

Camden Planning Guidance

Sustainability

London Borough of Camden

CPG 3



July 2015

CPG1 Sustainability

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1 Introduction

What is Camden Planning Guidance?

- 1.1 We have prepared this Camden Planning Guidance to support the policies in our Local Development Framework (LDF). This guidance is therefore consistent with the Core Strategy and the Development Policies, and forms a Supplementary Planning Document (SPD) which is an additional “material consideration” in planning decisions.
- 1.2 The Council adopted CPG3 Sustainability on 6 April 2011 following statutory consultation. This document has been subject to two updates:
- 4 September 2013 to clarify the guidance in Section 9 related to the Code for Sustainable Homes, and
 - 17 July 2015 to update a number of sustainable design standards and targets.

Details on these updates and the consultation process are available at camden.gov.uk/cpg.

- 1.3 The Camden Planning Guidance covers a range of topics as well as sustainability (such as design, housing, amenity and planning obligations) and so all of the sections should be read in conjunction, and within the context of Camden’s LDF.

What is this sustainability guidance for?

- 1.4 The Council is committed to reducing Camden’s carbon emissions. This will be achieved by implementing large scale projects such as installing decentralised energy networks alongside smaller scale measures, such as improving the insulation and energy performance of existing buildings.
- 1.5 This guidance provides information on ways to achieve carbon reductions and more sustainable developments. It also highlights the Council’s requirements and guidelines which support the relevant Local Development Framework (LDF) policies:
- CS13 - *Tackling climate change through promoting higher environmental standards*
 - DP22 - *Promoting sustainable design and construction*
 - DP23 - *Water*

What does the guidance cover?

- Energy statements
- The energy hierarchy
 - Energy efficiency – in new and existing buildings
 - Decentralised energy and combined heat and power (CHP)
 - Renewable energy
- Water efficiency
- Sustainable use of materials
- Sustainability assessment tools - BREEAM
- Green roofs, brown roofs and green walls
- Flooding
- Climate change adaptation
- Biodiversity
- Urban food growing

4 Energy efficiency: existing buildings

KEY MESSAGES

As a guide, at least 10% of the project cost should be spent on environmental improvements

Potential measures are bespoke to each property

Sensitive improvements can be made to historic buildings to reduce carbon dioxide emissions

- 4.1 Many of the sections in this guidance focus on reducing the environmental impact of new buildings, however Camden's existing buildings account for almost 90% of the borough's carbon dioxide emissions. Therefore it is essential that these buildings make a contribution towards the borough's reduction in carbon dioxide emissions.
- 4.2 This section provides more information on how existing buildings can be more energy efficient. It builds on the previous section, which covered Stage 1 of the energy hierarchy and improving energy efficiency in new buildings.
- 4.3 Camden Core Strategy Policy CS13, paragraph 13.9 expects development or alterations to existing buildings to include proportionate measures to be taken to improve their environmental sustainability, where possible.

WHAT DOES THE COUNCIL EXPECT?

- All buildings, whether being updated or refurbished, are expected to reduce their carbon emissions by making improvements to the existing building. Work involving a change of use or an extension to an existing property is included. As a guide, at least 10% of the project cost should be spent on the improvements.
- Where retro-fitting measures are not identified at application stage we will most likely secure the implementation of environmental improvements by way of condition. Appendix 1 sets out a checklist of retro fit improvements for applicants.
- Development involving a change of use or a conversion of 5 or more dwellings or 500sq m of any floorspace, will be expected to achieve 60% of the un-weighted credits in the Energy category in their BREEAM assessment. (See the section on Sustainability assessment tools for more details).
- Special consideration will be given to buildings that are protected e.g. listed buildings to ensure that their historic and architectural features are preserved.

How can I make an existing building more energy efficient?

- 4.4 There are many opportunities for reducing the energy we use in our homes. The design and the materials used can make a significant contribution. Simple measures, such as closing curtains at dusk, can help stop heat loss. Installing condensing boilers, heating controls and energy saving light bulbs and appliances reduce energy use and carbon dioxide emissions significantly. Reduced energy use also means lower energy bills.
- 4.5 When dealing with historic buildings a sensitive approach needs to be taken. Guidance on this is provided later within this section.

Draught proofing

- 4.6 There is a range of effective draft proofing measures you can use to help insulate your home:
- Fix brush seals to exterior doors and letterboxes, and tape to ill-fitting doors;
 - Put reflector panels behind radiators to reflect heat into the room; and
 - Use shutters for windows and/or thicker curtains that do not drape over radiators.

Energy efficient lighting

- 4.7 In most homes lighting accounts for 20% of the electricity bill. It is easy to cut waste by simply turning off lights and adjusting blinds and curtains to let in more natural light. When lighting a room, always use energy saving light bulbs.

Windows

- 4.8 Windows let light and heat into your home, but they can also let a lot of heat out when temperatures are colder outside than inside. If you are replacing windows or building an extension, thermally efficient glazed windows will provide more effective insulation than older windows. Double glazed panels can now be fitted into some original wooden frames, without the need to replace the whole frame. This helps preserve the historic character of the building.
- 4.9 The use of PVCu windows is not considered to be acceptable in historic buildings, conservation areas and listed buildings as this material detracts from their historic significance and the architectural qualities of historic buildings and places. See below for more information on listed buildings and conservation areas.
- 4.10 There is a range of simple measures which can improve the energy efficiency of windows. These include:



- General repair and maintenance – which can substantially improve the energy efficiency of windows, as much of the heat lost through windows is through leaks and cracks.
- Installation of draught seals – which can help to further eliminate cold draughts and leaks.
- Secondary glazing – adding a second sheet of glass or plastic to a window frame can improve sound-proofing as well as energy efficiency. If carefully designed it can be unobtrusive and appropriate in a listed property or one within a conservation area.
- Secondary protection - e.g. shutters or heavy curtains, although these are predominantly a night-time option.

Insulation

- Loft insulation - Your home may already have some loft insulation, but if the material is thin it will not be saving as much energy and money as it could. Fitting proper loft insulation is the most cost-effective way of saving energy. As a guide, your loft insulation should be around 250mm thick to be effective.
- Floor insulation - If you have any gaps between your floorboards and skirting boards, you can reduce heat loss by sealing them with a regular tube sealant, like the silicon sealant used around the bath. It is also very useful to insulate underneath the floorboards at ground floor level.
- Cavity wall insulation involves filling the gap between the bricks with insulating material. It can reduce heat loss by up to 60%. Most homes built after 1930 will have a cavity that could be insulated
- Solid wall insulation (internal or external) – buildings constructed before 1930 almost always have solid wall construction. The only way to insulate solid walls is to add insulation to the inside or outside of the wall. External insulation involves adding a decorative weather-proof insulating treatment to the outside of your wall while internal insulation involves attaching insulating plaster board laminates or wooden battens in-filled with insulation to the inside of the wall. Generally 100mm of insulation is required to be effective. Solid wall insulation, whether internal or external, will require relocation of the services attached to the wall e.g. radiators, electrical sockets, drainpipes.

Heating and hot water

- New boiler - Replacing an old boiler (more than 10 years old) with a high efficiency condensing boiler and heating controls to provide heating and hot water could significantly cut energy consumption.
- New/upgraded central heating – If you install a new boiler the rest of your central heating system may need upgrading, for example large, old radiators could be replaced with smaller, more efficient radiators that are better suited to the new boiler

- Upgrading heating controls - You can install heating controls that allow you to control the temperature in different parts of your building. These can be included as an electronic timer control for your boiler, room thermostats for your main living area and thermostatic valves on all your radiators.
 - Insulating hot water pipes and your hot water tank will retain hot water for longer, and save money on heating it.
- 4.11 See the Council's website for further information for householders on various retro-fitting measures and whether permission is required.

Generating your own energy

- 4.12 Buildings can also reduce their energy consumption by generating their own energy in the form of heat or electricity using low carbon and renewable technologies which use little or no energy. See section 6 of this guidance on renewable energy for more advice on the technologies that are available and appropriate in Camden.

CASE STUDY

Renovated Victorian Eco-home: A semi-detached Victorian house in one of Camden's conservation areas was transformed in 2007, reducing its carbon footprint by 60%. Works undertaken to improve energy efficiency included:

- internal solid wall insulation;
- a new fully insulated roof;
- underfloor insulation;
- double glazing; and
- draught proofing.

Heat is provided by an efficient condensing boiler complemented by solar hot water panels on the rear extension; power to the panels' water pumps is provided by solar panels. Other improvements include an upgraded ventilation system with heat recovery, water saving features (e.g. rainwater harvesting for garden irrigation, dual flush toilets), low energy lighting and energy monitoring.

For further information on this property and improvements to other properties of a similar age see www.sd-commission.org.uk



What if my building is historic, Listed or in a conservation area?

- 4.13 Historic buildings have special features that need to be conserved and therefore need to be treated sensitively. This section explains how energy efficiency improvements can be achieved without causing harm to the historic environment.

- 4.14 Reflecting the special qualities of historic buildings, additional consents may be required for statutorily designated buildings (listed buildings, or those in conservation areas). The Council's website has more detailed guidance on what types of permission are required. The Council will aim to balance the conservation of fuel and power against the need to conserve the fabric of the building.
- 4.15 Historic buildings can perform well in terms of energy efficiency. When looking to install high energy efficiency measures, however, it is essential to ensure that works do not compromise the character and significance of the building or area.
- 4.16 In order to identify the most appropriate measures, we recommend taking the following approach, which takes into account measures best suited to individual buildings and households (i.e. taking human behaviour into consideration as well as the building envelope and services):
- Assess the heritage values of the building;
 - Assess the condition of the building fabric and building services;
 - Assess the effectiveness and value for money of measures to improve energy performance;
 - Assess their impact on heritage values; and
 - Assess the technical risks.
- 4.17 A range of thermal efficiency measures can then be implemented, which avoid harm to the historic environment. Ranked according to their impact on heritage and the technical risks, these include:
1. Ensure that the building is in a good state of repair
 2. Minor interventions - upgrade the easier and non-contentious elements:
 - insulate roof spaces and suspended floors;
 - provide flue dampers - (close in winter, open in summer);
 - use curtains, blinds and window shutters;
 - provide energy efficient lighting and appliances
 - draught-seal doors and windows;
 - provide hot water tank and pipe insulation.
 3. Moderate interventions - upgrade vulnerable elements:
 - install secondary (or double) glazing (if practicable);
 4. Upgrade building services and give advice to building users on managing them efficiently:
 - install high-efficiency boiler and heating controls;
 - install smart metering;
 - install solar panels, where not visible from the street or public spaces.

5. Major interventions - upgrade more difficult and contentious elements (where impact on heritage values and level of technical risk shown to be acceptable)
- provide solid wall insulation.
- 4.18 When considering refurbishment, it is the owner's responsibility to ensure that any work does not cause unlawful or unnecessary damage to the building.
- 4.19 The Energy Savings Trust and English Heritage have published detailed guidance on refurbishing and improving the efficiency of historic buildings. See the Further Information section below for details of where to find these guides.
- 4.20 Before carrying out any work, find out if your property is listed, in a conservation area or subject to any other planning restrictions such as an Article 4 Direction. Then check if any of the proposed works require consent – such as listed building consent, planning permission or conservation area consent. See CPG1 Design for more information on Camden's historic buildings. The Council's website also provides detailed information on these matters.

Article 4 Direction

Removes the permitted development rights awarded to properties by legislation and means a planning application has to be made for minor works that usually do not need permission.

Further information

Energy efficiency in existing buildings:

The Energy Saving Trust	<p>A national agency promoting energy efficiency in the domestic sector. For information on home energy efficiency measures including grants, visit their website: www.energysavingtrust.org.uk</p> <p>The Energy Saving Trust also provides technical guidance on energy efficiency in the Publications and Case Studies section of their website. www.est.org.uk/housingbuildings/publications</p> <p>Recommended Best Practice in Housing technical guidance documents:</p> <ul style="list-style-type: none"> • CE120 - Energy Efficient Loft Extensions • CE122 - Energy Efficient Domestic Extensions
GreenSpec	<p>Provides details of products and how they can be used to improve the efficiency of your home or building</p> <p>www.greenspec.co.uk</p>
The Planning Portal	<p>Provides information on what alterations you can make to your home without requiring planning permission</p> <p>www.planningportal.gov.uk</p>

Energy efficiency in historic buildings:

Historic England	<p>Historic England, the UK government's adviser on the historic environment, has produced the following guidance:</p> <ul style="list-style-type: none"> • A Guide to Energy Conservation in Traditional Buildings, which looks at a range of improvements that can be made to reduce the heat lost through a building's walls, windows, floor and roof. This guide is one of a series looking at reducing energy consumption in traditionally constructed homes. https://www.historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/ • Meeting building regulations Part L in existing buildings. The purpose of the guidance is to help prevent conflicts between the requirements of the regulations and the conservation of historic and traditionally constructed buildings. https://www.historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/ • saving energy in historic buildings at www.climatechangeandyourhome.org.uk which includes very detailed information about a wide range of improvements, e.g. insulating solid walls.
The Energy Saving Trust	<p>Provides technical guidance on energy efficiency in the Publications and Case Studies section of their website. www.est.org.uk/housingbuildings/publications</p> <p>This includes their Recommended Best Practice in Housing technical guidance documents: CE138 - Energy Efficient Historic Homes</p>
The Victorian Society	<p>Has information on their website on greening Victorian homes - www.victoriansociety.org.uk/advice/greening</p>
Building Conservation	<p>Provides a directory of useful contacts, grant sources and websites www.buildingconservation.com</p>
The Sustainable Development Commission	<p>Provides case studies of existing homes that have improved their energy efficiency, including the example detailed in this section. www.sd-commission.org.uk</p>

Appendix 1: Checklist for retro-fitting measures

Applies to all:

- changes of use
- conversions
- extensions over 30sq m

Please note that not all the measures will be appropriate for all buildings and some measures will require planning permission e.g. alterations to the front of a property

Measure	Specification	Evidence
Draught proofing		
Reflective radiator panels		
Overhauling/upgrading windows		
New boiler		
LED lighting		
Meters, timers, sensors, controls on heating or lighting		
Mechanical Ventilation with Heat Recovery		
Insulation		
Hot water tank & pipes		
Roof		
Walls Internal		
Walls External		
Floor		
Renewable energy technology		
Solar PV panels		
Solar thermal (hot water) panels		
Ground source heat pumps		
Double glazed windows / Secondary glazing		
Combined heat and power unit		
Green or brown roof		
Rainwater harvesting		
Other measures		
Join the Camden Climate Change Alliance (commercial only)		
Off-setting contribution		

6 Renewable energy

KEY MESSAGES

There are a variety of renewable energy technologies that can be installed to supplement a development's energy needs

Developments are to target a 20% reduction in carbon dioxide emissions from on-site renewable energy technologies.

- 6.1 This guidance covers Stage 3 of the energy hierarchy. Stage 3 involves considering how renewable energy technologies can be used to further reduce the carbon dioxide emissions of a development. You will find information in this section on the types of renewable energy technologies that are available and when they are most appropriate. Stages 1 and 2 of the energy hierarchy – energy efficiency and decentralised energy & CHP – are dealt with in sections 2, 3 and 4.
- 6.2 Core Strategy policy CS13 - *Tackling climate change through promoting higher environmental standards* encourages developments to meet the highest feasible environmental standards that are financially viable during construction and occupation. Paragraph 13.11 states that developments will be expected to achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation unless it can be demonstrated that such provision is not feasible. The 20% reduction should only be attempted once stages 1 and 2 of the energy hierarchy have been applied.

WHAT DOES THE COUNCIL EXPECT?

All developments are to target at least a 20% reduction in carbon dioxide emissions through the installation of on-site renewable energy technologies. Special consideration will be given to heritage buildings and features to ensure that their historic and architectural features are preserved.

When assessing the feasibility and viability of renewable energy technology, the Council will consider the overall cost of all the measures proposed and resulting carbon savings to ensure that the most cost-effective carbon reduction technologies are implemented in line with the energy hierarchy.

Renewable energy technologies

Solar/Thermal Hot Water Panels

What is it?

A system made of flat plate collectors or evacuated tubes which allow water to flow through and be heated by the sun's rays.



What does it do?

Uses the sun's heat to warm water - up to 85 degrees Celsius

What issues should I consider?

- Flat plate systems are cheaper. Evacuated tube systems are more efficient so need less space.
- Generally used for hot water where approximately 4sq m of solar panel per household is sufficient with 80 litres of hot water storage.
- Aim to minimise pipe lengths as this reduces heat losses.
- Not ideal with combined heat and power as it can reduce the efficiency of the CHP system.

Where might this technology be appropriate?

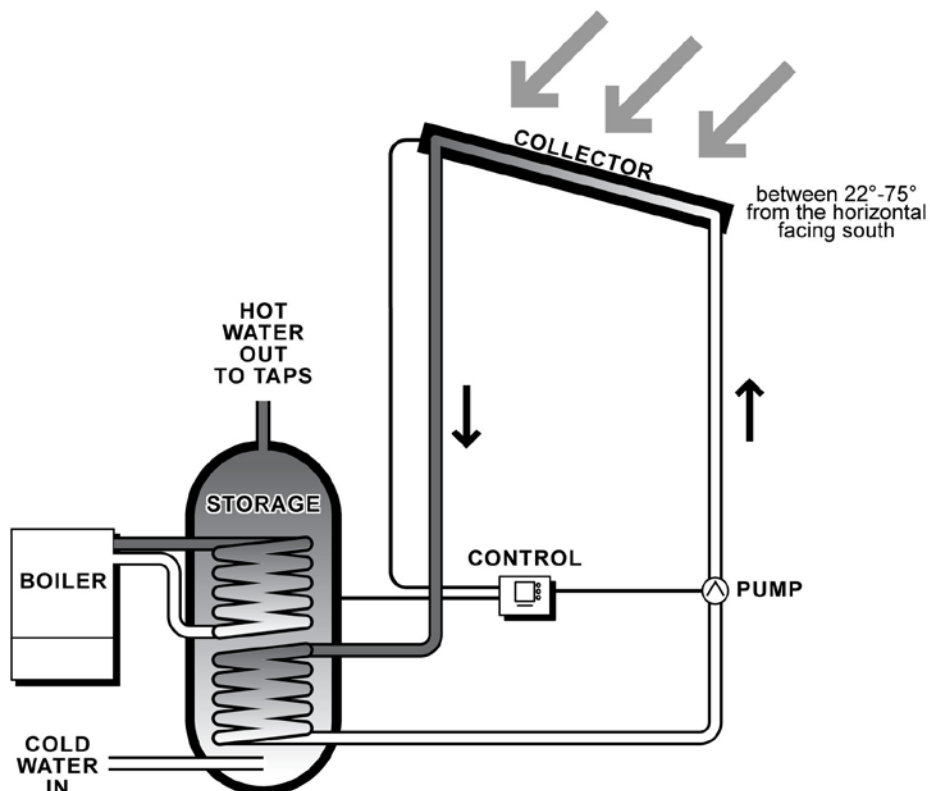
- Suitable for developments with all year hot water demands.
- South facing at 30-40 degrees is ideal, but as the panels do not rely on direct sunlight they can still be efficient at other angles.
- Can be fitted to existing buildings, but need to consider additional weight of the panels and compatibility of heating/hot water system

WHAT DOES THE COUNCIL EXPECT FOR THIS TECHNOLOGY?

- Where space allows, panels are to meet 100% of the site's summer hot water needs, which equates to 50-60% of the annual demand.
- Applicants are to confirm the number and size of panels or the overall square meters to be installed

- The accompanying heating system such as the top up boiler must be compatible. For example, it must include a storage tank and be able to use pre-heated water.
- Larger schemes should use a central system
- A meter is to be installed on the system for monitoring

Figure 6. Solar Hot Water Heating Schematic



Photovoltaic (PVs)

What is it?

Photovoltaic cells are panels you can attach to your roof or walls. Each cell is made from one or two layers of semiconducting material, usually silicon. There are a number of different types available e.g. panels, tiles cladding and other bespoke finishes.



How does it work?

When light shines on the PV cell it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced.

What issues should I consider?

- PV works best in full sunlight.
- Consider movement of shadows during the day and over the year. Overshadowing can impact the overall performance of the PV array.
- The best commercial efficiency is 22%.
- In general 1sq m of conducting material such as crystalline array will provide an output of 90-110 kWh per year.

Where might this technology be appropriate?

- On a roof or wall that faces within 90 degrees of south, and isn't overshadowed by trees or buildings. If the surface is in shadow for parts of the day, your system will generate less energy.
- On top of a green or brown roof is ideal because the cooler temperature created locally by the vegetation improves the efficiency of the solar panel.
- Can be fitted to existing buildings, but need to consider additional weight of the panels.

WHAT DOES THE COUNCIL EXPECT FOR THIS TECHNOLOGY?

- Preference is for PVs to be flush to the roof or wall, but considerations will include the efficiency of the panel/s and whether they are visible
- Applicants are to confirm the number and size of panels or the overall square meters to be installed
- A meter is to be installed on the system for monitoring

Ground Source Heat Pumps (GSHP) or geothermal

What is it?

A network of underground pipes, which circulate a mixture of water and chemicals (to prevent freezing) through a loop and a heat exchanger.

How does it work?

The heat from the ground is absorbed by the liquid that is pumped through the buried pipes. A heat exchanger in the heat pump extracts the heat from the liquid and transfers it the water in the building's heating system which can be used for central heating and hot water. In the summer, when the ground is cooler than the air, the system can be reversed to provide cooling.

What issues should I consider?

- There are horizontal and vertical systems.
- Horizontal systems, also known as loop systems use trenches
- Vertical systems use boreholes which require a ground survey and a drilling license from the Environment Agency
- There are a range of permits and consents that might be required
- Generally provides heat at lower temperatures (30-50 degrees Celsius) than normal gas boilers.
- Buildings need to be well insulated for a GSHP to be effective
- The pump requires electricity to run so this technology will not be renewable or energy efficient in all developments.

Where might this technology be appropriate?

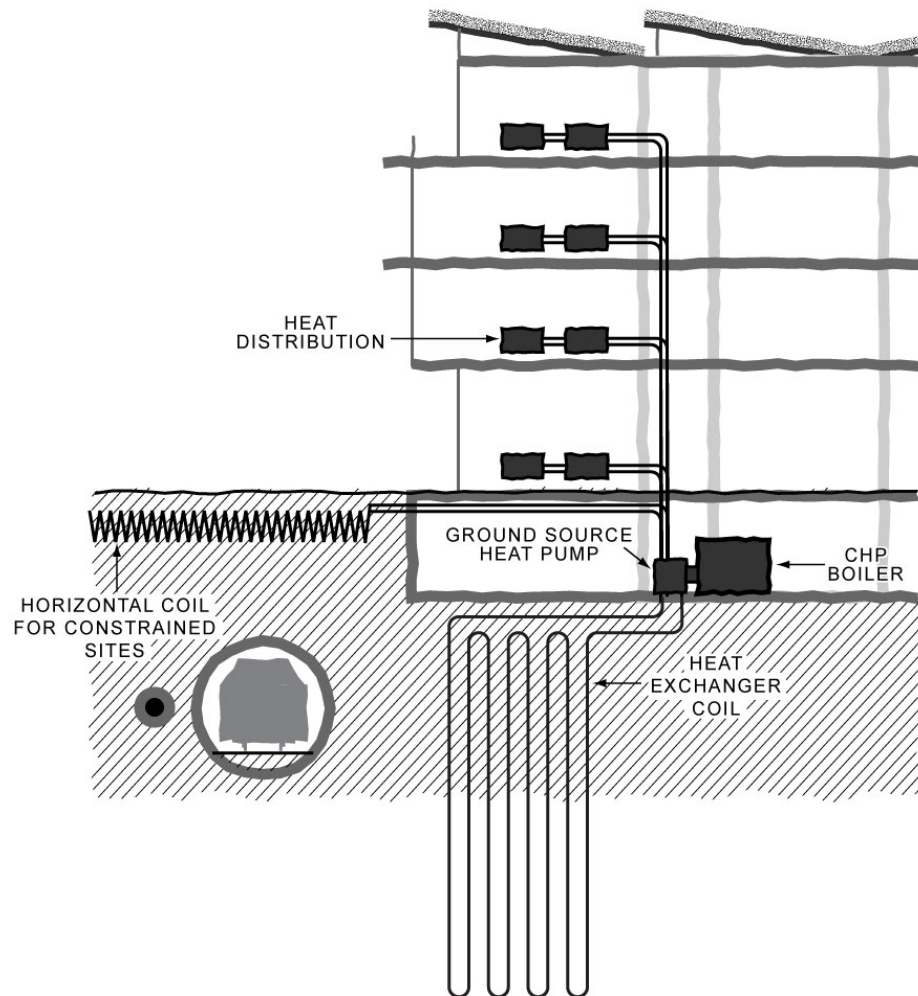
- The lower temperatures mean that GSHPs are well suited for underfloor heating
- Ideal for buildings which need heating in winter and cooling in summer

WHAT DOES THE COUNCIL EXPECT FOR THIS TECHNOLOGY?

- Evidence is to be provided to demonstrate that the local geology can accommodate the necessary excavation
- Consider how much electricity is required to work the pump versus the energy savings of providing heat or cooling. The carbon content of the electricity required to run the pump could be higher than the gas need to run a traditional gas boiler. The ratio of heat or cooling produced to the energy used to produce the heat is called the coefficient of performance (COP). For example, a heat pump which uses 1kW of electricity to produce 4kW of usable energy has a COP of 4 and is therefore 400% efficient. GSHPs need to have a COP of 4 or more to be considered renewable.

- When considering the carbon efficiency of a heat pump system the Council will take into account research and evidence of past performance of heat pumps and the seasonal performance.
- A meter on the system for monitoring

Figure 7. Ground Source Heat Pump Schematic



Air source heat pumps (ASHP)

What is it?

A heat pump that extracts heat from the outside air to heat the interior of a building or to heat hot water. It can also extract the heat from inside a building to provide cooling.

How does it work?

Air to water heat pumps operate on a similar principle to an ordinary refrigerator. Heat from the atmosphere is extracted by an outdoor unit and is absorbed by a refrigerant solution which is then compressed to a high temperature. The heat generated is used by the indoor unit to create hot water for a traditional heating and hot water system.

Air to air heat pumps work in a similar way, but instead of generating hot water, the heat from the compressed refrigerant solution is turned into hot air by an indoor unit which is used to heat the building.

What issues should I consider?

- ASHPs need electricity to run
- Can be less efficient than GSHPs as air temperature is more variable, i.e. colder in the winter when more heat needs to be extracted from the air.
- Consider the noise and vibration impact.
- Consider the visual impact.

Where might this technology be appropriate?

- Where there is no gas connection.
- Where the heating demand is isolated and for a short period of time.
- Can produce cool air as well as heat, so could be suitable in buildings which may otherwise require air conditioning

WHAT DOES THE COUNCIL EXPECT FOR THIS TECHNOLOGY?

- Consider how much electricity is required to work the pump versus the energy savings of providing heat or cooling. We will expect carbon calculations to show that their use for heating is more efficient than gas. Otherwise they will not be acceptable. The calculations will be based on the co-efficient of performance (COP) and the carbon content of electricity and gas. ASHPs need to have a COP of more than 4 to be more efficient than a conventional heating system.
- When considering the carbon efficiency of a heat pump system the Council will take into account research and evidence of past performance of heat pumps and the seasonable performance.
- Noise assessment and mitigation report to be submitted
- A meter on the system for monitoring

Biomass heating and power

What is it?

A boiler which generates heat for central heating as well as hot water or a system which generates heat and electricity, known as a Combined Heat and Power (CHP) system.

How does it work?

Produces heat or heat and electricity by burning organic materials (such as wood, straw, energy crops or liquid biofuels). Natural gas can also be used, however, this will be considered to be a 'low carbon technology' rather than renewable, as gas is a fossil fuel.

What issues should I consider?

- The suitability of this technology will depend on the:
 - local air quality
 - need for air quality mitigation measures
 - source and carbon intensity of processing the fuel
 - emissions generated from transporting the fuel
 - the impact on air quality – biomass boilers releases higher levels of nitrogen oxides (NOx) and particulates than conventional gas fired boilers or CHP systems
- There are a range of permits and consents that might be required
- Space is needed for power plant and fuel store
- Servicing arrangements for fuel delivery and transfer
- Possibility of sharing the system with other developments or consider establishing of a Community Combined Heat and Power scheme (CCHP)

Where might this technology be appropriate?

Biomass fed CHP systems are generally only proven on very large scale.

WHAT DOES THE COUNCIL EXPECT FOR THIS TECHNOLOGY?

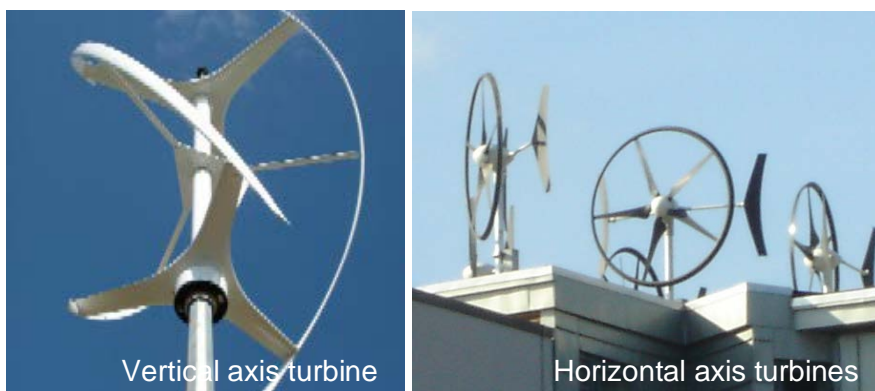
- Boilers must be accredited as 'exempt appliance' under the Clean Air Act 1999
- Technical information relating to the biomass boiler/CHP will be required
- All biomass boilers and CHP will require an air quality assessment, including location and height of flues, details of emissions and how the emissions can be mitigated

- Biomass boilers and CHP are required to be designed, operated and maintained in accordance with best practise measures to minimise emissions to air. (Please refer to the section on Air Quality in the CPG6 Amenity for more detailed information)
- Evidence of potential fuel suppliers – a local fuel source is preferable
- Fuel is to be carbon neutral. Preparation of fuels must be treated and handled appropriately to ensure there are zero carbon emissions e.g. natural drying process not one that uses energy
- A meter on the system for monitoring

Wind turbines

What is it?

Blades or turbines which are rotated by the power of the wind.



How does it work?

The wind turns the blades of the turbine to produce electricity. Horizontal or vertical axis turbines are available

What issues should I consider?

- Require a certain level of wind to make them feasible which is often difficult in London where there large obstacles such as buildings and trees which distort the flow of wind.
- If poorly located could use more energy than they generate.
- Need to be orientated towards the prevailing wind.
- Noise, vibration and flicker.

Flicker:

Rotating wind turbine blades can cast moving shadows when the sun is in a low position behind the turbine

Where might this technology be appropriate?

Could be suitable for low density developments or those with large amounts of open space e.g. schools and playing fields.

WHAT DOES THE COUNCIL EXPECT FOR THIS TECHNOLOGY?

- An assessment of the impact on neighbouring properties, particularly flicker, noise and vibrations
- A wind study and feasibility report.
- A meter on the system for monitoring

What is the feed-in tariff?

- 6.3 The feed-in tariff is a scheme where energy suppliers make regular payments to householders and communities who generate their own electricity from renewable or low carbon sources. The scheme guarantees a minimum payment for all electricity generated by the system, as well as a separate payment for the electricity exported to grid. These payments are in addition to the bill savings made by using the electricity generated on-site.
- 6.4 When considering the viability of the installation of technologies, the financial benefits of the feed-in tariff must be considered.

Further information

The London Energy Partnership	<p>Has produced a toolkit which explains how renewable energy can be integrated into new developments: London Renewables Toolkit - Integrating renewable energy into new developments: Toolkit for planners, developers and consultants</p> <p>Available from the London Energy Partnership website www.lep.org.uk</p>
REAL Renewable Energy Action for London	<p>A web resource run by Creative Environmental Networks which provides information on installing renewable energy for home owners, architects and developers. www.cen.org.uk/REAL</p>
Environmental Protection UK and LACORS	<p>Have produced guidance on biomass and air quality. The guidance provides background material on the issues involved, and details procedures for assessing and managing the effects of biomass on air quality – specifically nitrogen dioxide (NO₂) and particulates (PM₁₀ and PM_{2.5}).</p> <p>There are a number of guidance leaflet available on their website:</p> <ul style="list-style-type: none"> • ‘Biomass and Air Quality Guidance for Local Authorities’ <p>‘Biomass and Air Quality, Developers’ Information Leaflet’ www.environmental-protection.org.uk/biomass</p>
The Mayor of London	<p>Mayor's Air Quality Strategy includes emissions standards for new biomass and CHP equipment which will be implemented by the GLA www.london.gov.uk/publication/mayors-air-quality-strategy</p>

7 Water efficiency

KEY MESSAGES

At least 50% of water consumed in homes and workplaces does not need to be of drinkable quality re-using water

All developments are to be water efficient

Developments over 10 units or 1000sq m should include grey water recycling

7.1 Core Strategy Policy CS13 protects the borough's existing water infrastructure to ensure we have an adequate water supply as well as adequate water storage and foul water capacity. Development Policy DP23 expects all developments to be designed to be water efficient and to minimise the need for further water infrastructure.

7.2 This section outlines what measures the council will expect to ensure developments reduce the consumption of water and reduce the amount of water that is disposed of.

WHAT DOES THE COUNCIL EXPECT?

The Council expects all developments to be designed to be water efficient by minimising water use and maximising the re-use of water. This includes new and existing buildings.

Minimising water use

7.3 The simplest way of doing this is through installing efficient water fittings and plumbing, such as

- dual flush toilets;
- low flow taps and shower heads; and
- low water consuming washing machines and dishwashers.

7.4 Your development will need to use a range of these measures to reduce their water consumption. Specifications should be practical for the intended occupier to ensure that fittings are not simply replaced.

7.5 Your development should include meters which are visible to occupants, as this has been shown to result in reductions in water use.

7.6 We will assess the performance of water minimisation measures used against the water category in BREEAM (see section 8 on sustainability assessments for more information).

Maximising the re-use of water

7.7 At least 50% of water consumed in homes and workplaces does not need to be of drinkable quality. For example, rain water can be water used for flushing toilets, washing laundry and watering plants and gardens.

Collecting rain water

- 7.8 This involves collecting rainwater from a building's roof, as well as its surroundings, and storing it in a tank. Once filtered of leaves and larger objects, the water can be re-used for toilet flushing, laundry and watering plants. If used outside, the rain water harvesting system can take the form of a simple water butt. If used within the building it will need to be supplied through pipes and taps that are separate from the standard mains water supply.



WHAT WILL THE COUNCIL EXPECT?

The Council will require buildings with gardens or landscaped areas that require regular maintenance to be fitted with water butts.

Green/brown roofs and collecting rain water

- 7.9 Green/brown roofs can be designed to include rain water collection. However, more consideration needs to be given to the materials and pipe work that will go underneath the green/brown roof structure. Green/brown roofs with rainwater harvesting may also need to use extra filters to ensure the water can be re-used. See section 10 for more information on green/brown roofs.

Re-using water

- 7.10 'Grey water' (water that has already been used in hand basins, baths and showers) can be stored, filtered and disinfected, and then reused, for toilet flushing, garden watering or laundry. It is also possible to recycle 'black water' (water used for toilet flushing and washing up) although this is more resource intensive. Both 'grey water' and 'black water' systems will require regular maintenance to ensure their ongoing quality and effectiveness. A separate standard mains supply will also always be needed in addition to provide drinking water.

The Council will require developments over 10 units or 1000sq m and/or intense water use developments, such as hotels, hostels, student housing etc to include a grey water harvesting system, unless the applicant demonstrates to the Council's satisfaction that this is not feasible.

- 7.11 When considering the feasibility of grey water systems applicants should consider
- The cost of the system;
 - Cost savings for owner/occupier over a 10 year period;
 - Projected grey water generation;
 - Projected demand for use of grey water; and

- Water savings as a result of the grey water system.

Further information

The Environment Agency produces a range of guidance about how to conserve and reduce water consumption.

- Conserving Water in Buildings: Fact Sheets, Environment Agency,
- Greywater: An information guide, Environment Agency, 2008
- Harvesting rainwater for domestic uses, Environment Agency, 2008

They are all available on the EA website:

www.environmentagency.gov.uk

10 Brown roofs, green roofs and green walls

KEY MESSAGES

All developments should incorporate green and brown roofs

The appropriate roof or wall will depend on the development, the location and other specific factors

Specific information needs to be submitted with applications for green/brown roofs and walls

- 10.1 As development densities increase, brown roofs, green roofs and green walls can provide valuable amenity space, create habitats and store or slow down the rate of rain water run-off, helping to reduce the risk of flooding.
- 10.2 Green and brown roofs can help to reduce temperatures in urban environments. This is particularly valuable in Camden where we suffer from increased temperatures in Central London (known as the urban heat island effect).
- 10.3 Development Policy DP22 states that schemes must incorporate green or brown roofs and green walls wherever suitable. Due to the number of environmental benefits provided by green and brown roofs and green walls, where they have not be designed into a development the Council will require developers to justify why the provision of a green or brown roof or green wall is not possible or suitable.

WHAT WILL THE COUNCIL EXPECT?

The Council will expect all developments to incorporate brown roofs, green roofs and green walls unless it is demonstrated this is not possible or appropriate. This includes new and existing buildings. Special consideration will be given to historic buildings to ensure historic and architectural features are preserved.

What are green and brown roofs?

- 10.4 Green and brown roofs are roofs that are specially designed and constructed to be waterproof and covered with material to encourage wildlife and to help plants grow. They can be left without planting - 'brown' or planted with a range of vegetation - 'green' depending on the depth or the soil or substrate.

Substrate

Substrate is a layer of material which supports the roots and sustains the growth of vegetation.

There are three main types of green and brown roof:

1. Intensive roofs
2. Semi intensive roofs
3. Extensive roofs.

The general features of these roofs are shown below:

	Extensive	Semi Intensive	Intensive
Use	Ecological Landscape	Garden/Ecological Landscape	Garden/Park
Type of vegetation	Mosses, Herbs, Grasses	Grasses-Herbs-Shrubs	Lawn, Perennials, Shrubs & Trees
Depth of Substrate	60-200mm	120-250mm	140-400mm
Weight	60-150 kg/m ²	120-200 kg/m ²	180-500 kg/m ²
Maintenance requirement	Low	Periodic	High

Intensive roofs

- 10.5 Intensive roofs provide the widest range of uses such as for accessible amenity space or to create ecological habitats. They are known as 'intensive' due to the high level of design, soil or substrate depth and maintenance that they require. They can also be used to manage water by including systems that process wastewater or store surplus rain water. They can also be designed specifically for food production.

Semi Intensive roofs

- 10.6 Semi Intensive Roofs can provide a degree of access and the potential for the creation of habitat. Similar water management functions can be integrated into their design as outlined above.

Extensive roofs

- 10.7 Extensive Roofs are generally light weight, with a thin layer of substrate and vegetations. They can be further sub divided into 3 types:

1. Sedum Roofs:

These either take the form of Sedum mats or plug planted Sedum into a porous crushed brick material. Sedum roofs are relatively light weight and demand low levels of maintenance. They can be more readily fitted on to existing roofs.

Sedum

Sedum is a type of vegetation. They are generally short plants with shallow roots and thick leaves.

2. Brown roofs for biodiversity:

Brown roofs should create habitats mimicking local brownfield sites by using materials such as crushed brick or concrete reclaimed from the site. However, these materials are very heavy and cannot hold water for irrigation. Therefore it is preferable to use materials of known quality and water holding capacity. The brown roof is then planted with an appropriate wild flower mix or left to colonise naturally with areas of dead wood or perches for birds.

3. Green roofs for biodiversity:

Green roofs are usually formed by planting a wild flower mix on an appropriate layer of material. There are various techniques for the creation of this type of roof.

What are green walls?

- 10.8 Green Walls are walls or structures attached to walls where plants have been planted. Plants can be planted directly into a material within the wall or can be planted in the ground or a pot and encouraged to climb up a structure so that the wall is covered with vegetation.

Green walls provide a number of benefits:

- They provide useful habitat for invertebrates which in themselves provide a food source for birds and bats. Dense foliage provides nesting sites for a number of birds such as robin, wren and blackbirds
- evergreen, climbing plants provide insulation and can reduce wind chill during winter months
- climbing plants provide shade which can help to cool a building in summer, particularly when grown on south and western facing walls.
- climbing plants can also be effective in trapping airborne pollutants
- provide visual interest adding colour and texture to the wall surface



Green wall can be split into 3 main types:

4. Self clinging climbers such as Ivy, Russian Vine and Virginia Creeper. These plants are able to grow directly onto the wall surface.
5. Climbers which need support e.g. Honeysuckle and Jasmine. Supports are usually provided by trellis structures, wires etc. Well designed trellis or cable structures can become design features in themselves.

6. Vertical Systems (also known as Living Walls, Vertical Gardens). These walls are called 'systems' as they are made up of modular panels designed to support plant growth and require a feeding and watering system. The modules themselves are supported on or within a steel framework. Watering systems and a plant nutrient supply is incorporated into these systems requiring ongoing maintenance. The planted panels can be designed with a variety of plants depending on the aesthetic and habitat requirements of a project.

What to consider when choosing green roof or brown roof or green wall

- 10.9 Selecting the appropriate type of green/brown roof or wall type will depend on a number of factors including:
- the type of building
 - cost
 - maintenance
 - weight of the roof or wall
 - provision of amenity space
 - provide visual interest to surrounding building occupants
 - habitat creation
 - reduction of rain water run off
 - reduction of heating and cooling energy usage of a building
 - water conservation and recycling
 - space for food production (see section 14 of this guidance on urban food production).

What will the Council consider when assessing applications?

- 10.10 All developments should aim to incorporate green or brown roofs and green walls. Careful consideration needs to be given to the design of the roofs and any blank walls to enable the incorporation of these features and the need to access these areas for maintenance.
- 10.11 The Council will expect green or brown roofs and green walls to be provided in areas with low levels of vegetation, such as town centres and Central London, which are both more likely to feel the effects of climate change and developments where occupiers will be susceptible to overheating such as schools and offices. (See Camden Core Strategy policy CS15 - *Protecting and improving our parks and open spaces and encouraging biodiversity*).
- 10.12 The assessment of planning applications incorporating green/brown roofs and green walls will be made based on appropriateness for the site, the degree to which the chosen design objectives are met by the proposal and sustainable maintenance. Where green roofs are to be accessible for amenity purposes potential overlooking and loss of

privacy to adjoining properties will also be assessed (See the Overlooking, privacy and outlook section of the CPG6 Amenity)

10.13 The most appropriate green or brown roof and green wall should be incorporated into a development. We will consider the following factors when determining the most appropriate form of roof and wall:

- the loss of any biodiversity habitat on the site and the surrounding area;
- the existing need for habitat on the site and surrounding area;
- whether the site is overlooked;
- whether the site is an area that has historically suffered from surface water flooding;
- the amount of external heat generated by the development;
- whether the roof is to be accessible;
- the location of mechanical plant;
- the inclusion of areas of blank wall;
- access to walls and roofs;
- where being retro-fitted, the weight of the new roof or wall; and
- the amount of irrigation and maintenance required.

WHAT INFORMATION WILL THE COUNCIL EXPECT?

- a statement of the design objectives for the green or brown roof or green wall
- details of its construction and the materials used, including a section at a scale of 1:20
- planting details, including details of the planting technique, plant varieties and planting sizes and densities.
- a management plan detailed how the structure and planting will be maintained

Further information

The Environment Agency	The EA has a green roof toolkit that can be used to help you determine what solution is best for your development www.environment-agency.gov.uk/business/sectors/91967.aspx
“Living Roofs: Promoting green roofs, roof terraces and roof gardens across London”	GLA document which highlights the significant role that the roof space on buildings have to play in providing amenity space, increased biodiversity and improved building performance in terms of energy conservation and SUDS.
LivingRoofs.org	Provides detailed information on all the types of green and brown roofs as well as case studies, articles and research. www.LivingRoofs.org
National Centre of Excellence for green roofs	This website has a wide range of information on green roofs, including best practice, guidance, research and case studies. www.greenroofcentre.co.uk

12 Adapting to climate change

KEY MESSAGE

All development should consider how it can be occupied in the future when the weather will be different

The early design stage is the most effective time to incorporate relevant design and technological measures.

- 12.1 In Camden the changing climate is likely to mean we will experience warmer, wetter winters with more intense rainfall and local flooding events. It will also bring hotter drier summers which will potentially increase the number of days we experience especially poor air quality. Hotter summers will also increase the demand for our open space, water and the use of electricity for mechanical cooling e.g. air conditioning.
- 12.2 Sections 1 to 11 have concentrated on climate change mitigation measures which are aimed at minimising the impact of human activity on the climate (e.g. by minimising carbon emissions). However, it is also important to think about how we will adapt to a changing climate, so this section is about responding to the unavoidable changes in climate that are already occurring. Adaptation recognises both risks and opportunities arising from climate change and the need to plan for them now.
- 12.3 Policy CS13 expects developments to be designed to consider the anticipated changes to the climate, especially developments vulnerable to heat and in those locations susceptible to surface water flooding.
- 12.4 Policy DP22 requires development to be resilient to climate change by ensuring schemes include appropriate adaptation measures.

WHAT WILL THE COUNCIL EXPECT?

All development is expected to consider the impact of climate change and be designed to cope with the anticipated conditions.

How to adapt to warmer temperatures

- 12.5 Plants and vegetation - Plants can have evaporative cooling effects. Improving the boroughs network of green spaces, parks, trees, and green roofs and walls will have a significant cooling effect.
- 12.6 Shading - Planting, shading and special glazing, such as triple glazing with filters that remove some of the suns harmful UV rays, can be used to reduce the heat from the sun. European style shaded squares and seating areas can also be used to provide cover during intense periods of heat / sunshine. Large, shade providing trees also provide cool, shady areas during summer.

Insulation

- 12.7 Materials should be selected to prevent penetration of heat, including the use of reflective building materials as well as green roofs and walls. Appropriate levels of glazing, which facilitates natural daylighting but prevents excessive overheating should also be considered.

Water cooling

- 12.8 Innovative use can be made of water for cooling, including by using ground or surface water. See sections 3 and 4 on energy efficiency and section 6 on renewable energy for more information.

Natural Ventilation

- 12.9 Instead of using air conditioning, buildings should be designed to enable natural ventilation and the removal of heat using fresh air. The use of plant equipment that expels hot air increasing the local outdoor air temperature.

Thermal materials

- 12.10 Materials with high thermal storage or mass capacity, particularly where it is exposed, can be used to absorb heat during hot periods so that it can dissipate in cooler periods, usually using ventilation.

Orientation

- 12.11 Buildings should be orientated as far as possible to reduce excessive solar gain and facilitate natural ventilation.

'Cool' surfaces

- 12.12 Certain materials on roadways or large parking areas can increase surface reflectivity (though it is important to avoid glare problems) or increase rainfall permeability to encourage the cooling effect of evaporation. Porous cool pavements offer the additional benefit of rainwater infiltration at times of heavy rain. Networks of 'cool roofs' made of light coloured materials can reduce solar heat gain and the need for mechanical cooling.

How to adapt to heavier rainfall**Sustainable Drainage Systems (SUDS)**

- 12.13 SUDS reduce the quantity of water leaving a site, limiting both the volume and rate of runoff during heavy rainfall and storms. They do this by using mechanisms to capture, filter and store rainwater on site (See section 11 on Flooding for more information on SUDS).

Green space

- 12.14 Green open space, verges and green roofs can be designed to filter and store rainwater, thus reducing pressure on drainage systems during heavy rainfall. Trees also reduce surface water runoff.

How to adapt to drier summers

Plants and vegetation

- 12.15 Selecting drought resistant or low water use plants will greatly reduce water demands associated with landscape. This is sometimes known as xeriscaping.

Water efficient fixtures and fittings

- 12.16 These can significantly reduce demand for water and will become increasingly important for high density developments. (See the section on Water conservation and flooding for more information on minimising water consumption).

Re-using water

- 12.17 Collecting rainwater from roofs and other surfaces for reuse (for example in flushing toilets or irrigation) or recycling greywater from sinks or showers reduces water use. By reducing the amount of water entering the drains, water reuse also reduces the risk of surface water flooding.

How to adapt to changing ground conditions

- 12.18 During longer, hotter summers shrinkable clay soils are likely to dry out, making buildings and service pipes vulnerable to cracking. Wetter winters will contribute to risks of 'heave' where ground swells.
- Plants and trees - Trees can prevent shrinking and heave as they retain moisture in the soil.
 - Structural stability - Stronger retaining walls and fences with good drainage or use of vegetation can prevent surface erosion. Careful choice and placement of trees should avoid building subsidence where soils swell after heavy rainfall and shrink in hot, dry conditions.
 - SUDS – Use of SUDS techniques, such as surfaces which allow water to flow through and ponds, which increase infiltration of water into the ground, can reduce subsidence caused by drying out of soils (See section 11 on Flooding for more information on SUDS).
 - Foundation design - Foundations should be designed to be strong enough and extend downward below the zone that may be affected by seasonal variations in moisture content. Other measures include underpinning with concrete supports that extend under existing foundations into more stable soils and infilling of foundations.

Climate change and the historic environment

- 12.19 Many historic buildings have withstood climatic changes in the past, but we need to make sure they are protected from the impacts of a changing climate in the future. Many of the adaptation measures above can be used in the historic environment. However, the character of historic features and the potential for their damage and loss should always be taken into account when adaptation measures are being planned and executed.
- 12.20 These climate-change proposals should avoid harm to historic character and fabric, as assessed against the Planning (Listed Buildings and Conservation Areas) Act 1990 and PPS5. Please see English Heritage's Climate Change and the Historic Environment (2008) for further detail on climate change issues.
- 12.21 See section 4 on Energy efficiency: existing buildings of this guidance and section 2 on Heritage in CPG1 Design for more guidance on Camden's historic environment.

Further information

London Climate Change Partnership	Provides a checklist to help establish how developments can best adapt to climate change
"Adapting to Climate Change: A Checklist for Development"	www.climatesoutheast.org.uk
Chartered Institution of Building Services Engineers	Provides guidance on how to change and adapt buildings to be more sustainable and adapt to future climatic conditions. Their website has a number of guidance notes including: CIBSE TM36 – "Climate Change and the Indoor Environment: Impacts and Adaptation" www.cibse.org
UK Climate Impacts Programme	Helps organisations to adapt to climate change www.ukcip.org.uk