Statement of Community Consultation.
- Design and Access Statement.
- Landscape & Visual Impact Assessment including impacts on the Chilterns AONB and on the Green Belt.
- Heritage Statement.
- Ecological Survey identifying any adverse impacts and including management plans and mitigation measures.
- BNG plan demonstrating a minimum 10% net gain in biodiversity.
- Noise Impact Assessment.
- Air Quality Impact Assessment.
- Transport Statement.
- Decommissioning and restoration statement.

Community energy schemes

2.40. Community energy schemes can make a significant contribution to the decarbonisation of the District while supplying community benefits such as affordable energy. These could include neighbourhood or village heat networks, solar PV schemes, or community run hydro's[4]. The latter utilise streams and rivers to generate renewable energy. It works by converting the potential energy of water at a high

[4] See Halton Lune Hydro example

point into kinetic energy (using turbines) as the water flows downhill. This is then used to drive a generator to produce electricity. Further information and technical support is available through the Greater South East Energy Hub and the Council will support in principle community led schemes. Macro-renewable schemes are expected to include an element of community investment such as through local shareholder investment, the provision of lower cost energy to community services such as schools and community centres, and/or setting up a community fund or trust.

Checklist 2 - Achieving Low Carbon Energy

Achieving low carbon energy			
	Bronze	*Silver*	*Gold*
Residential development	☑ Ensure development is Policy & Building Regulations compliant ☑ Larger schemes (>10 dwellings) are encouraged to submit a Feasibility Study from an Energy Specialist showing how the most appropriate Low/Zero Carbon technology will be implemented on site.	☑ Show that 75% or more of dwellings energy demand is supplied from onsite renewable technology such as PV (assuming low carbon heating/hot water technology is used such as ASHPs) ☑ Show that roof shape and orientation is optimised to maximise solar PV outputs ☑ Show that the development commits to investigating better uses of PV (if present) and detail what these are (connecting any array directly to the landlord supply should NOT be allowed. Options could include: SolShare (or similar), connecting to thermal stores of communal heat pumps)	In addition to silver level requirements ☑ 100% dwelling's energy demand is supplied from onsite renewable technology such as PV (assuming low carbon heating/ hot water technology is used such as ASHPs)

Non-residential development	☑ Ensure development is Policy & Building Regulations compliant ☑ Submit a Feasibility Study from an Energy Specialist showing the most appropriate Low/Zero Carbon technology to be implemented on site.	☑ Show that at least 20% renewable energy is provided from onsite renewable technology such as PV. If this cannot be achieved, it should be shown that PV provision has been maximised. ☑ Submit a Feasibility Study from an Energy Specialist showing the most appropriate Low/Zero Carbon technology to be implemented on site will be supported	☑ Show that at least 40% renewable energy is provided from onsite renewable technology such as PV. If this cannot be achieved, it should be shown that PV provision is above 20% and has been maximised. ☑ Submit a Feasibility Study from an Energy Specialist showing the most appropriate Low/Zero Carbon technology to be implemented on site will be supported

3. Minimising Carbon Footprint

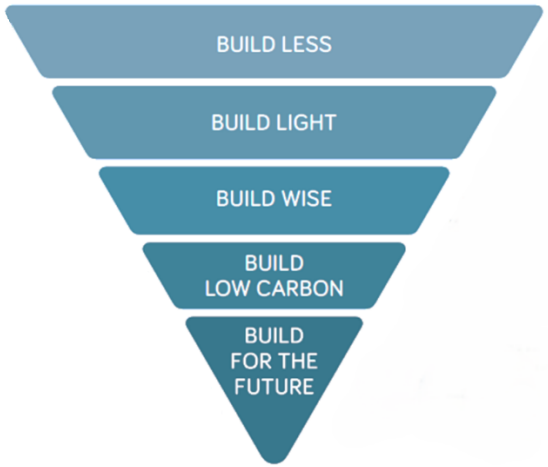
3.1. Around 40% of UK carbon emissions are associated with the built environment. Construction and demolition activities are some of the largest consumers of raw materials and produce substantial waste and emissions. It is important to drastically reduce carbon emissions associated with the built environment if we are to meet net zero targets.

3.2. The carbon footprint of a building is made up of the following elements:

- **Operational carbon**: the emissions associated with energy used to operate the building including heating, cooling, hot water, ventilation, lighting and equipment.
- **Embodied carbon**: the carbon emissions released during the lifecycle of building materials, including extraction, manufacturing, transport, construction, and disposal. This can be broken down into the following elements:
    - Upfront embodied carbon refers to emissions associated with production of materials used in construction and emissions during the construction phases before the building becomes operational.
    - In-use embodied carbon refers emissions associated with materials and processes to maintain the building during use (e.g. maintenance and refurbishment works)
    - End-of-life embodied carbon refers to the carbon emissions associated with decommissioning, demolition, disposal and transport from site at the end of the building's life.

3.3. Strategies for reducing a development's carbon footprint can include:

- Reducing the amount of cement used;
- Using alternative materials such as masonry instead of concrete blocks and clay fired bricks;
- Using timber framing instead of steel structures; and
- Using materials that have a lower carbon footprint (e.g. locally sourced or recycled).



Source: Passivhaus Trust

3.4. In addition, the design could take into account factors such as durability, adaptability and the scope for disassembly and re-use at the end of the development's life. Circular economy practices that aim to achieve net zero waste (as far as practicable) would be supported. This can be achieved through 'Modern Methods of Construction' and design for manufacture and assembly[5] processes and following the waste hierarchy. It is also important to consider the lifetimes of the various elements of buildings. Elements with the shortest lifetimes (e.g. finishes, and furnishings) should ideally have minimal negative environmental impacts and embodied carbon so they can be renewable. Elements with longer lifetimes (e.g. building structures) may require more embodied carbon, but their associated negative environmental impacts may be minimised by designing these elements for the greatest degree of durability. Development proposals are expected to prioritise circular economy practices, sourcing reused and recyclable materials where possible and minimising the amount of waste going to landfill. This can be achieved by working closely with supply chains from the design stage to minimise wasteful practices.

3.5. In summary, minimising embodied carbon requires:

- Optimising design with the aim of reducing the raw materials used in new developments and utilising low/ zero carbon products;
- Reuse: utilising recycled materials, re-purposing of existing buildings/ structures and designing buildings for deconstruction and re-use; and

[5] A design approach focussing on optimised design based on off-site pre-fabrications of elements such as floors, slabs and columns for on-site construction. This can lead to less waste generation and a reduction in vehicular transport of materials to site.

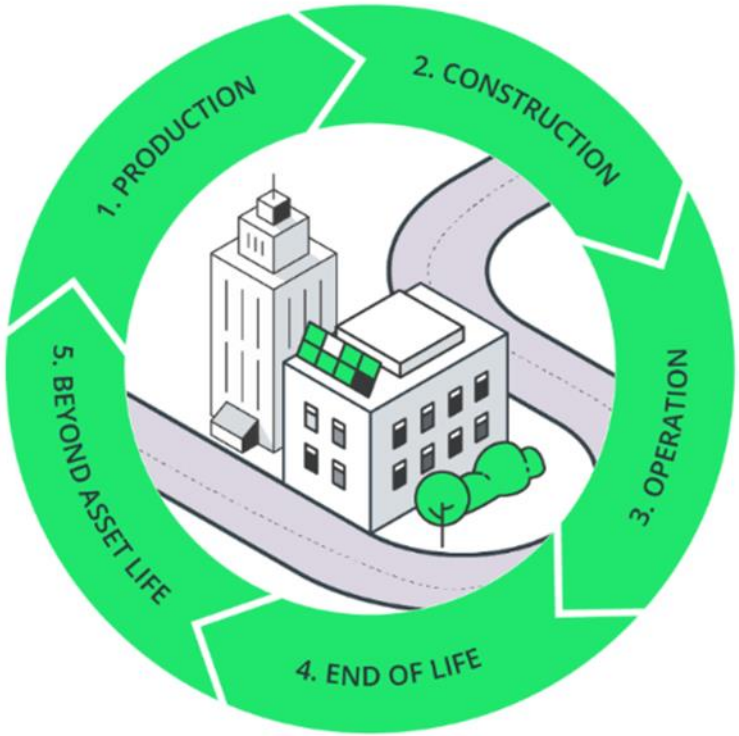
- Incorporating measures to reduce carbon and using alternative materials such as wood or recycled concrete products. For example, substituting wood for steel and concrete has the potential to greatly reduce the GHG impact of buildings, especially if the wood structure can be salvaged at the end of its life and reused. Also landscaping can be designed to sequester carbon through appropriate planting.

Operational Carbon

3.6. Operational carbon refers to the amount of carbon emissions associated with the building's annual operation. This includes electricity, gas and other fuels used in a building for heating, cooling, ventilation, lighting, hot water, appliances, and computer servers in commercial premises. Developers are encouraged to follow a fabric first approach such as LETI or Passivhaus standards, aiming for net zero carbon; where energy on an annual basis would be zero or negative. For the operational carbon emissions of a building to be zero, it must be highly energy efficient and powered by renewable energy either on or off-site, with any remaining annual carbon emissions offset. Further information is provided in the Hertfordshire Development Quality Charter.

Whole life carbon

3.7. Whole Life Carbon (WLC) emissions are the total carbon emissions resulting from the construction and the use of a building over its entire life, including its demolition and disposal. A WLC assessment will capture a building's operational carbon emissions from both regulated emissions



(due to fixed building services, as defined in the Building Regulations such as lighting, heating, hot water, air conditioning and ventilation) and unregulated energy (e.g. emissions relating to cooking and electrical appliances), as well as its embodied carbon emissions (emissions associated with raw material extraction, the manufacture and transport of building materials, and construction; and the emissions associated with maintenance, repair and replacement, as well as dismantling, demolition and eventual material disposal).

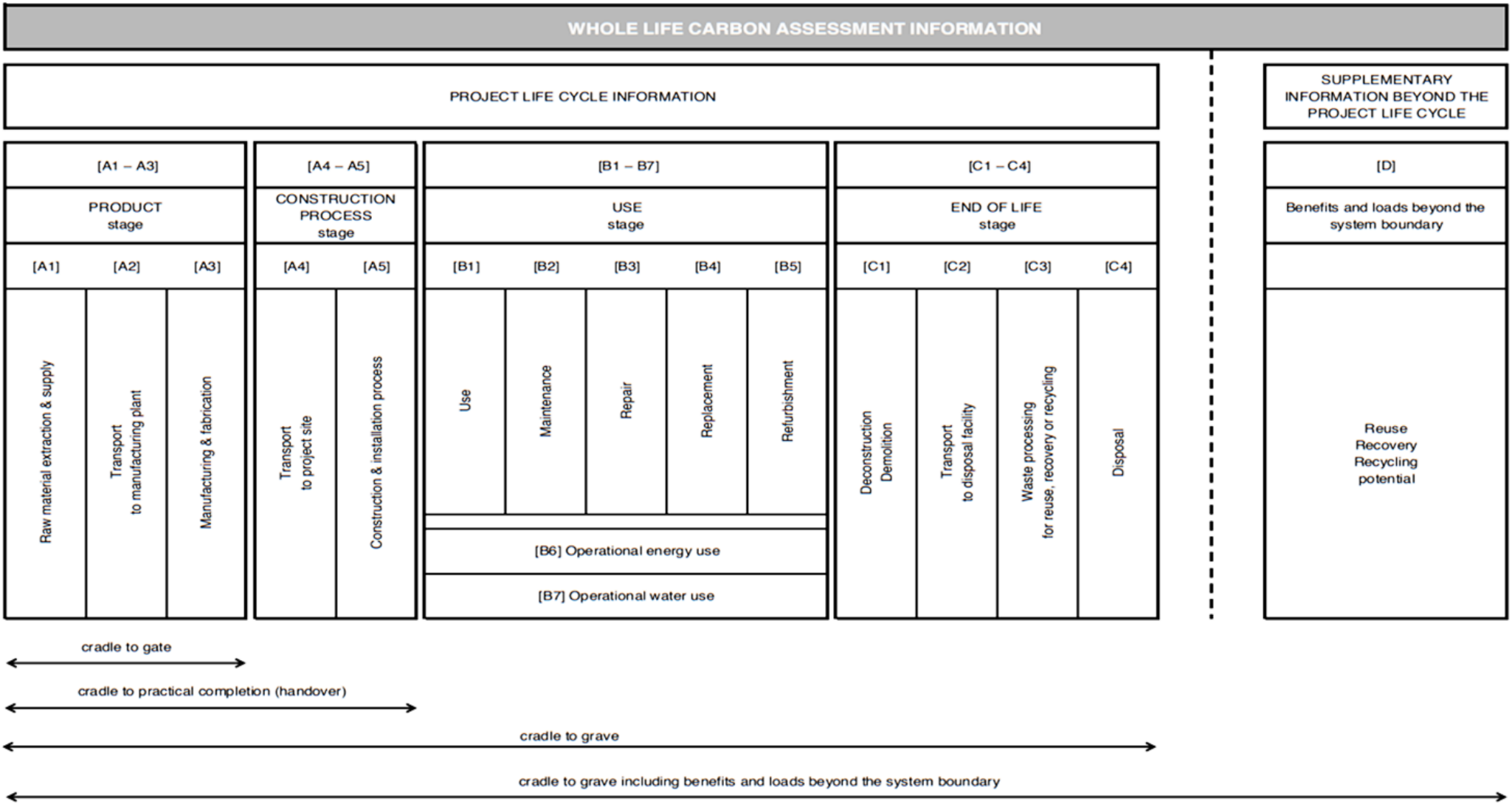
3.8. A WLC assessment also includes an assessment of the potential savings from the reuse or recycling of components after the end of a building's useful life. It provides a true picture of a building's carbon impact on the environment. The structure of WLC assessments is defined by British Standard BN EN15978. The Royal Institution of Chartered Surveyors (RICS) publishes guidance (and reporting templates) on its standard for whole life carbon assessment (WLCA) in the built environment, providing guidance on a range of issues involved in a WLC assessment including spatial boundaries, units of measurement and carbon sequestration.

3.9. The WLCA includes the following life cycle modules:

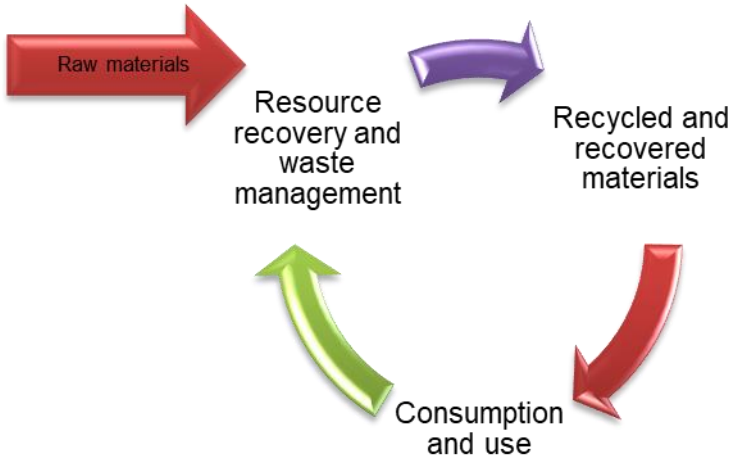
- A1-A3: Product stage
- A4 and A5: Construction process stage: transport to site and construction installation process
- B1: Use
- B2: Maintenance
- B3 and B4: Repair and replacement

- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use
- C1: Deconstruction and demolition process
- C2: Transport
- C3: Waste processing for reuse recovery or recycling
- C4: Disposal
- D: Benefits and loads beyond the system boundary (reuse, recovery, recycling potential)

3.10. Applicants can submit the assessment at the outline application stage with updates at subsequent stages of the application process. This is to demonstrate how the development will reduce overall emissions.

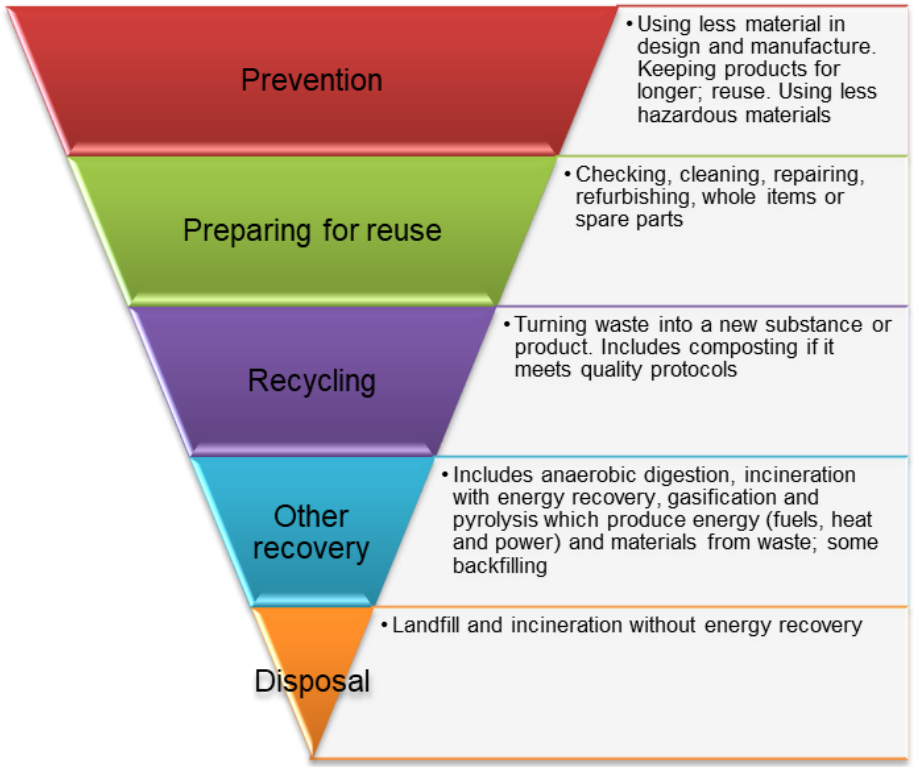

WHOLE LIFE CARBON ASSESSMENT INFORMATION
PROJECT LIFE CYCLE INFORMATION
SUPPLEMENTARY INFORMATION BEYOND THE PROJECT LIFE CYCLE
[A1 – A3]
PRODUCT stage
[A1]
[A2]
[A3]
Raw material extraction & supply
Transport to manufacturing plant
Manufacturing & fabrication
[A4 – A5]
CONSTRUCTION PROCESS stage
[A4]
[A5]
Transport to project site
Construction & installation process
[B1 – B7]
USE stage
[B1]
[B2]
[B3]
[B4]
[B5]
Use
Maintenance
Repair
Replacement
Refurbishment
[B6] Operational energy use
[B7] Operational water use
[C1 – C4]
END OF LIFE stage
[C1]
[C2]
[C3]
[C4]
Deconstruction Demolition
Transport to disposal facility
Waste processing for reuse, recovery or recycling
Disposal
[D]
Benefits and loads beyond the system boundary
Reuse
Recovery
Recycling
potential
cradle to gate
cradle to practical completion (handover)
cradle to grave
cradle to grave including benefits and loads beyond the system boundary

Source RICS



Zero Waste

3.11. Waste from households, commercial, industrial, construction and demolition has economic and environmental consequences. Disposal of plastic, food and garden waste can release greenhouse gases which contribute to climate change. The government's 'Our waste, our resources: a strategy for England' (2018) sets out a strategy for preserving material resources by minimising waste, promoting resource efficiency and moving towards a circular economy where products are reused and recycled. The Environment Act 2021 sets out a target of 50% reduction in the amount of residual waste (excluding major mineral waste) produced per person in England by the end of 2042, from 2019 levels.



3.12. The Hertfordshire Waste Development Framework sets out the spatial vision and strategic objectives for waste planning in Hertfordshire up to 2026. It seeks to achieve net self-sufficiency (to deal with the county's own waste) and to

maximise recycling, recovery and processing of waste to minimise the amount of waste sent to landfill.

3.13. NHDC follows the principles of the waste hierarchy seeking to prevent waste in the first place. When waste is created, priority is given to re-use, then recycling, then recovery, and last of all disposal (e.g. to landfill).

3.14. Proposals should seek to minimise operational and construction waste and include strategies to maximise the recycling of materials.

Construction Waste

3.15. Major Residential development should demonstrate best practice through the efficient management of waste during construction. This consists of measures to minimise construction waste and to maximise diversion of remaining waste from landfill. For major developments, a Site Waste Management Plan (SWMP) is required, demonstrating recycling of non-hazardous construction waste and diverting it from landfill.

Pre-demolition audits

3.16. Developers are encouraged to carry out a pre-demolition/ refurbishment audit to identify existing materials that may be suitable for re-use in the proposed scheme.

Operational waste

3.17. Location of bin storage areas should be in accordance with Building Regulations Document H. The 'Waste management in buildings code of practice BS5906:2005 provides a code of practice for methods of storage, collection, segregation for recycling and recovery, and on-site treatment of waste from residential and non-residential building

3.18. Further general advice on waste provision for developments is available on our website. The bin requirements stated there provide details to inform space requirements.

Checklist 3 - Minimising Carbon Footprint

Minimising carbon footprint			
	Bronze	*Silver*	*Gold*
Whole life carbon assessment: ***All residential development***	☑ Ensure compliance with Policy and Building Regulations including Part Z, if and when it is introduced. Discussions around reducing emissions will be required ☑ Applicants are encouraged to consider Whole Life Carbon (WLC) for Major Development, and methods for reducing emissions during the technical design stages	☑ Incorporate the findings of pre-demolition audits (where applicable) into the WLC assessment for the development ☑ Applicants must commit to updating the assessments at pre-commencement (Stage4) and pre-occupation (Stage5/6) ensuring alignment with the targets ☑ Ensure the scheme achieves the following ($kgCO_2e/m^2GIA$) scores: • Embodied Carbon – Product & construction (A1 - A5) score = 675	In addition to silver level requirements ☑ Ensure the scheme achieves the following ($kgCO_2e/m^2GIA$) scores: • A1 - A5 score <500 • B1 - 5, C1 - 4 (incl. sequestration) <300 Or • LETI Band C

Minimising carbon footprint			
	Bronze	*Silver*	*Gold*
		• Embodied Carbon – maintenance, replacement repair and end of life (B1 - 5, C1 - 4, sequestration) score = 325 Or • LETI Band D	
Whole life carbon assessment: ***Non-residential development***	☑ Ensure compliance with Policy and Building Regulations including Part Z, if and when it is introduced. Discussions around reducing emissions will be required ☑ Applicants are encouraged to consider Whole Life Carbon (WLC) and evidence discussions and include methods for reducing emissions during the technical	☑ Incorporate the findings of pre-demolition audits (where applicable) into the WLC assessment for the development ☑ Applicants must commit to updating the assessments at pre-commencement (Stage4) and pre-occupation (Stage5/6) ensuring alignment with the targets	In addition to silver level requirements ☑ Ensure the WLC assessment demonstrates that the scheme achieves the following Embodied Carbon ($kgCO_2e/m^2GIA$) scores: • Offices A1 - A5 score <600 B1 - 5, C1 - 4 incl. Sequestration score <370

Minimising carbon footprint			
	Bronze	*Silver*	*Gold*
	design stages and within planning assessments	☑ Submit WLC assessment in accordance with British Standard BN EN15978 and RICS Guidance ☑ Ensure the scheme achieves the following ($kgCO_2e/m^2GIA$) scores: • Offices A1 - A5 score = 775 B1 - 5, C1 - 4 incl. Sequestration score = 405 • Retail A1 - A5 score = 700 B1 - 5, C1 - 4 incl. Sequestration score = 170 • Education A1 - A5 score = 625 B1 - 5, C1 - 4 incl. Sequestration score = 210	• Retail A1 - A5 score < 550 B1 - 5, C1 - 4 incl. Sequestration score < 140 • Education A1 - A5 score <500 B1 - 5, C1 - 4 incl. Sequestration score < 175

Minimising carbon footprint			
	Bronze	*Silver*	*Gold*
Circular Economy Principles (Major residential and non-residential developments)	☑ Ensure compliance with Policy and Building Regulations	☑ Ensure a pre-demolition audit is undertaken (where applicable). ☑ Ensure a pre-redevelopment audit is undertaken for brownfield sites. ☑ Ensure the proposal demonstrates how excavated materials will be put to beneficial use (e.g. re-used/recycled). ☑ Submit a Circular Economy Statement showing a waste hierarchy approach with: • A minimum of 30% of construction materials being of re-used materials • 50% of materials used are designed for re-use • 80% of demolition (where applicable) waste materials (non-hazardous) are diverted	In addition to silver level requirements the Circular Economy Statement should also show: • 50% of construction materials being of re-used materials • 80% of materials used are designed for re-use • 100% of demolition waste materials (non-hazardous) are diverted from landfill for reuse/ recycling or recovery • 100% of excavation waste materials are diverted from landfill for reuse • 100% of construction waste materials are diverted from

Minimising carbon footprint			
	Bronze	*Silver*	*Gold*
		from landfill for reuse/ recycling or recovery • 80% of excavation waste materials are diverted from landfill for reuse • 80% of construction waste materials are diverted from landfill for reuse, recycling, or recovery • 80% of materials are sourced from ethical and responsible supply chains: 80% (LETI)	landfill for reuse, recycling, or recovery • 100% of materials are sourced from ethical and responsible supply chains • 80% of materials used are reusable i.e. they can be disassembled and reused in future buildings (LETI)

4. Healthy Placemaking

4.1. The NPPF recognises that planning plays a role in facilitating social interaction and creating healthy, inclusive communities. Community and recreation facilities, together with green spaces play an important role in enabling people to participate in physical and cultural activities which can help enhance physical, spiritual and mental wellbeing and engender a sense of inclusion and community. It can also reduce crime and create a sense of place, enhancing the overall attractiveness and vitality of neighbourhoods. Our Local Plan Policy HC1 seeks to protect existing community facilities and supports the provision of new ones; subject to proposals meeting the criteria set out in the policy. New developments should aim to achieve socially, economically and environmentally sustainable communities. Policy SP10 supports the retention of existing community, cultural, leisure, health, education and local retail facilities and the provision of new ones in new developments.

4.2. It is important for new development to relate to the local heritage and cultural context, both in terms of the built environment and the landscape. Development should conserve and enhance (where appropriate) the significance and setting of local heritage assets and reflect the local vernacular, historical building typologies, the treatment of facades, materials, and architectural styles. Modern day interpretations to complement the local vernacular are encouraged where they have a demonstrably lower impact over their lifetime and comply with relevant local plan policies. This is discussed further in Historic Buildings section.

Health and Wellbeing

4.3. The built environment has multiple and significant impacts on people's health and wellbeing. It needs to feel safe and secure for all, including the more vulnerable members of the community. It can also positively influence behaviours and lifestyles of residents, addressing multiple objectives such as

- Improving safety;
- Reducing air pollution;
- Maximising environmental protection; and
- Securing infrastructure investment to attract new residents and skilled workers.

4.4. Developers and delivery partners are expected to engage with health, sport, and physical activity consultees early in

the development process to maximise health and wellbeing benefits through design.

4.5. The NPPF outlines how the provision of accessible green infrastructure (GI), sports facilities and layouts that encourage walking and cycling, contributes to healthier lifestyles. This is echoed in HCC's Green Infrastructure Strategy and NHLP Policy SP9 which seek the provision of accessible, multifunctional GI. The Hertfordshire Climate Change and Sustainability Partnership's (HCCSP) Strategic Action Plan for Biodiversity includes several actions seeking to enhance green infrastructure, green space provision and nature based solutions to enhance biodiversity and improve community health.

4.6. The NHS's 'Putting Health into Place' sets out principles for designing, delivering, and managing healthy places. The following principles are of relevance to designing healthier developments:

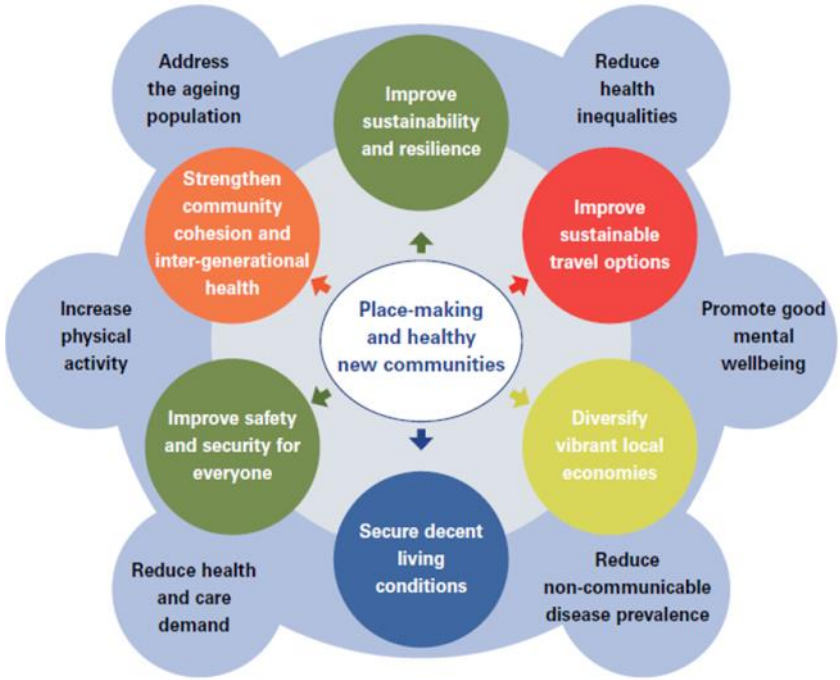
- **Create compact neighbourhoods**: new schemes should facilitate social and economic connections by designing compact, walkable, mixed-use neighbourhoods with distinct identities. Neighbourhoods that do not rely on cars, with attractive streets, parks and community spaces facilitate social interaction and engender beneficial effects on health and wellbeing. Commitment to creating compact neighbourhoods is needed at the earliest stages of planning and development. This should be implemented through a master planning approach informed by the National Model Design Code and NHS England's Healthy New Towns guidance.
- **Maximise active travel**: well-planned neighbourhoods can make walking, cycling and affordable public transport the preferred choice for getting around. Providing appropriate, accessible, infrastructure for whole journeys makes active travel options practical and attractive for users. Development should incorporate networks of safe walking and cycling paths with clear signposting, seating and cycle-parking These should link to the wider surroundings, schools, health and local centres. The provision of trails incorporating active play,

heritage and nature walks, also encourages active lifestyles.

- **Foster health in homes and buildings:** Provide healthy homes and buildings that are efficient and resilient to climate change. Homes should be designed to have sufficient space (meeting or exceeding Nationally Described Space Standard), daylight levels, ventilation, outlook and privacy. Buildings that are comfortable, offer character and cultivate a sense of community and pride have a positive impact on people's health.
- **Enable healthy play and leisure**: Development should create opportunities for people of all ages and abilities to come together, be active and enjoy leisure time.

4.7. It is important to recognise that some members of the community face barriers in accessing green spaces and nature (Public Health England, 2020). People living in the most deprived areas, and ethnic minorities are disproportionately affected by high levels of pollution and people in the least deprived areas of England generally enjoy significantly more accessible green space than those in more deprived areas (Wider determinants of health Nov. 2022).

4.8. It has also been shown that, across the older population, a higher percentage of males are active than females (Hertfordshire Cohort Study). Girls and young women often



report feeling unsafe when spending time in public spaces such as parks and green spaces (Out of Bounds – Equity in Access to Urban Nature).

Green Infrastructure (GI)

4.9. Development proposals should ensure that nature and landscape are woven into scheme design and careful consideration given to access, visibility, and lighting to improve passive surveillance and reduce crime. It is important to consider how people use space, for example women generally feel safest in well-used spaces. Obscure, isolated areas create situations of vulnerability. Ensuring that streets, paths and public spaces are well overlooked yet deliver privacy to individual dwellings giving the impression of a high degree of passive surveillance which discourages crime and creates a sense of safety. Sensory areas and provision of talking/ tactile maps can help make green spaces more accessible to people with sight impairment.

4.10. Well-designed GI can provide multifaceted benefits to climate change adaptation and mitigation as well as health and wellbeing benefits. The NHLP includes policies addressing GI such as SP12 and NE1 which seek to protect / enhance the existing strategic GI network and create new GI were appropriate. GI should be an integral part of new development and its surrounding and ought to be considered as early as possible at the pre-application and masterplanning stages.

4.11. Natural England set out the following process journey for developers to incorporate GI into development:

4.12. Natural England's Green Infrastructure Framework - Principles and Standards document can be used to inform the design of a comprehensive GI (including blue infrastructure) within new development that address local needs and responds to local opportunities. The GI Principles covers the 'Why', 'What' and 'How' of good GI and can help inform the scale of GI requirements for a development. It sets out 15 principles for well-designed GI.

Adaptation to higher temperatures

4.13. Extreme heat events can pose significant risk to human health, infrastructure and economic productivity. Therefore, it is important for development to include adaptation measures to improve resilience to extreme heat events.

4.14. The Urban Heat Island (UHI) effect describes the localised rise in temperature (in comparison to rural or less dense surroundings) within a built-up area. This occurs due to the concentration of buildings, paving and tarmac which absorb heat. For example, temperatures in London can often be 10 degrees warmer than in the surrounding suburbs. This poses a health risk to health and infrastructure creating a need for additional cooling and ventilation thus increasing energy demand.

4.15. The following measures can mitigate the urban heat island effect:

- Trees: provide shade and cool air through transpiration. They also remove carbon dioxide and enhance biodiversity.
- Green roofs and walls: help insulate buildings with additional carbon sequestration and biodiversity benefits.
- Shade providing structures: such as canopies and awnings.
- Colours: Lighter colours reflect sunlight helping to reduce heat.
- SuDS: provide cooling effects through evaporation and counteract some of the effects of hard impervious surfaces in urban areas which rapidly convey water away, preventing cooling associated with evaporation.
- Water features: such as fountains create spray which provides cooling through evaporation.
- Design: passive cooling can be implemented through layout and using a variety of heights to facilitate air flow and convey heat away. Selecting materials than absorb less heat is also helpful.

Green Infrastructure Principles Wheel (Natural England)

Urban Greening Factor

4.16. The Urban Greening Factor (UGF) is a policy initiative from the London Plan. It aims to increase green cover and be considered at the beginning of the design and planning for new buildings and developments. It is a tool that evaluates and quantifies the amount and quality of urban greening that a development scheme provides. The UGF has two main components; a UGF target score that sets a minimum proportion (urban greening divided by total area of site) of greening for a particular site, area or land use; and a schedule of green infrastructure elements or surface cover types and factor weightings that are used to calculate the target score. The recommended minimum UGF target scores for major developments in England are 0.3 for predominately commercial development and 0.4 for predominately residential development.

4.17. These target scores take account of current UGF planning practice and can be considered as a minimum benchmark rather than a maximum requirement. For example, a UGF of 0.5 is considered more appropriate for predominately residential development on greenfield sites.

4.18. Further guidance and UGF calculator is available from Natural England.

Green Flag Award

4.19. The Green Flag Award® scheme recognises and rewards well managed parks and green spaces, setting the benchmark standard for the management of recreational outdoor spaces. Successful sites show that they manage a quality space with a clear idea of what they are trying to achieve, why, and who they seek to serve. Green Flag criteria are a useful way to assess the green infrastructure quality and benefits. The approach is based on 27 assessment criteria, split into the following 8 sections, each of which is scored out of 10:

- A Welcoming Place
- Healthy, Safe and Secure
- Well Maintained and Clean
- Environmental Management
- Biodiversity, Landscape and Heritage
- Community Involvement
- Marketing and Communication

Checklist 4 - Healthy Placemaking

Healthy placemaking			
	Bronze	*Silver*	*Gold*
Green & Blue Infrastructure ***& NHS Health into Place Principles*** ***Residential development***	☑ Ensure compliance with Policy requirements and open space standards	☑ All schemes must submit a landscaping strategy ☑ Ensure all schemes propose play, community amenity and food production opportunities. Fields in Trust distances should be followed for play spaces and locations mapped with walking isochrones. ☑ Green Infrastructure design should follow Natural England's Green Infrastructure Principles ☑ Ensure all schemes embed key aspects of healthy placemaking as outlined in the NHS Putting Health into Place guidance. ☑ Ensure 50% of all flat roofs are green or blue roofs	In addition to silver level requirements ☑ Locations of play areas, amenity and food growing areas should be mapped, and character areas defined. Strategies should be included for play / food / active frontages. ☑ Ensure any Green Infrastructure provision links to strategic Green Infrastructure to compliment the Nature Recovery Network (where appropriate). ☑ Ensure schemes embed key aspects of healthy placemaking as outlined in the NHS Putting Health into Place guidance. ☑ Ensure 100% of flat roofs are green or blue roofs

Healthy placemaking			
	Bronze	*Silver*	*Gold*
		☑ Ensure that an air quality assessment is undertaken to achieve air quality neutral (AQN) or provide justification of why AQN not possible. ☑ Undertake an overheating risk assessment to assess residential dwellings against CIBSE TM59 and Part O ensuring compliance at planning stage - prioritising passive measures ☑ Undertake an acoustic assessment to confirm performance against the Part O acoustic criteria for the overheating assessment. All domestic units to meet Part M4(1) ☑ Ensure the development scheme includes community allotments.	☑ Ensure that the air quality assessment demonstrates air quality positive

Healthy placemaking			
	Bronze	*Silver*	*Gold*
Green & Blue Infrastructure ***& NHS Health into Place Principles*** ***Non-residential development***	☑ Ensure compliance with Policy requirements and open space standards	☑ All schemes must submit a landscaping strategy ☑ Ensure all schemes propose play, community amenity and food production opportunities. Fields in Trust distances should be followed for play spaces and locations mapped with walking isochrones. ☑ Green Infrastructure design should follow Natural England's Green Infrastructure Principles ☑ Ensure all schemes embed key aspects of healthy placemaking as outlined in the NHS Putting Health into Place guidance. ☑ Ensure 50% of all flat roofs are green or blue roofs ☑ Ensure that an air quality assessment is undertaken to achieve air quality	In addition to silver level requirements ☑ Locations of play areas, amenity and food growing areas should be mapped, and character areas defined. Strategies should be included for play / food / active frontages. ☑ Ensure any Green Infrastructure provision links to strategic Green Infrastructure to compliment the Nature Recovery Network (where appropriate). ☑ Ensure schemes embed key aspects of healthy placemaking as outlined in the NHS Putting Health into Place guidance. ☑ Ensure 100% of flat roofs are green or blue roofs ☑ Ensure that the air quality assessment demonstrates air quality positive

Healthy placemaking			
	Bronze	*Silver*	*Gold*
		neutral (AQN) or provide justification of why AQN not possible. ☑ Achieve BREEAM Hea 02 Indoor Air Quality credits ☑ Achieve BREEAM Hea 05 Acoustic performance credits ☑ Assess for overheating risk against CIBSE TM52 and ensure compliance ☑ Achieve Wst 05 BREEAM credit ☑ Ensure the development scheme includes community allotments	

Healthy placemaking			
	Bronze	*Silver*	*Gold*
Urban Greening Factor (UGF) ***Major residential and non-residential schemes***	Not applicable	☑ Ensure schemes include a multifunctional UGF calculation achieving a minimum of 0.4 (residential) or 0.3 (commercial) UGF along with a maintenance and management plan ☑ Ensure the green space attains a Green Flag score of 'Very Good'	☑ Ensure schemes include a multifunctional UGF calculation achieving a minimum of 0.6 (residential) or 0.5 (commercial) UGF along with a maintenance and management plan ☑ Ensure the green space attains a Green Flag score of 'Outstanding'

5. Promoting Biodiversity

5.1. North Herts has a wide range of habitats, including hedgerows, wildflower meadows, orchards, ponds, lakes, reed beds, ancient woodlands and chalk streams, many of which contribute to important wildlife corridors locally and through the District. Many of these habitats are within designated biodiversity sites, reflecting their value in terms of known wildlife interest. These include statutory designations such as Sites of Special Scientific Interest (SSSI), Local Nature Reserves (LNR), and Local Wildlife Sites (LWS). Additionally, in urban areas green spaces such as gardens, churchyards, park and allotments also provide valuable habitats that support a range of species and provide stepping stones for biodiversity.

5.2. The Environment Act 2021 introduced a requirement for planning applications to provide 10% Biodiversity Net Gain (BNG). It also established the requirement for Local Nature Recovery Strategies (LNRS); a new mandatory system of spatial strategies that will create a national system of interconnected sites for nature. The 10% BNG requirement became mandatory for major development from the 12th February 2024 and from 2nd April 2024 for small sites[6]. BNG will be measured using the statutory biodiversity metric or the small sites metric if development meets the criteria to do so[7]. BNG can be delivered either fully or in part through on-site habitat, off-site habitat, or as a last resort, the purchase of statutory biodiversity credits. Resulting habitat and significant on-site habitats will need to be legally secured for at least 30 years.

5.3. Residential and non-residential developments have the potential to produce detrimental effects on wildlife and biodiversity through direct habitat loss and fragmentation, encroachment and recreational disturbance. The Local Plan seeks to address this by focusing growth within existing key settlements and utilising brownfield/previously development land where possible.

5.4. Where strategic development is allocated on greenfield land, the Local Plan includes policies seeking to mitigate potential adverse impacts on the environment. This is also part of the Plans vision which states '*the rich biodiversity and geodiversity of North Herts will have been protected and*

[6] Guidance on BNG exempt developments

[7] Guidance on BNG metrics

enhanced where possible. Where new development could potentially have an adverse impact on biodiversity and geodiversity, measures will have been taken to ensure that the impact was either avoided or mitigated' and '*new green infrastructure will have enhanced the network of green corridors linking settlements to the open countryside, providing greater opportunities for healthy lifestyles*.'

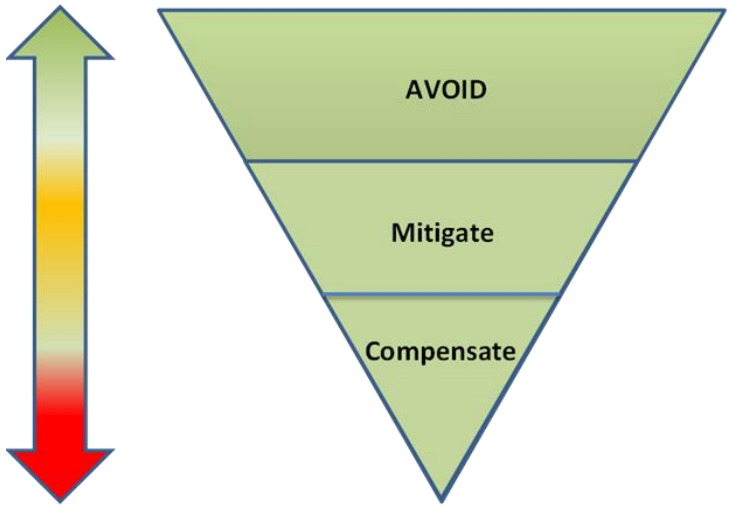
5.5. The Plan seeks to protect wildlife and habitats and deliver BNG. In this context the following strategic objectives and policies are particularly relevant:

- **ENV3** – Protect, maintain and enhance the District's historic and natural environment, its cultural assets and network of open spaces, urban and rural landscapes.
- **ENV5** – Reduce water consumption, increase biodiversity and protect and enhance the quality of existing environmental assets by enhancing new green spaces and networks of green space for both recreation and wildlife.
- **NE4** – Development to deliver measurable biodiversity net gain and to contribute to the restoration of ecological networks and degraded or fragmented habitats. Applicants are required to submit an ecological survey commensurate with the scale, location of development and its likely impacts on biodiversity demonstrating that adverse effects can be avoided and / or minimised according to the mitigation hierarchy. Net gains can be delivered through soft landscaping and tree planting to support wildlife habitats as identified in the Hertfordshire Biodiversity Action Plan and Local Nature Recovery Strategy (when published).
- **NE1** – seeks to protect the existing Green Infrastructure (GI) network and the creation of new strategic GI where appropriate**.** This is also the objective of SP12 which sets out a hierarchy of designations and features, seeking to protect and enhance designated and non-designated biodiversity sites in accordance with their position within the hierarchy.
- **NE5** and **NE6** - seek to protect existing open space and support new and improved provision as part of new development schemes.
- **NE8 -** seeks to use the most appropriate sustainable drainage solution, including enhancing biodiversity, water quality and provide amenity benefits, and also aims to mimic the natural drainage patterns and processes as far as possible.

5.6. The presence, or potential presence, of any protected species such as bats, great crested newts or badgers is a material consideration in planning application decisions. Similarly, there are priority habitats such as deciduous woodland and chalk grassland present within the District which are also a material consideration.

5.7. Proposals should avoid habitat loss and enhance the connectivity of ecological networks. Combining green and blue infrastructure within a development is an effective way of providing ecological connectivity whilst also delivering sustainable, natural solutions to our changing climate as well as creating pleasant places to live and work. The NPPF requires that development proposals follow the mitigation hierarchy.

5.8. Therefore, it is important to ascertain if there are important habitats on the proposed site by carrying out an ecological survey of the site. Where important habitat is present, avoidance should always be the first consideration. It may also be possible to avoid harm to existing habitat through careful consideration of alternative siting, layout and scale of development such that the existing natural features that contribute to the biodiversity of the site are retained.



5.9. Where avoidance is not entirely possible, appropriate mitigation measures should be implemented. These should be commensurate to the scale of development and the importance and legal status of the habitat affected. Examples include the incorporation of planting to create buffer zones to reduce disturbance, implementing a permeable landscape design helping to reduce habitat fragmentation and linking to the existing GI network. This is further discussed in the 'Planning for Nature' guidance. Advice can also be sought from Hertfordshire LEADS.

5.10. Where Biodiversity Net Gain is pursued, offsite compensation should only be considered as a last resort where avoidance and mitigation are not possible. This would

involve the creation of offsite compensatory habitat according to a spatial hierarchy where local offsite delivery should be prioritised over delivery outside the District which should only be considered as a last resort.

5.11. NHLP policy NE4 states that all development should deliver measurable net gains for biodiversity. This requirement is set to a minimum 10% mandatory net gain in the Environment Act. BNG should be considered early in the design process to ensure it is accounted for at the outset, using the Metric to evaluate the impacts of different design options. Under the statutory framework for biodiversity net gain, subject to some exceptions, every grant of planning permission is deemed to have been granted subject to the condition that the biodiversity gain objective is met ("the biodiversity gain condition").

5.12. The biodiversity gain condition is a pre-commencement condition: once planning permission has been granted, a Biodiversity Gain Plan must be submitted and approved by the Council before commencement of the development. The Biodiversity Gain Plan is a document which sets out how a development will deliver BNG and allows the Council to check whether the proposals meet the biodiversity gain objective including:

- How adverse impacts on habitats have been minimised;
- The pre-development biodiversity value of the onsite habitat;
- The post-development biodiversity value of the onsite habitat;
- The biodiversity value of any offsite habitat provided in relation to the development;
- Any statutory biodiversity credits purchased; and
- Any further requirements as set out in secondary legislation.

5.13. Opportunities for biodiversity enhancement include the following elements:

- Creating or enhancing wildlife corridors that connect through the development. The design of the development should not interrupt or block existing wildlife networks;
- The creation of community woodland within development schemes on greenfield sites where appropriate;
- Community food growing projects, community orchards and gardens and allotments;

- Green roofs/ walls and water features;
- Incorporating wildflowers to support pollinators;
- Including flowering lawns to provide forage for bumblebees;
- Providing housing for wildlife such as bat boxes, bird boxes, Swift bricks, insect hotels, insect hibernation houses (note this provision is not accounted for in the BNG Metric);

- Retaining native planting, trees, orchards, hedgerows, newt ponds and streams; and
- Sustainable drainage systems to manage surface water, filter out pollutants in surface water run-off and can provide habitats for wildlife.

5.14. We recommend that the following points are also considered in the BNG submissions:

- Ensuring development is set back at least 10m from a waterbody to protect the critical riparian buffer zone supporting several aquatic and terrestrial species; and
- Habitat creation / enhancement plans for significant onsite and offsite BNG
- A habitat management and monitoring plan (HMMP) will be required alongside BNG submissions.

5.15. The Council already require a Preliminary Ecological Appraisal or Ecological Impact Assessment to be submitted with most types of planning applications. These are now required to contain a specific section entitled 'Biodiversity Net Gain' (BNG) which must clearly show how the site has been assessed using the Statutory Biodiversity Metric. This will demonstrate the baseline habitat value of the site (pre-development) and the post development habitat value. It is also required to demonstrate how compliance with the BNG 10 good practice principles has been applied as part of the net gain assessment. The Statutory Biodiversity Metric User Guide provides further details. NHDC's Developer contributions SPD includes details regarding the BNG evidence and reporting requirements.

5.16. The Council will produce further guidance as statutory BNG requirements, LNRS and related processes evolve. Applicants are expected to have regard to the latest versions of the guidance and requirements.

Herts Local Nature Recovery Strategy

5.17. The Government's 25 Year Environment Plan includes the provision of Local Nature Recovery Strategies (LNRSs) across England. The Hertfordshire Nature Recovery Partnership will lead on the creation of Hertfordshire's Local Nature Recovery Strategy which will enable the delivery of more habitat, in better condition and in bigger patches that are more closely connected. As well as helping wildlife thrive, the LNRS will be designed to bring a wide range of additional benefits such as:

- greater public enjoyment;
- pollination;
- carbon capture;
- water quality improvements and
- flood management.

5.18. Further information pertaining to important habitats and species within the District is provided in the Hertfordshire Biodiversity Action Plan and the Herts Environmental Records Centre (HERC). Additional guidance is provided by The Hertfordshire Nature Recovery Partnership, Hertfordshire County Council.

5.19. Once in place the LNRS will determine Strategic Significant areas for BNG calculations. In the meantime the Hertfordshire Ecological Network Map provided by Hertfordshire Environmental Records Centre can be used to determine strategic areas of significance. Further information is available Ecology advisory service.

5.20. Development is expected to align with the objectives and priorities of the Hertfordshire LNRS to support the delivery of the Government's Environmental Improvement Plan (2023) which includes:

- Strengthening: improving management for nature, preventing degradation and ensuring appropriate access for people;
- Extending and creating: designating new protected areas and restoring or creating wildlife rich habitat outside of these; and

- Investing: investing in habitat restoration across our protected areas and beyond.

Protecting Chalk Streams & Rivers

5.21. Development schemes in the riparian zone of water bodies can help improve the quality of river habitats through projects seeking to restore internationally important Chalk streams in the District. This will benefit wildlife and improve resilience to climate change as droughts become more frequent. This can be achieved for example by reversing historic drainage works to restore naturally meandering channels which reconnect rivers and streams surrounding floodplains[8].

5.22. Developers should seek to integrate and enhance natural watercourses though sympathetic design aimed at protecting and enhancing the quality of watercourses and harnessing the recreational opportunities they offer where appropriate. This should include the identification of opportunities for de-culverting to enhance heavily modified water bodies. Furthermore, appropriate tree planting to enhance tree cover along water courses serves to provide shade and reduce temperatures so that river habitats and species can survive increasingly hot summers.

5.23. Areas with Chalk streams are groundwater sensitive; therefore, we encourage developments in these areas to protect the groundwater resources and use construction methods which remove or minimise the amount of de-watering needed. Under the Water Act 2005 (implemented in 2018) de-watering is licensable.

[8] Case study: Working-to-improve-Norfolk's-chalk-streams

Checklist 5 - Promoting Biodiversity

Promoting biodiversity			
	Bronze	*Silver*	*Gold*
Ecological surveys & assessments	☑ Carry out and submit a habitat survey to enable metric baselines to be completed, including quadrat survey (where necessary) to demonstrate UK Habitats. The survey should be undertaken in line with best practice (e.g. timing and age) and identify Priority/ irreplaceable habitats (BS42020) ☑ A species assessment and follow-up surveys should be completed and submitted according to recommendations required to enable determination – i.e. no outstanding surveys	In addition to bronze level requirements ☑ Ensure surveys include a review of existing sources of information such as the Hertfordshire Environmental Records Centre, MAGIC or any other appropriate resource ☑ Ensure that an assessment of additional features within the site but beyond compensation for species affected is included in the species assessment	In addition to silver level requirements ☑ Ensure habitats are evidenced in photographs, and the local context of the site is shown in relation to features beyond the site / wider ecological networks / LNRS

Promoting biodiversity			
	Bronze	*Silver*	*Gold*
Aboriculture Assessment (where trees are impacted by the proposal)	☑ Submit a survey of all trees on site, identifying trees of value and potential impacts on offsite trees	In addition to bronze level requirements ☑ Retain any high value tress onsite (Category A/B or other highest value trees)	In addition to silver level requirements ☑ Retain all existing trees on site
Biodiversity Net Gain (BNG) ***(all development except BNG exempt developments)***	☑ Ensure the Statutory Metric or Small Sites Metric (SSM) is completed and submitted showing baseline value and demonstrate how the mitigation hierarchy has been applied ☑ Submit a plan showing that habitat proposals achieve at least 10% BNG. (see North Herts Developer Contributions SPD) ☑ Submit a Habitat Management and Monitoring Plan (HMMP) showing how BNG significant habitats are to be managed and monitored	In addition to bronze standard requirements ☑ Ensure 10% BNG is achieved onsite ☑ Provide on plot ecological enhancements to support wildlife (housing for bats, birds, bees, hedgehog holes in fences etc.)	In addition to silver standard requirements ☑ Submit a plan showing that 20% BNG is achieved, either all onsite or 10% onsite plus 10% offsite (e.g. contributing to the Hertfordshire LNRS)

Promoting biodiversity			
	Bronze	*Silver*	*Gold*
Ecological buffers	☑ Ensure the scheme takes account of Natural England's Standing Advice for ancient woodland and veteran trees to provide a 15m buffer in these areas ☑ Ensure the scheme includes a 12m buffers for SSSIs ☑ Ensure the scheme includes a 10m riparian zone buffer alongside watercourses, where applicable	In addition to bronze standard requirements ☑ Ensure the scheme includes a 12m buffer adjacent to LWS and species rich hedgerows	In addition to silver standard requirements ☑ Ensure the scheme includes enhancements to national and/or local sites and other habitats seeking to limit impacts of development and positively contribute to existing habitats

6. Sustainable Travel

6.1. Sustainable travel is a crucial element for healthy and liveable new developments. By prioritising walking, cycling, and public transport infrastructure and services, residents can reduce their reliance on cars, leading to a safer environment for travel and play, cleaner air, less noise pollution, and a more active lifestyle.

6.2. All development expected to generate significant amounts of movement are required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed (NPPF).

6.3. The Hertfordshire Place & Movement Planning and Design Guide (P&MPDG), provides detailed design advice to ensure that development complies with the Herts Local Transport Plan (LTP4) in terms of sustainable design.

6.4. Transport assessments are required for:

- Residential development of more than 25 units (or retirement developments of more than 50 units);
- Where traffic levels to and from the proposed development are likely to exceed 5% of the two-way traffic flow on the adjoining highway from which it takes access;
- Where traffic congestion exists or will exist within the assessment period; and
- In sensitive locations such as adjacent or close to traffic lights or roundabout junctions.

6.5. Design and Access statements required for most developments and parking is a key aspect that must be covered.

6.6. In some cases parking arising from development will require measures to be put in place to manage the impact of parking on the public highway. This includes physical protection against parking (i.e. on verges) or protection via Traffic Regulation Orders against short/long stay parking at inappropriate locations (i.e. at junctions, in locations that may conflict with pedestrian movements). All parking management required because of new development must be provided by the developer and should have regard to the Council's Parking Strategy and other parking management in the area.

Electric Vehicle Charging Points

6.7. In January 2022 the Government adopted amendments to the National Building Regulations, which require new developments to provide EV charging points. The amendments in Part S of Schedule 1 to the Building Regulations 2010 took effect on 15 June 2022 for use in England (Approved Document S). Whilst most of the requirements of these Building Regulations are reflected in the advice in this document, additional guidance is provided on the requirements by development type.

Car & Cycle Parking

6.8. Parking standards for residential car and cycle parking are set out in Appendix 4 of the NHLP and in the Council's Vehicle Parking at New Development SPD.

6.9. The standards apply a 'minimum' parking standard to residential development that considers levels of car ownership and expected growth, whilst retaining 'maximum' provision for non-residential development along with the zonal approach to parking restraint.

6.10. Applications for new residential development must seek to promote walking, cycling and public transport and in doing so developers may make a case for negotiating the provision of parking below the minimum standard. Clear evidence must be provided that shows residents and visitor parking demand will not exceed the parking provided or that alternative short and long stay daytime and evening parking will be readily available to future residents and visitors. The developer should identify examples of this evidence from other developments or locations in similar circumstances to those found in the district. The Council does not consider, however, that residents will choose not to own cars if they live within locations that have good road connections. Evidence suggests that constraining the supply of parking spaces is not an effective tool for incentivising residents to own fewer cars and choose sustainable transport modes more often. Instead, it tends to normalise parking on pavements and verges, which disadvantages disabled people and degrades the urban realm.

6.11. Parking strategies should be linked to a Sustainable Travel Strategy and include EV charging points.

Sustainable Transport

6.12. The NPPF expects development proposals to ensure that opportunities to promote sustainable transport modes are considered, taking into account the type and location of the development.

6.13. Hertfordshire County Council is the highways authority and its guidance (P&MPDG) and Local Transport Plan 4 (LTP4) provide the framework for achieving better transport systems in Hertfordshire for the plan period 2018-2031. These cover all modes of transport including walking, cycling, public transport, car-based travel, reducing road freight movements and making provision for those with mobility impairments. LPT4 supports sustainable travel and a modal shift away from car dominance. It is important that P&MPDG and LTP4 are taken into consideration at the early stages of all developments.

6.14. Sustainable transport should be considered at the outset when designing new developments taking into account the potential impacts on congestion and air quality. The emphasis should be on reducing reliance on private vehicles and promoting modal shift through public transport and active travel provision. Ideally, new development should incorporate segregated pedestrian and cycle paths located away from motorised traffic.

6.15. For larger strategic developments the provision of local services and facilities can reduce the need to travel further afield to access such services (e.g. retail, health and education). Further information is provided by the North Herts Transport Strategy.

Travel Plans

6.16. Development proposals are required to include travel plans demonstrating how they deliver sustainable transport objectives and support modal shift towards active travel. This should be prepared in accordance with the Herts Travel Plan Guidance.

6.17. The layout of streets should be designed to facilitate efficient bus operation. Consideration should be given to including bus priority at traffic signals and 'bus gates'. All bus stops should be connected to the surrounding area by direct and safe walking routes. Railway stations and bus stops on major corridors, served by 'express' services, should include secure cycle parking and safe cycling routes from the surrounding area.

6.18. Well-designed secure cycle parking within dwellings and other areas should be conveniently located to encourage greater use.

6.19. Electric vehicle spaces and charging points need to be suitably located to avoid street clutter. E-bike spaces should be provided with appropriate security measures.

6.20. Development should consider access for servicing such as refuse collection, deliveries, and removals through the careful placement of parking and the provision of loading bays. Further guidance is provided in the Manual for Streets.

6.21. Sport England's Active Design guidelines sets out active design guidelines on how to incorporate public transport, and active travel networks through development and into existing communities.

6.22. NHS England's Putting Health into Place provides further guidance including case studies showing how active travel provides the most sustainable from of transport and how it can facilitate improved health and wellbeing.

6.23. Car-sharing schemes and car clubs are actively sought in the district, including in new developments, to give residents a practical alternative to owning a car, especially a second or third car, which may be used only occasionally.

6.24. Enhanced digital connectivity such as high-speed broadband services can help facilitate home working thus reducing the need to travel helping maintain the post Covid trend towards hybrid working.

6.25. Digital technologies can also be used to enable digital transport service platforms such Mobility as a Service (MaaS) systems that enable users to access, pay for, and get real-time information on, a range of public and private transport options.

Air quality

6.26. Hertfordshire's Local Transport Plan (LPT4) highlights the role of transport as a major contributor to air pollution in the county recognising its adverse impact on human health. It

identifies transport and growth as presenting threats to the local air quality and supports reducing car use and new fuel and energy technologies as a way to help improve air quality. The importance of tackling air quality in Hertfordshire is also outlined in Hertfordshire County Council's Air Quality Strategy 2019 and North Herts Annual Air Quality Status Report.

6.27. NHLP Policy D4 (Air Quality) expects proposals to consider impacts on air quality and to provide air quality impact assessments (where applicable) demonstrating that the development will not produce unacceptable impacts on local air quality (pre, during and post construction). Developers would be expected to provide appropriate levels of mitigation even where an impact assessment is not required. An air quality impact assessment will be required in the following instances:

- The following types of developments within or adjacent to an Air Quality Management Area (AQMA):
  - Housing;
  - Biomass / other combustion boiler;
  - Industrial developments;
  - Car parks; and
  - Developments likely to significantly increase vehicle movements.
- Development elsewhere in the District:
  - Major' developments that lead to significantly increased car parking / traffic movements particularly heavy duty vehicles;
  - Industrial developments; and
  - Development introducing people to a previously unpopulated area where air quality is an issue.

6.28. An approach to considering the impact of a development on air pollution and the potential mitigation measures are outlined in the Council's air quality planning guidance.

Demolition and Construction Management Plan

6.29. A detailed Demolition and Construction Management Plan and a Traffic Management Plan are usually required. This is to be submitted for approval prior to commencement of construction. This is to ensure that adequate measures are adopted to control nuisance during works associated with construction traffic and the spread of pollution, notably dust and fine particulate matter.

Measures to improve air quality

6.30. Development design should prioritise sustainable and active travel modes to help reduce reliance on private cars (see transport section). Applicants are encouraged to apply the Healthy Streets approach when designing developments;

6.31. Green infrastructure can be used to protect residents from air pollution. This should be included within the air quality assessment;

6.32. Children are more vulnerable to the effects of air pollution therefore play/ recreation spaces should be located such as to minimize exposure to air pollution;

6.33. Studies suggest that the most deprived areas bear a disproportionate share of poor air quality. Also, the risk of experiencing poorer health outcomes because of air pollution may be heightened for those living in areas of deprivation. Therefore, measures should be taken to minimize exposure to air pollution in such areas as well as at schools, care / residential homes, and health care facilities.

6.34. Provision of EV charging infrastructure within development will help encourage Electric Vehicle usage and help reduce NO2 emissions;

Checklist 6 - Sustainable Travel

Sustainable travel			
	Bronze	*Silver*	*Gold*
Transport statements, assessments and travel plans	☑ Submit a Transport statement and travel plan clearly demonstrating how the scheme will facilitate sustainable transport and encourage active travel ☑ Ensure the scheme includes segregated cycle ways, pedestrian paths away from traffic and integrated with green infrastructure	In addition to bronze level requirements ☑ Ensure the transport statement/ travel plan seeks to achieve 50% of local trips (under 5 miles) by active travel by for example: • Including proposals/ financial contributions for off-site upgrades to walking and cycling infrastructure creating safe, continuous routes to schools and key destinations • Including proposals/ financial contributions to enhance/ provide additional local bus services serving the development and its environs	In addition to silver level requirements ☑ Ensure the transport statement/ travel plan seeks to achieve 50% of all trips by sustainable modes, by including, for example: • Car clubs • Ride sharing schemes • Community transport schemes • Cycle hire schemes

Sustainable travel			
	Bronze	*Silver*	*Gold*
EV Charging	☑ Ensure compliance with Policy and the Building Regs Part S	In addition to bronze level requirements ☑ Provide one active EV charging point (EVCP) per dwelling, rated 7kW (minimum) ☑ Provide at least one EV charging point at each mobility hub and destination location (e.g. community hall, parade of shops, sports facilities etc.), rated 7kW (minimum) ☑ Provide one EV charging point per 200 dwellings for a car club, disabled visitor, and other visitor use, evenly distributed throughout the site, rated 7kW (minimum)	In addition to silver level requirements ☑ Ensure EV charging points at mobility hubs and destination locations are rated 22kW or higher. ☑ Ensure passive provision for an additional EV charging point per 200 dwellings for car clubs and visitor use

7. Conserving Water

7.1. North Herts District is within an area of 'serious water stress'. This implies that water demand is high compared to available water resources. Population growth coupled with droughts and extreme weather events associated with climate change are expected to exacerbate this issue. Affinity Water's Water Resources Management Plan (WRMP) identifies significant pressures on the local environment and water resources due to population growth and climate change. Therefore, it is important to ensure the long-term sustainable management of water supplies as well as the protection of our local rivers and wildlife.

7.2. Policy NE10 of the NHLP sets criteria pertaining to water conservation and wastewater infrastructure, which development proposals are required to meet. Developers are required to demonstrate that there is adequate capacity in the public water supply for the scope of the development's use.

7.3. The NPPF (paragraph 158) expects plans to proactively mitigate and adapt to the long-term implications of climate change including on water supply.

7.4. The Building Regulations include a requirement for all new dwellings to achieve a water efficiency standard of 125 litres of water per person per day (lpd). They also include an optional, higher efficiency requirement (Part G) of 110 lpd for new residential development. For all new dwellings, a completed "water efficiency calculator for new dwellings" worksheet that accords with Part G of the Building Regulations Approved Documents should be provided prior to occupation. The calculation must demonstrate that the new dwellings will achieve a maximum water usage of 110 litres per person per day (SPD bronze standard). However, developers are encouraged to achieve greater levels of water efficiency (SPD silver or gold standards).

7.5. Non-residential buildings are expected to be as water efficient as possible. The Herts Building Futures Sustainable Design Toolkit (Commercial & Industrial) includes advice and guidance on reducing water consumption in non-residential buildings. The Council seeks a minimum efficiency standard of 2 credits for category Wat 01 of BREEAM unless demonstrated not practicable. However, developers are encouraged to achieve full credits for category Wat 01 of the Building Research Establishment Environmental Assessment

Method (BREEAM). Further guidance on this is available from BREEAM.

7.6. Development, involving new construction or a change of use and refurbishment, can save water by including measures such as:

- Systems for greywater reuse;
- Aerated washbasin/kitchen taps and shower heads;
- Tapered and low capacity baths;
- Sensor and low flush toilets;
- Shower timers; and
- Water efficient white goods and appliances such as washing machines and dishwashers.

7.7. Measures to conserve water used during construction can include:

- Closed loop wheel washers;
- Waterless wheel washing using angled steel grids to remove debris;
- High pressure low volume power hoses;
- Recirculating water where possible;
- Limiting the water used for flushing building services by stopping it as soon as the flush water turns clear; and
- Employing a regime for monitoring water use and water waste.

7.8. By minimising the length of hot water pipes the volume of water that must be drawn off each time a tap or shower is used can be reduced. Positioning hot water pipes above pipes carrying cold water will reduce heat transfer. Further heat loss can be reduced by insulating the piping.

7.9. For all new dwellings, a completed "water efficiency calculator for new dwellings" worksheet that accords with Part G of the Building Regulations Approved Documents should be provided prior to occupation. The calculation must demonstrate that the new dwellings will achieve a maximum water usage of 110 litres per person per day (SPD bronze standard). However, developers are encouraged to achieve greater levels of water efficiency (SPD silver or gold standards).

Rainwater Harvesting

7.10. Rainwater harvesting involves the collection of rainwater directly from the surfaces it falls on (e.g. a roof). Once collected and stored it can be used for non-potable purposes such as watering gardens, supplying washing machines and flushing toilets, thereby reducing consumption of potable

water. Potable water is produced through a purification process and is pumped over large distances, both of which require energy and result in embodied carbon that is not present in water harvested locally. In a residential development, rainwater can be captured for domestic use using water butts connected to a down pipe. Larger systems can use water stored in underground water tanks.

7.11. Rainwater harvesting also helps mitigate flood risk by capturing the first flush of summer storms and by delaying the entry of water into the surface water drainage network. Schemes should be designed to include space for water storage. In residential developments, down pipes should be carefully placed so that water collection and use is convenient for residents. Further guidance is provided by the Environment Agency's Energy and carbon implications of rainwater harvesting and greywater recycling.

Greywater Re-use

7.12. Water that is recycled from bathrooms and kitchens for non-potable uses is known as greywater. Greywater systems require treatment on a regular basis to prevent a build-up of bacteria, and some systems are powered, which entails an energy cost. As a result, greywater reuse is generally less preferable than water use minimisation measures.

7.13. Water recycling systems are better suited to new developments rather than retrofitting in existing buildings because of the excavation required for storage tanks and changes needed to the plumbing system. These are generally more cost effective for new developments and developments of a larger scale.

7.14. Recycling systems should be backed up by mains supply or a sufficiently large reserve storage system to meet higher demands during dry spells. Storage tanks will need an overflow to allow excess water to be released which should be able to flow into a soakaway.

Protecting Water Sources

7.15. North Hertfordshire is an area of water stress where much of the water comes from groundwater sources. Therefore consideration should also be given to protecting groundwater sources. Further guidance is provided by the Environment Agency's approach to groundwater protection.

Checklist 7 - Conserving Water

Conserving water			
	Bronze	*Silver*	*Gold*
Residential development	☑ Ensure compliance with Policy requirements of 110 lpppd	☑ Ensure that water consumption can meet the target of < 95 lpppd (RIBA 2025 Climate Challenge)	☑ Ensure that water consumption can meet the target of < 75 lpppd (RIBA 2030 Climate Challenge)
Non-residential development	☑ Applicants are encouraged to achieve a minimum of 1 credit for category Wat 01 of BREEAM	☑ Ensure development achieves 25% improvement over baseline water consumption in line with BREEAM New Construction V6 (or latest version).	☑ Ensure development achieves 40% improvement over baseline water consumption in line with BREEAM New Construction V6 (or latest version).

8. Incorporating Sustainable Drainage

8.1. As weather patterns shift due to climate change, the risk of flooding in urban areas is on the rise. Traditional drainage systems are often overwhelmed by increased runoff from impervious surfaces like concrete. Sustainable urban drainage (SuDS) is a critical tool for mitigating flood risk. By mimicking natural water processes, SuDS not only reduce floodwater volume but also improve water quality and create a more resilient urban environment.

8.2. The NHLP strategic objective ENV4 seeks to mitigate the effects of climate change and reduce the risk of flooding. The Plan is supported by a Strategic flood Risk Assessment (SFRA) which identifies mitigation required to reduce the risk of flooding from surface water. The SFRA provides the basis for applying the sequential test and exception tests for development sites. Developments will be refused planning permission where they increase the risk of flooding to others or conflicts with the sequential approach set out in the NPPF. Plan policies such as SP11 seek to meet the challenges of climate change and flooding supporting a risk-based approach to development and flood risk. Development is directed to areas at lowest risk of flooding and policy.

8.3. It is important to understand the risks of flooding to proposed .development sites from all sources (including surface water, fluvial and groundwater). This should also factor in how risk is likely to change in the future. Further guidance is provided in Planning Practice Guidance on flood risk and coastal erosion (Aug. 2022). The latter includes the application of the sequential and exception tests and encourages an integrated approach to flood risk management. Proposals should seek to reduce flood risk and include measures to ensure that development does not increase the risk of flooding for nearby communities. Climate change allowances vary for different catchments and developers must use the appropriate ones to assess their proposal for the effects of fluvial flooding, now and in the future. These are calculated based on the vulnerability of the development; therefore the development must assess fluvial flood risk on a case-by- case basis. Further guidance is provided by the Environment Agency's Living Better with a Changing climate (2021).

8.4. NHLP Policy NE8 requires the provision of SuDS to manage surface water run-off. These can include a variety of forms including green roofs, swales, permeable pavements, and retention ponds. Well-designed SuDS emulate natural

drainage patterns and integrate with wider green infrastructure providing multiple benefits including reducing surface water flooding, enhancing biodiversity, water quality and providing amenity benefits. Measures for the re-use of rainwater should be included wherever possible. Proposals are expected to aim towards meeting the higher, most sustainable end of the hierarchy.

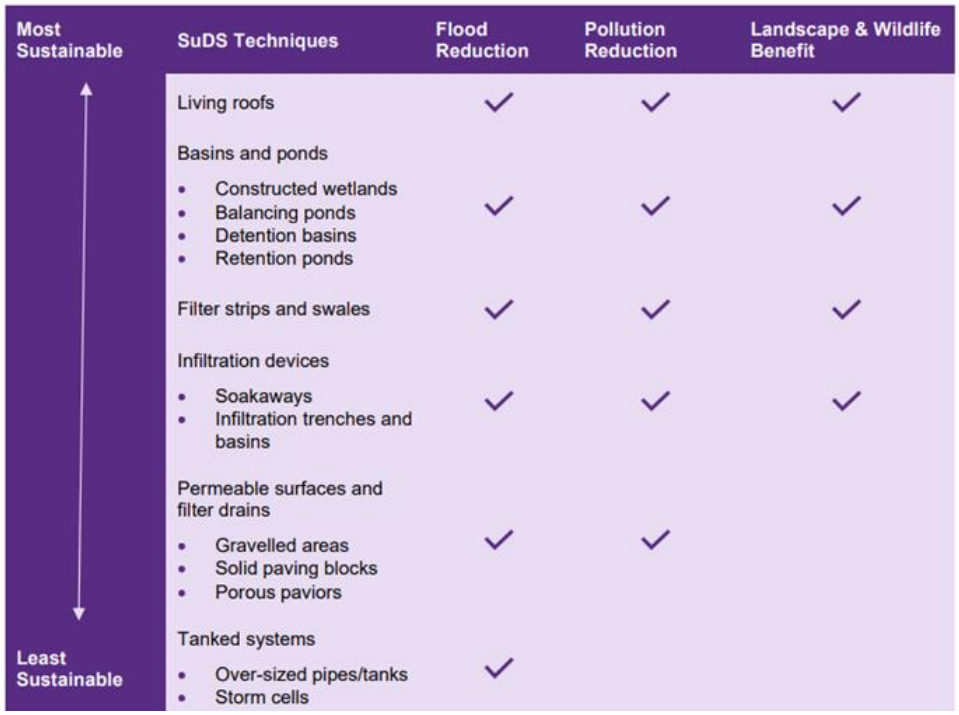
SuDS Best Practice Guidance

8.5. The overarching principle of SuDS design is that surface water should be managed for maximum benefit in accordance with the 4 pillars (or benefits) of SuDS:

- Water quality;
- Water quantity;
- Amenity; and
- Biodiversity.

8.6. All development proposals should be informed by an overall awareness of their potential impacts on, and exposure to the surrounding water environment considering all sources of flood risk.

8.7. The developer is responsible for ensuring proper provision for surface water drainage into the ground, water courses or surface water sewers. Drainage to the foul sewer will not be accepted as it could contribute to sewer flooding.



The SuDS Hierarchy

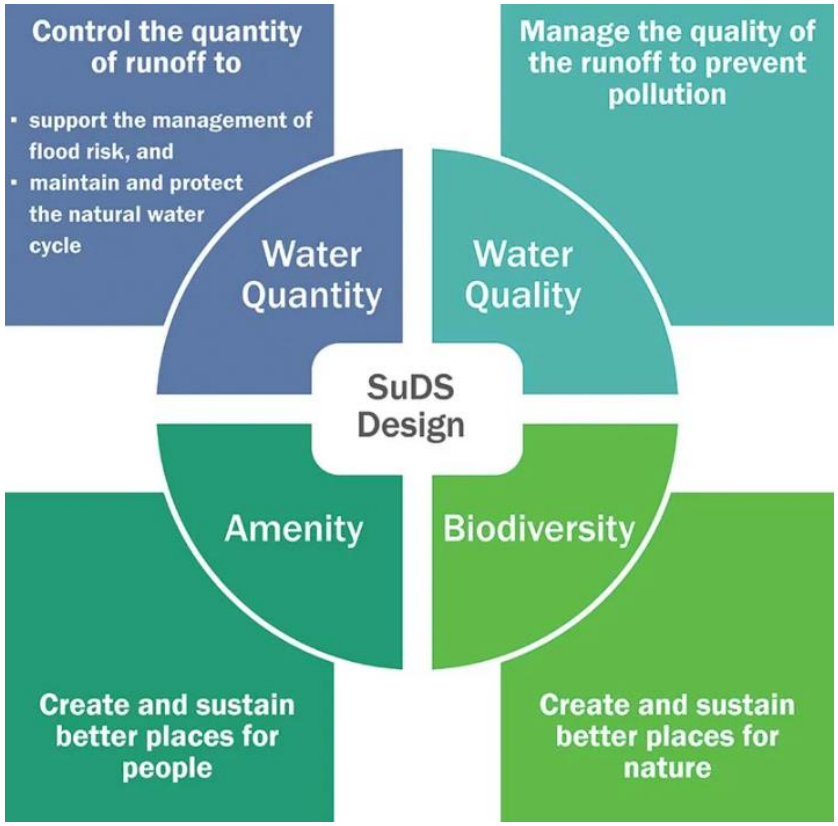
8.8. Development proposals should avoid harm to existing water courses including through increasing risk of blockage, erosion or disruption of their natural flow patterns or culverting, pipe crossings or altering the natural course of the water body.

8.9. Works on or near watercourses may require prior permission from the Environment Agency or the Lead Local Flood Authority (Hertfordshire County Council). Contact should be made with these authorities or NHDC to ascertain the requirements.

8.10. Proposals should identify likely impacts on water run-off rates and volumes and include measures demonstrating how these can be mitigated. This should take cumulative impacts into account by considering overall development growth in the area covered by buildings and hardstanding. Suitable mitigation can include SuDS features such as rainwater harvesting, green roofs/ walls, swales and retention ponds.

8.11. A SuDS strategy should be considered early in the design process taking into account the site's geology, water table levels, topography and constraints. This should also consider synergies between the SuDS features proposed and benefits to biodiversity, quality of public realm, shading and water quality (filtration of run-off) and water efficiency.

8.12. New SuDS requirements are anticipated to be brought into force in 2024 making SuDS mandatory for most new construction in England. This will require a SuDS-specific approval from HCC's SuDS Approval Body (SAB) prior to construction.



Multifunctional SuDS Design

8.13. The Environment Agency encourages the use of infiltration SuDS as this is a sustainable approach to surface water

management that mimics natural processes. However, the use of infiltration SuDS is not appropriate on all sites and in all locations. For example, infiltration SuDS should not be constructed in contaminated ground where infiltration can re-mobilise contaminants already within soils leading to groundwater pollution. The potential for infiltration drainage is also limited in locations where peak seasonal groundwater levels are shallow as a minimum thickness of unsaturated zone must be maintained beneath the infiltration level. It is also important to consider the time of concentration i.e. the time it takes from when rainfalls to when it discharges. In piped conveyance systems, this can be significantly shortened which impacts the downstream receptor and ultimately increases the risk of flooding.

8.14. The use of deep infiltration systems such as boreholes is not routinely accepted and generally only approved where there are no other feasible disposal options (e.g. shallow infiltration systems or drainage fields/ mounds) and where the developer demonstrates that there will be no unacceptable pollution risk to groundwater. Such a system may require an environmental permit if approved.

8.15. In all cases the SuDS train should provide sufficient water quality treatment in line with the land use of the drainage catchment and sensitivity of the receiving groundwater body.

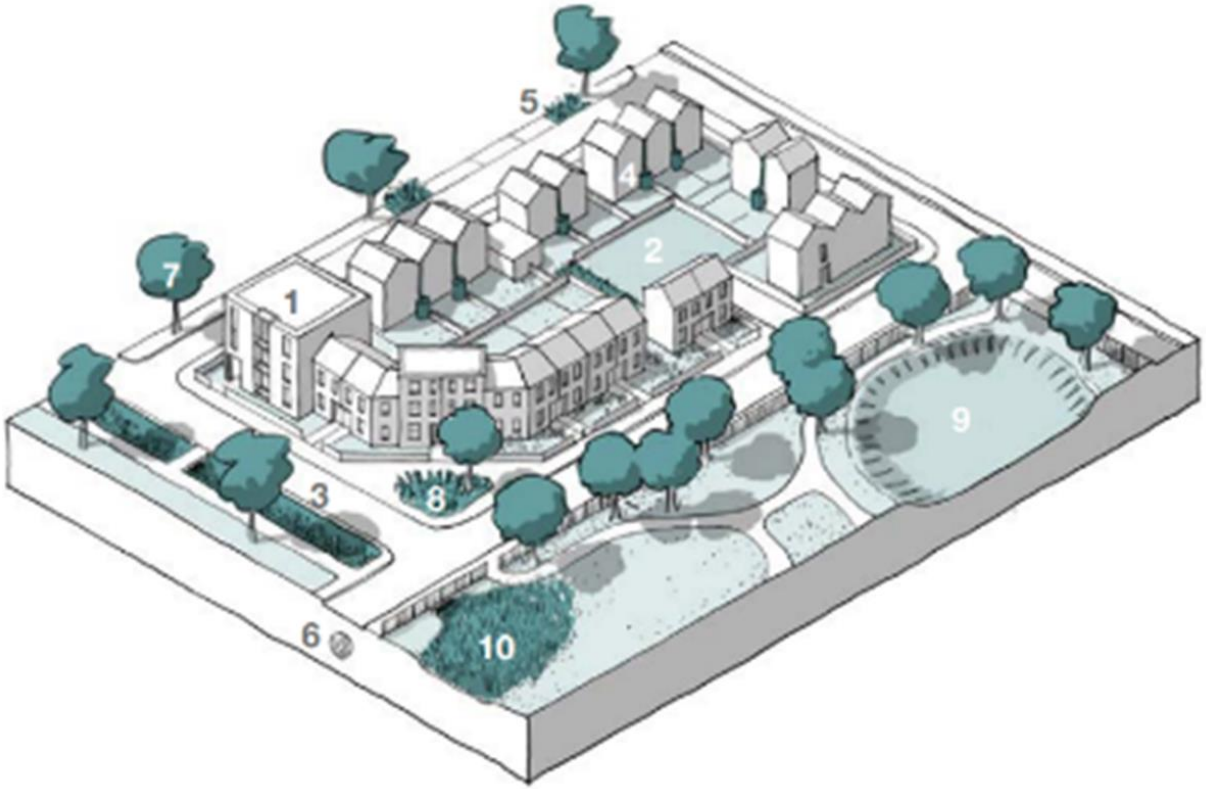
8.16. Further guidance includes the following:

- The Environment Agency's Approach to Groundwater Protection, particularly statements G1 and G9 to G13;
- CIRIA C753 SUDS Manual;
- Susdrain website; and
- Sustainable drainage systems: Non-Statutory Technical Standards Guidance

SuDS Toolkit

8.17. The National Model Design Code SuDS Toolkit sets out a variety of tools that can boost sustainable drainage in different contexts These including the following elements (illustrated below)

1. Green roofs and walls which serve to attenuate water run-off and produce ecological benefits.
2. Permeable landscaping and surfaces allowing water to infiltrate through the ground.
3. Swales provide attenuation and channel water to features such as ponds.



4. Rain harvesting utilising water butts for use in gardens.
5. Soakaways and filter drains reduce surface water run-off contamination reducing potential impacts on nearby habitats
6. Retention Tanks can store run-off in underground tanks within high density developments
7. Street trees are important assets helping reduce flood risk resulting from intense rainfall and contribute to biodiversity
8. Rain gardens in the form of containers and ditches with native drought tolerant plants release water gradually and filter out pollutants
9. Basins and ponds are normally dry but fill during rain events and store or gradually discharge water to the system
10. Reed beds/ wetlands can provide attenuation, filter our pollutants and provide habitat for wildlife

Property flood resilience

8.18. Property Flood Resilience (PFR) is about enabling households and businesses to reduce damage, speed up recovery and reoccupy flooded buildings through careful measures. Examples include flood doors, barriers, auto-closing air bricks and non-return valves. PFR measures fall broadly into the following categories:

- Resistance measures: any measure which helps to prevent water getting into the property in the first place; and
- Resilience measures: reducing the impact of flooding should water get into a property.

Checklist 8 - Incorporating Sustainable Drainage

Incorporating sustainable drainage			
	Bronze	*Silver*	*Gold*
SuDS scheme ***All development***	☑ Submit a SuDS strategy and maintenance plan approved by SAB ensuring that surface water run-off is managed as close to its source as possible and the scheme will not increase downstream flood risk. Strategy to include a climate change allowance ☑ Ensure that discharge to a combined sewer is avoided unless all other discharge options (infiltration, watercourse, surface water sewer) have been exhausted first, as per the discharge hierarchy ☑ Ensure that the scheme achieves greenfield run-off rates unless this is demonstrably not feasible in which case a minimum of 50% reduction will be required. Brownfield sites will need to achieve run-off rates as close to greenfield as possible	In addition to bronze level requirements ☑ Ensure the SuDS strategy is in accordance with DEFRA's non-statutory SuDS technical standards ☑ Ensure the SuDS strategy also addresses the 4 pillars of SuDS. The scheme must also include SuDS planters, tree pits and rain gardens ☑ Ensure the scheme achieves Wst 05 BREEAM credit	In addition to silver level requirements ☑ Ensure the scheme achieves better than greenfield (pre-development) run-off rates ☑ Ensure that the scheme does not discharge to combined sewers ☑ Ensure the scheme achieves Wst 05 Exemplary BREEAM credit.

9. Historic Buildings

Introduction

9.2. The NPPF (para. 164) states that LPAs "should give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights)".

9.3. Where proposals would affect conservation areas, listed buildings or other relevant designated heritage assets, the NPPF requires the consideration of additional considerations as set out in Chapter 16 of the NPPF (Conserving and enhancing the historic environment).

Energy Efficiency

9.4. Retrofitting listed buildings should take into account the construction of the building and ensure the aesthetic character is maintained. Certain retrofit strategies designed for modern construction may not be appropriate for historic and traditional buildings. Generally, any material change to a listed building will require listed building consent which will include most retrofit measures.

Listed building consent required?		
Energy Efficiency	Thermal Mass	Yes
	Wind Driven Ventilation	Yes
	Insulation	Sometimes
	Solar Gain and Overheating	n/a
	Glare	n/a
On-site Low Carbon and Renewable Energy	Solar Photovoltaic and Thermal	Yes
	Ground Source Heat Pumps	Yes
	Air Source Heat Pumps	Yes
	Biomass	Yes
	Wind Energy	Yes
	Energy Storage	Yes

Technical Guidance

9.5. The Building Regulations state that existing buildings are not generally required to be brought up to newer building regulations standards. However, existing buildings, or parts of existing buildings, may need to comply with certain aspects of the Building Regulations in certain circumstances such as when renovating/ replacing walls, floors or roofs, adding an extension and replacement windows or boilers (controlled fitting and controlled service). More information is available in the Manual to the Building Regulations.

9.6. Responsible retrofit should deliver net reductions in energy use, at minimal environmental impact, while maintaining or improving the traditional built environment and making a positive contribution to human health. The Sustainable Traditional Buildings Alliance (STBA) Whole House Approach promotes a holistic and risk based approach to retrofit which involves:

- Considering the three areas of risk: energy, health, heritage;
- Taking a whole building approach, accounting for: fabric, services, inhabitants' needs and behaviour, immediate context (weather, locality), and wider context (embodied carbon, decarbonisation of fuels), integrated for a building in balance; and
- Using a joined-up process (linking assessment, design, construction, feedback).

Insulation

9.7. For listed buildings any form of wall insulation is likely to require consent. For many buildings, including those in conservation areas and national parks, external wall insulation will usually require planning permission.

9.8. Insulating suspended timber floors from below is usually preferable except where there is a historically significant surface to a ceiling below. Installation from above should only be considered where it is not possible to insulate from below.

9.9. If installation from above is required, a professional will be required to avoid damaging historic building elements (e.g. floorboards, skirting boards, door architraves).

9.10. Quilt or rigid board insulation is preferable – sprayed foams will not usually be acceptable as they are not easily reversible should future repairs be required.

9.11. Breathable materials should be used to maintain the passage of air and moisture.

9.12. If lifting floorboards reveals 'deafening' material, this should be left in place, as it can be an efficient fire retardant.

Airtightness

9.13. Listed building consent and/or planning permission will be required to make changes for some works, such as replacement windows, to buildings that are protected for their special interest or buildings in conservation areas.

Draughtproofing Windows

9.14. Draught-proofing is one of the simplest and most cost-effective means of improving a building's thermal performance. This can usually be achieved with only a negligible effect on a building's special interest. Repaired originals will also have character and historic value which a replica window would not have. Total replacement of a window or a door even as an exact replica may require consent if the building is listed.

Skirting Boards, Ceilings and Flues

9.15. Any mastic-type draught proofing should be as discreet as possible in colour (i.e. clear, or matching the surrounding colour as closely as possible)

9.16. Skirting boards: Care should be taken if temporary removal of skirting boards is required.

9.17. Flues: temporarily sealing of unused flues is also a simple process that does not require consent – chimney balloons are simple to fit and are removable. Typically, they also permit some air flow through being ill-fitting, which is important for ventilation. Total sealing of flues is not recommended.

Draughtproofing Floors and Doors

9.18. Floors: Sealing the gaps between floorboards, traditionally referred to as caulking, is the most likely of these measures to affect appearance and can make them harder to lift in the future. If you are planning any associated works that may require lifting of floorboards these should be done before sealing these gaps. Proprietary flexible caulking strip is an inexpensive and simple measure for draught proofing the gaps between timber floorboards. It should be noted that comprehensive eradication of natural ventilation beneath timber floors can lead to damp and decay.

9.19. Unobtrusive products should always be used and loss of historic fabric avoided.

9.20. Non-permanent solutions should be favoured where possible (e.g. laying a rug or another breathable membrane on the floor).

9.21. Professional installation will be needed for products such as rebated edge seals

9.22. Care should be taken to ensure the strength of the frame is not compromised. This is particularly the case with slender late 18th century sash windows where the timber sections are often very narrow.

Secondary Glazing

9.23. Secondary glazing involves installing a 'secondary' fully independent internal window on the internal side of your existing primary window. This is generally a low-risk intervention that can deliver long-term energy and carbon savings. It is also relatively low cost compared to window replacement. Listed Building Consent is unlikely to be required for secondary glazing. The following points should be considered when installing secondary glazing:

- Ensure that the design is as discreet as possible and does not obscure distinctive architectural detailing, including careful alignment of any glazing bars and use of slim frames of appropriate colour. With terraced dwellings, the design should retain a sense of unity with surrounding properties.
- Ensure that they will not compromise the use of existing shutters

- Minimise the impact of permanent fixings required to secure the new frame
- Consider fitting secondary glazing within an easily removable frame that does not require a separate subframe and will allow the use of the existing windows and, where they exist, shutters.
- The secondary glazing units can be colour-finished to match the existing interior decorative scheme.
- In many circumstances magnetic strip secondary glazing is likely to be consented.

Further Guidance

- Historic England (HE) Advice Note 18 (HEAN 18): Adapting Historic Buildings for Energy and Carbon Efficiency
- Historic England (HE) Advice Note 16 : Listed building consent
- HE: Advice Note 14 - Energy Efficiency and Traditional Homes
- HE: Energy Efficiency and Historic Buildings: How to Improve Energy Efficiency
- The Sustainable Traditional Buildings Alliance (STBA) Responsible Retrofit Guidance Wheel
- HE: Energy Efficiency and Historic Buildings Secondary Glazing for Windows
- HE Traditional Windows - Their Care, Repair and Upgrading
- HE I Want to Alter My Windows
- HE Modifying Historic Windows as Part of Retrofitting Energy-Saving Measures
- HE Draft Advice Note: Climate Change and Historic Building Adaptation
- The Letchworth Garden City Heritage Foundation's Design Principles have been developed to help plan and implement any external alterations to homes in the Garden City Character Areas.

On-site Low Carbon and Renewable Energy

Solar Photovoltaic and Solar Thermal

9.24. Listed building consent will always be required for the installation of photovoltaic and solar thermal panels.

- Panels should avoid harm to the historic fabric. Careful consideration should be given to the location and the impact of associated infrastructure on the historic fabric, external and internal appearance.
- The implications of additional loading (due to weight of panels) may need to be considered (consult a structural engineer).
- Avoid significant alternation to roof structure.
- Panels should be located so that they are not overtly visible in short and medium distance views and in longer distance views blend, through product type into the roofscape. This can be achieved by:
- Avoiding prominent and highly visible roof slopes of primary elevations
- Considering roof slope of rear and secondary elevations
- Considering inner roof slope of double pitched, M style roof
- Avoiding reflective materials and match the colour of the existing roof covering
- Where ground mounting can be accommodated consider the setting of heritage assets, character and appearance of the conservation area and potential of below ground archaeology
- Whilst evacuated tube solar thermal systems are more visible than flat-plate panels, they require less space, and can be well suited to flat roofs.

Further Guidance:

- HE: Installing Solar Panels
- Energy Saving Trust: A comprehensive guide to solar panels

Heat Pumps

9.25. Listed Building Consent is required where it involves alterations to the listed building.

Ground Source Heat Pumps

9.26. Boreholes need to have regard to the County of Avon Act (1982) which protects the source of the Bath hot springs (contact the Council for more detailed advice)

9.27. Older properties often contain microbore pipework, which may need to be replaced as it is not usually compatible with a heat pump. Care should be taken when planning pipe runs.

9.28. When used for space heating, heat pumps work most efficiently with under-floor heating. This is unlikely to be appropriate under undisturbed, historic floor surfaces. However, where this is not the case, such as where there is a poor quality modern, replacement flooring, the installation of under floor heating may be possible. In which case it is recommended that limecrete is used which can be used in conjunction with insulation and under floor heating systems whilst allowing the transfer of moisture.

9.29. Care should be taken when drilling boreholes adjacent to any particularly fragile structure to avoid damage.

Further Guidance:

- Energy saving rust: A guide to ground source heat pumps
- Centre for Sustainable Energy (cse.org.uk): Ground source heat pumps
- HE: Installing Heat Pumps in Historic Buildings

Air Source Heat Pumps

9.30. Listed Building Consent is required for an air source heat pump.

9.31. Buildings of a traditional construction require a level of passive natural ventilation and the design of the heat pump system will need to allow for the lower levels of insulation and higher rate of ventilation.

9.32. Care should be taken to locate the external unit of an air source heat pump in a discreet location away from the principal elevation – this could include behind greenery or fencing. You can also find ducted ASHP units which can be located indoors.

9.33. If under-floor heating is not possible, radiators may be considered. In some cases, historic radiators may survive and are likely to be considered as significant elements of the interior and therefore their retention is important. Where this is not the case, new radiators should be of a discreet design and sensitively located.

9.34. Older properties often contain microbore pipework, which may need to be carefully replaced as it is not usually compatible with a heat pump.

9.35. When used for space heating, heat pumps work most efficiently with under-floor heating. This is unlikely to be appropriate where there are significant historic floor surfaces which could be harmed from being lifted. However, where there is not the case, such as where there is already modern, replacement flooring, under floor heating may be possible. In

which case, it is highly recommended that limecrete is used which can be used in conjunction with insulation and under floor heating systems whilst allowing the transfer of moisture

Further Guidance:

- HE: Installing Heat Pumps in Historic Buildings
- Centre for Sustainable Energy: Air source heat pumps

Electric Vehicle Charging Points

9.36. Listed building consent is required if the charging point is attached to historic fabric. The following points should be considered:

- Choose a discreet location for any associated equipment.
- Be mindful of the setting of heritage assets and the requirement to preserve or enhance the character and appearance of the conservation area.
- Avoid physically altering a heritage asset where possible and, where this is unavoidable, minimise the damage and loss of historic fabric.
- Consult the Council's pre-application/planning advice service at the earliest opportunity to seek specialist advice.

Water Efficiency

9.37. Listed buildings or buildings in conservation areas are not exempt from complying with building regulations. However, the special needs of historic buildings are recognised in some of the building regulations' approved documents. Approved Document G addresses sanitation, hot water safety and water efficiency and includes the following pertaining to historic buildings:

9.38. 'Special considerations may apply if the building on which the work is to be carried out has special historic or architectural value, and compliance with the sanitation or hot water safety requirements would unacceptably alter the character or appearance of the building or part of it.

9.39. 'When undertaking work on or in connection with buildings with special historic or architectural value, the aim should be to improve sanitation and hot water safety where and to the extent that it is possible provided that the work does not prejudice the character of the host building or increase the risk of long-term deterioration to the building's fabric or fittings.

9.40. 'In arriving at a balance between historic building conservation and sanitation or hot water safety requirements, it would be

appropriate to take into account the advice of the local authority's conservation officer before work begins.'

Rainwater Harvesting

9.41. Listed Building Consent is required for rainwater harvesting systems and support will be given to sensitively detailed schemes. The alternative DIY rainwater harvesting option of simply using water butts or buckets to collect and recycle water does not require listed building consent.

Further Guidance:

- UK Rainwater Management Association (ukrma.org)

Greywater systems

9.42. Listed building Consent is required for grey water harvesting systems in listed buildings.

Further Guidance:

- Greywater for domestic users: an information guide (sswm.info)

Appendix A Glossary

Term	Definition
Adaptation	The process of adjusting to the effects of climate change in order to minimise harm
Biodiversity	The variety and variability of life on Earth, including plants, animals and micro-organisms
Biomass	Fuel from plant material such as wood or energy crops used as a renewable energy source
Carbon	The term 'Carbon' is used to refer to green house gases
Carbon neutral	Development that achieves net-zero carbon dioxide (CO2) emissions by creating a balance between levels of emissions and absorption of carbon from the atmosphere
Climate Change	Defined by the United Nations as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".
Design and Access Statement	A document submitted with most types of planning applications providing a framework for applicants to explain how a proposed development is a suitable response to the site and its setting, and demonstrate that it can be adequately accessed by prospective users.
District Heat Network	A system that uses a singular central heat source to distribute hot water through a network of insulated pipes to multiple individual dwelling

Embodied Carbon	The carbon footprint of a building or infrastructure project before it becomes operational. It also refers to the CO_2 produced maintaining the building and eventually demolishing it, transporting the waste, and recycling it.
Energy Statement	A detailed report about how a planned development will meet the energy efficiency standards set by local planning authorities
Green and Blue Infrastructure	A network of nature-based features based on vegetation (green), water (blue), or both, integrated into development.
Heat Pumps	Heat pumps are an energy efficient, low carbon way to heat homes. They're suitable for almost all types of dwelling and generally produce savings on energy bills.
Low / Zero Carbon	Technologies that produce energy with low or zero carbon emissions
Net Zero emissions	Reduction in net GHG emissions by at least 100% below 1990 levels by 2050 (the 'UK carbon target', often referred to as 'net zero').
Passive solar gain	Refers to the siting, form, fabric and internal layout of buildings so that natural light and solar heat gains are harnessed and controlled reducing the need for artificial lighting, space heating, mechanical ventilation / cooling
Photovoltaic	Thin semiconductors that convert light (e.g. sunlight) into electricity. They can be fitted to buildings including panels and roof tiles
Renewable Energy	Energy that occurs naturally and repeatedly in the environment e.g. from wind, the movement of water, from the sun and from biomass.

Sustainable Drainage Systems (SuDS)	A sequence of control structures designed to drain surface water in a more sustainable fashion than some conventional techniques. Sometimes referred to as SuDS or Sustainable Urban Drainage.
Urban heat island effect	Occurs when the urban area is significantly warmer than the surrounding rural area. The heat difference is mainly caused through urban development, lack of green and blue infrastructure and the generation of waste heat
Whole Life Carbon	Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from the materials, construction and the use of a building over its entire life, including its demolition and disposal.
Operational Carbon	The carbon that comes from energy used for heating, lighting, hot water, ventilation and domestic appliances.