LOCAL DEVELOPMENT FRAMEWORK

SUPPLEMENTARY PLANNING DOCUMENT

Bexley Sustainable Design & Construction Guide

Adopted
29 October 2007



LONDON BOROUGH OF BEXLEY

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London Borough of Bexley Local Development Framework

Sustainable Design and Construction Guide October 2007

Supplementary Planning Document

Please note:

Since the adoption of this document, a revised London Plan (Feb 2008) has been approved. Policy 4A.7 Renewable Energy, of the London Plan will take precedence and is relevant at the following pages:

page 8 - Matrix

page 29 - Guidance 15

page 32 - Guidance 18

page 33 - Guidance 19

Policy 4A.7 Renewable Energy

The Mayor will, and boroughs should, in their DPDs, adopt a presumption that developments will achieve a reduction in carbon dioxide emissions of 20% from on site renewable energy generation (which can include sources of decentralised renewable energy) unless it can be demonstrated that such provision is not feasible. This will support the Mayor's Climate Change Mitigation and Energy Strategy and its objectives of increasing the proportion of energy used generated from renewable sources by:

- requiring the inclusion of renewable energy technology and design, including: biomass fuelled heating, cooling and electricity generating plant, biomass heating, renewable energy from waste (Policy 4A.21), photovoltaics, solar water heating, wind, hydrogen fuel cells, and ground-coupled heating and cooling in new developments wherever feasible
- facilitating and encouraging the use of all forms of renewable energy where appropriate and giving consideration to the impact of new development on existing renewable energy schemes.

Boroughs, in their DPDs should identify broad areas where the development of specific renewable energy technologies is appropriate. These should encourage the fullest realisation of the potential for renewable energy, having regard to the environmental and transport policies of the London Plan. these should include:

- identifying sites for zero carbon development
- identifying suitable locations for wind turbines in developments
- encouraging at least one large wind power scheme in London
- encouraging applications for new street appliances (such as bus shelters, bus stops, parking ticket machines and road signs)
- to incorporate off-grid solar power and other renewable energy sources where feasible.

Foreword

Status of this document

This Sustainable Design & Construction Guide is a Supplementary Planning Document (SPD) within Bexley's Local Development Framework (LDF). It has been prepared to supplement the policies and proposals of the adopted Bexley Unitary Development Plan (UDP) 2004 and the London Plan 2004, which together form the development plan for the area. It is a material consideration when the Council considers planning applications.

This document has been prepared in line with the legislative requirements of the Planning and Compulsory Purchase Act 2004 and associated regulations and guidance.

Introduction

A householders guide has also been produced which gives general sustainability advice.

We all want to improve the quality of life in Bexley and this guidance highlights the important contribution made by those involved in the design and construction of new developments. The Council wants to work in cooperation with developers to achieve the highest possible standards of sustainable design and construction. This means creating developments that are more cost effective to run, more secure, minimise their environmental impact and provide healthy living conditions, at the same time as respecting the area's rich heritage and distinctiveness.

The Council expects everyone to follow the guidelines set out in this document when undertaking new development in Bexley. Careful consideration of design and specification at an early stage can provide significant savings compared with an ad hoc approach, and those proposing development should ensure that they are familiar with the Council's expectations for sustainable design and construction prior to commencing the design work. This document is aimed at developers and those seeking planning permission.

Contact

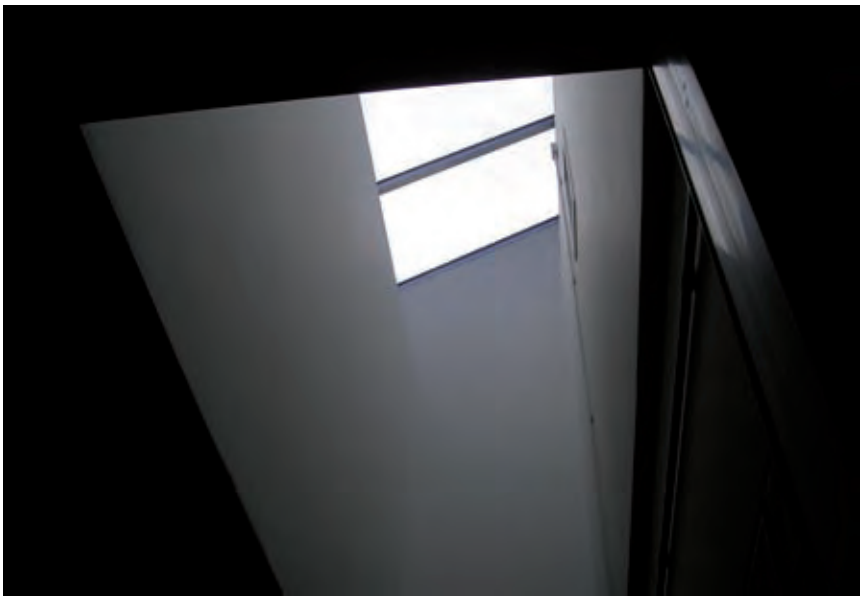
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The development of this document has been informed by the Mayor of London's Supplementary Planning Guidance on Sustainable Design and Construction, which provides guidance to local planning authorities, architects and developers on how to meet London Plan policy for developments that are referable to Mayor.



Orchard Primary School, Sidcup



Upland Primary School, Bexleyheath

Designing for natural light

"A lack of natural light can have adverse health effects" (Chapter 6)

Acknowledgements:

With thanks to Creative Environmental Networks for their valuable help with text and supply of some of the photographs in this document

Thanks also to Karen Sutton at Crossness Nature Reserve for her time and assistance

Cover photo: Roof at Orchard Primary School, Sidcup

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Acronyms used in this document

BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmrntal Assessment Method
BRECSU	Building Research Establishment Conservation Support Unit
CABE	Commission for the Built Environment
CHP	combined heat and power
CCHP	Combined cooling, heat and power
CIBSE	Chartered Institute of Building Services Engineers
CIRIA	Construction Industry Research and Information Association
DTI	Department of Trade and Industry
DCLG	Department of Comminities and Local Government
GLA	Greater London Authority
ODPM	Office of the Deputy Prime Minister
PPS	Planning Policy Statement
PSD	Passive solar design
SUDS	Sustainable urban drainage system
UDP	Unitary Development Plan



Green roof, photovoltaics and sun light at Orchard Primary School, Sidcup

The drivers for sustainable design and construction

1.1 There are now many factors encouraging designers and developers to adopt more sustainable design and construction practices.

- Those companies that adopt forward thinking approaches will increase opportunities for developing on sites being brought forward by informed landowners and building clients.
- Growing awareness amongst shareholders, investors and the public has led to increased public reporting on social and environmental issues and the effects of climate change, with some developers now producing annual environmental, social or sustainability reports.
- Socially responsible investment has placed pressure on companies to integrate social and environmental considerations into their working practices, and to adopt environmental management systems, creating greater pressure from clients for buildings with reduced running costs and more attractive and healthy working environments for their staff.
- The threat of climate change and it being imperative for businesses to be proactive in mitigating against the effects.
- Government Guidance, particularly in the form of the Code for Sustainable Homes and information such as Building a Greener Future: Towards Zero Carbon Development.
- Draft PPS on climate change.

1.2 There is growing recognition that creating decent places for people to work and live, with high quality public spaces and amenities creates value and will lead to higher investment returns for developers.

Putting a price on sustainability

1.3 It is commonly assumed that incorporating sustainability features into a development will greatly increase the costs of a building project. The Building Research Establishment (BRE) and Cyril Sweet 2005 study, Putting a Price on Sustainability, contradicts this assumption and illustrates that significant improvements in performance can be achieved at relatively little additional cost.

1.4 As part of the study, the costs of achieving enhanced and exemplar environmental performance were investigated for four types of building:

- Ventilated office
- Air conditioned office
- Domestic dwelling
- Healthcare centre

1.5 These buildings were chosen to represent Building Regulations-compliance, typical industry projects in the UK. BRE's suite of BRE Environmental Assessment Method (BREEAM) tools were used to determine benchmarks of environmental performance.

1.6 In the BREEAM scheme, several credits are available for aspects of the site and its location. These include proximity to local amenities and public transport, existing

1 Introduction

ecological value and whether the site has been previously built upon. In the study the following three location scenarios were assessed:

- Poor location (where no location credits are achievable)
- Typical location (where a selection of credits are achievable; a brownfield site with limited access to local amenities and public transport, in an edge of town location)
- Good location (where allocation credits are achievable

1.7 Ecohomes scheme only applies to older projects. For all new housing developments the Code for Sustainable Homes applies.

1.8 A more recent study has been completed and published in the Cyril Sweett Policy Document commissioned by the Housing Corporation and English Partnerships, 'A cost review of the Code for Sustainable Homes - February 2007'.

1.9 An overview of the study results, including the percentage increase on base build cost for meeting a BREEAM pass, good, very good or excellent rating are provided in Appendix E.

1.10 Findings illustrated that reaching the highest standards does incur costs, but careful consideration of design and specification at an early design stage can provide significant savings compared with an ad hoc approach. Low or no-cost options identified included:

- specifying water efficient appliances;
- ensuring all timber is procured from sustainably certified sources;
- committing to good construction practice, such as the Considerate Constructors Scheme (see Chapter 7 for further information);
- providing low energy lighting;
- incorporating the principles of passive solar design; and
- other energy saving / renewable devices.

1.11 The complete findings of this study have been published in a BRE Trust report entitled Putting a Price on Sustainability (FB10) and is available from the BRE bookshop: www.brebookshop.com

How to use this guide

1.12 This guide comprises the following:

- **Overall policy, specific policy context, information and guidance on the themes of sustainable design and construction**
- **Sustainable design and construction checklist** - illustrates the Council's requirements with regard to sustainable design and construction and references further sources of information and support. For use by developers when preparing proposals
- **Sustainable design and construction proposal template** - sets out, in template form, the key themes of sustainable design and construction to be addressed by proposals for major developments. This is a template for the production of a Sustainable Design and Construction proposal as proposed in Guidance 1.

Sustainable design and construction matrix

Summary of key principles and where they apply						
Key principles	Small residential and non-residential extensions below 60m²	Large residential extensions 60m² and above and one house	2-9 houses	10+ houses	Commercial and other	Commercial and other non-residential development 1000m² and above
Submit an appropriate sustainable design and construction assessment with planning application	✓	✓	✓	✓	✓	✓
Achieve BREEAM very good rating (and excellent for some non-residential) Code for sustainable Homes level 3		✓	✓	✓	✓	✓
Land contamination site investigation	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant
Provision or contribution to open space			✓ where relevant		✓ where relevant	✓ where relevant
Protect and enhance biodiversity	✓ where relevant	✓ where relevant	✓	✓	✓	✓
Minimise noise impact	✓	✓	✓	✓	✓	✓
Minimise air pollution			✓ where relevant	✓	✓	✓
Minimise light pollution	✓	✓	✓	✓	✓	✓
Apply flood risk assessment	✓ where relevant	✓ where relevant	✓	✓	✓	✓
Incorporate SUDS	✓ where relevant	✓ where relevant	✓	✓	✓	✓
Wind environmental assessment				✓ if over 10 stories		✓ if over 10 stories
Cultural heritage and archaeology	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant

1 Introduction

Summary of key principles and where they apply						
Key principles	Small residential and non-residential extensions below 60m²	Large residential extensions 60m² and above and one house	2-9 houses	10+ houses	Commercial and other	Commercial and other non-residential development 1000m² and above
At least 10% of energy needs to come from renewable resources (20% encouraged) also energy efficiency, passive internal environment regulation	✓	✓	✓	✓	✓	✓
Consider sustainable material choces	✓	✓	✓	✓	✓	✓
Installation of water saving devices	✓ where relevant	✓ where relevant	✓	✓	✓ where relevant	✓ where relevant
Internal air quality			✓	✓	✓ where relevant	✓
Natural light	✓	✓	✓	✓	✓	✓
Accessibility	✓ where relevant for non-residential extensions		✓	✓	✓	✓
Secure design	✓ where relevant	✓ where relevant	✓	✓	✓	✓
Safe routes to public transport			✓	✓	✓	✓
Safe and securer parking			✓	✓	✓	✓
Flood resistant design	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant	✓ where relevant
Waste and recycling	✓	✓	✓	✓	✓	✓
Considerate construction			✓	✓	✓	✓
Apply waste hierarchy in construction and demolition			✓	✓	✓	✓
Encourage sustainable forms of transport and locally sourced labour	✓	✓	✓	✓	✓ where relevant	✓

1.13 This guide does not contain case studies. Case studies relating to sustainable design and construction can be found in Appendix D of the Mayor of London's Supplementary Planning Guidance on Sustainable Design and Construction.

Policy context

- Planning Policy Statement (PPS)1 states that 'good design' is indivisible from good planning.
- London Plan 4BI.

Guidance 1

The Council requires that proposers of all developments submit a sustainable design and construction proposal with their planning application. The checklist and template are included in this guide to assist with this process. It should be noted that not all items within the checklist will be applicable to all building types.

Proof that a Registered Social Landlord has met Housing Corporation Standards will be taken into account to avoid duplication.

1.14 The matrix on page 6 summarises which guidance applies to which type of development.

1.15 While the Council will expect that all developments adhere to the principles of sustainable design and construction, certain requirements relate to major developments only. Major developments are defined as follows:

- **dwellings -** where 10 or more are to be constructed (or if number not given, area is more than 0.5 hectares)
- **all other uses -** where the floorspace will be 1,000m² or more (or site is 1 hectare or more). The site area is defined as the portion directly involved in some aspect of the development. Floorspace is defined as the sum of floor area within the building measured externally to the external wall faces at each level. Basement car parks, rooftop plant rooms, caretakers' flats, etc. should be included in the floor space figure.

1.16 This guide is not intended to tell designers how to design or what a sustainable building should look like. It has been created in order to highlight the key principles of sustainable design and the expectations of Bexley Council with regard to sustainable design and construction information in planning proposals.

Policy context

- The London Plan Policy 4B.6
- GLA Sustainable Design and Construction.

1 Introduction

Guidance 2

- High quality design and layout are expected.
- Registered Social Landlords should provide evidence that they have met CABE Building for Life criteria.

1.17 Certain developments are referable to the Mayor, and will be determined on the basis of policy contained within the Mayor's Spatial Development Strategy, The London Plan.

Signposts

- Building for Life Standard: A Better Place to Live. CABE November 2005. www.cabe.org.uk

Sustainability Appraisal methodologies and checklists

1.18 There are a range of sustainable development appraisal methodologies and checklists available, including BREEAM

Guidance 3

The Council expects that:

- Residential development achieve a Code for Sustainable Homes Level 3. BREEAM Ecohomes 'Very good' rating.
- Non-residential development achieve a BREEAM 'Very Good' rating or excellent for brownfield sites which have very good access to public transport

1.19 The Council recognises that these ratings can be achieved without compliance with Bexley's building integrated renewable energy policy. Compliance with this policy and all other prescriptive policy will be required in addition to achieving the Code for Sustainable Homes Level 3 / Ecohomes very good rating and will naturally drive the credit scores achieved across the range of environmental criteria set out in the BREEAM methodology.

1.20 Evidence will be required that a development by a Registered Social Landlord has complied with the Code for Sustainable Homes Level 3.



Code level 6 house

Signposts

- Building Research Establishment, Environmental Assessment Method.
  Code for Sustainable Homes - Communities and Local Government December 2006.
- Design for Living - Bexley's Residential Design Guide January 2006.
-



Earthship, Brighton

Overall policy context

1.21 **The Planning and Compulsory Purchase Act, 2004** sets out the duty of planning authorities towards sustainability. Section 39 places a statutory duty on local planning authorities when preparing local development documents to exercise their functions with the objective of contributing to the achievement of sustainable development.

1.22 **The UK Sustainable Development Strategy** - Securing the future sets out the Government's plans to improve quality of life without compromising the life of future generations.

1.23 **Planning Policy Statement (PPS) 1**, Delivering Sustainable Development states that "Sustainable development is the core principle underpinning planning. At the heart of sustainable development is the simple idea of ensuring a better quality of life for everyone, now and for future generations."

1.24 The following more specific documents also provide policy context:

PPS9: Biodiversity and Geological Conservation

PPS10: Planning for Waste Management

PPS22: Renewable energy

PPS23: Planning and Pollution Control

PPS25: Development and Flood risk

Code for Sustainable Homes

Building a Greener Future: Towards Zero Carbon Development (draft for consultation)

Planning and Climate Change - Supplement to PPS1 (draft for consultation)

1 Introduction

1.25 **The London Plan, The Mayor's Spatial Development Strategy for Greater London (2004),** contains various policies that provide context and they are referred to in the relevant sections of this Sustainable Design & Construction SPD. Policy 4B.6 states that "The Mayor will, and boroughs should, ensure future developments meet the highest standards of sustainable design and construction and reflect this principle in UPD policies."

1.26 **The Mayor's Climate Change 'Action Today to Protect Tomorrow'** sets out a path to tackle the climate change challenge and to deliver London's carbon dioxide (CO2) targets.

1.27 **Sustainable Design and Construction, The London Plan Supplementary Planning Guidance (May 2006)** provides guidance on The London Plan sustainable design and construction policy 4B.6.

1.28 **Bexley Council's Unitary Development Plan (UDP)**, adopted in April 2004, contains the planning policies that guide development in the Borough.

1.29 **Bexley Council** is in the process of producing a **Climate Change Strategy**, and this Sustainable Design & Construction SPD will make a significant contribution to the delivery of the Climate Change Strategy.



Use of natural light at Upland Primary School, Bexleyheath

Land contamination

Policy context

- PPS1, PPS23
- The London Plan Policy 4B.6

2.1 Bexley Council is committed to encouraging the re-use of land that is no longer required by its current or former user. Development on potentially contaminated sites will however require investigation and possibly treatment to make it suitable for re-use. Typically these are sites where certain kinds of industrial process have occurred or landfill has taken place.

2.2 Many early reclamation schemes in the UK relied on the use of cover systems to limit exposure to contaminants at the surface of a site. The construction of physical barriers can represent a relatively simple low-cost reclamation strategy, but is a predominantly cosmetic exercise that simply conceals contamination and results in property blight and increased liability.

2.3 Alternative techniques such as bio-remediation, soil vapour extraction, soil washing, injection and recovery are established in the UK and are frequently cheaper than disposal.

2.4 The Council will consult the Environment Agency regarding what remediation techniques to be employed. The Environment Agency provides good practice guidance such as the model procedures for the Management of Land Contamination (CLR 11). The Environment Agency also provides guidance on requirements for land contamination reports.

Guidance 4

Bexley Council requires site investigation where land contamination is suspected.

Where contamination is found, the Council will encourage on-site treatment in preference to cover systems or off-site disposal.

Prospective developers are advised to consult with the Council's Environmental Health division at an early stage, if contamination is suspected, for advice on whether site investigation will be required.

Signposts

- Bexley Council Developers Guide, Planning Applications and Land Contamination. Helping to get it right.
- DETR Circular 2/2000 Contaminated Land: Implementation of Part 11A of the Environmental Protection Act 1990
- The Environment Agency Model Procedures for the Management of Land Contamination (CLR 11)

3 Ensuring access to and protection of the natural environment

Open space

Policy context

- PP1, PPS9
- The London Plan Policy 4B.6
- Bexley UDP Policies TAL6, TAL7 and ENV27

3.1 Open and green spaces can contribute to a positive image and vitality of areas. As London becomes more compact and intensive in its built form, the value of these open spaces will increase. Open spaces will need to fulfil a multitude of functions, from educational to social and cultural to sport and recreation as well as visual respite from the hard urban areas. Open spaces also provide a habitat for wildlife and enable children to have access to nature and adventure.

3.2 Urban green space has a number of beneficial impacts on the microclimate of our towns and cities where the consequences of climate change will be most severe. By creating daytime shade and evaporative cooling at night, green space can moderate the urban heat island effect. With greater precipitation expected during winter months, green spaces will absorb storm waters, thereby helping to lower the risk of urban flooding.

3.3 Green spaces and water spaces occupy two-thirds of London's land area and encompass a diverse range of natural environment. Of this, about a third of the total area is in private gardens, a third in parks or in sports use and a further third is in a wide range of other categories, including much wildlife habitat. These open spaces support over 1500 species of flowering plants and 300 types of birds. The diversity of wildlife they support adds to people's enjoyment of these areas.

3.4 Sustainable Urban Drainage Schemes (SUDS) such as wetlands, swales or ponds next to watercourses can contribute to flood risk reduction, water quality and habitat improvements.

Guidance 5

- Identify opportunities to improve access to and the accessibility of open spaces, through support for public transport, cycling, walking and improving access and facilities for disabled people.
- Identify opportunities for improving linkages between open spaces and the wider public realm.
- Ensure that the open space can be used and owned by the community (e.g. provision of allotments and access to green space for those without gardens).
- Make use of interpretation to help improve accessibility and foster understanding and ownership of common land.
- Ensure convenient and enjoyable access to nature by prioritising increases in biodiversity where sites are within or near to areas deficient in accessible wildlife sites

Ensuring access to and protection of the natural environment 3

- In residential developments, make provision or a contribution for open space, amenity space, children's play space in accordance with UDP policies TAL6 and TAL7.
- Increase confidence in using open spaces by design that is sensitive to issues of safety, anti-social behaviour and fear of crime in green spaces.
- Protect green spaces next to watercourses to maintain natural flood plain and where possible incorporate SUDS schemes.



SUDS and habitat creation, Greenwich Peninsula

3.5 River corridors provide open space for amenity and enhance biodiversity through the link with river channel and bankside habitats. Natural river corridors are needed for sustainable water cycle management and to enable natural systems to cope with climate change.

Guidance 6

Where development is taking place within an identified area of open space deficiency, new publicly accessible open space should be created or improvements made to existing open spaces. London's public open space hierarchy (The London Plan, Table 3D.1) will be used as a basis for this assessment until a Borough Open Space Strategy has been produced and has identified the priority needs and areas for provision. Residential development in particular should address the need of playspace for children and the need to create wildlife habitat wherever possible and appropriate. The Mayor's draft SPG - East London Green Grid should also be referred to.

3 Ensuring access to and protection of the natural environment

Guidance 6

Natural river corridors should be protected wherever possible. Existing networks need to be enhanced through the linkage of existing sites and restoring natural processes.

Signposts

- Bexley Biodiversity Action Plan
- Design for Living, Bexley's Residential Design Guide SPD (2006)
- The Mayor's draft SPG - East London Green Grid

Biodiversity

Policy context

- PPS1, PPS9
- Bexley UDP Policies G26, ENV23, ENV24, ENV25, ENV26, ENV27 and ENV28

3.6 Planning decisions should aim to maintain and enhance, restore or add to biodiversity and geological conservation interests. External private open space can be important for wildlife, recreation and access external private space such as gardens can contribute to sustaining biodiversity, sustainable drainage, and opportunities for composting.

3.7 Sites of importance for biodiversity in Bexley are separated into three different grades: Areas of Metropolitan Importance; Sites of Borough Importance; and Sites of Local Importance.







Bat hibernacular, log pile and insect box, Crossness Nature Reserve

Ensuring access to and protection of the natural environment 3

Guidance 7

A site appraisal should include ecological survey data with relevant desk and field studies carried out at the appropriate time of year.

The ecological appraisal should provide recommendations on protection, enhancement, and management of biodiversity on the site - in the design of the building and landscaping - and if necessary mitigation.

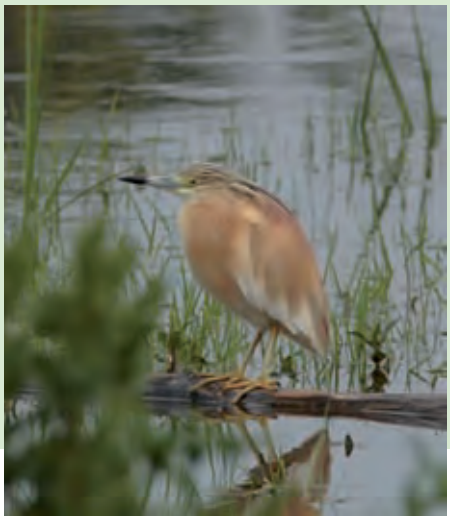
Special attention should be given to assessing the impact on protected sites and taking account of the unavoidable climate change anticipated in the locality over the lifetime of the development.

Development should protect, conserve and enhance the biodiversity of the river environment for sites which have a river or watercourses within their boundary.

Measures to be considered include: green or brown roof; green walls; bird and bat boxes; links to wildlife corridors; wildlife ponds and other habitats; native planting schemes; the renaturalisation of river corridors where appropriate; inclusion of a vegetated buffer zone for biodiversity.

In all development circumstances, the Design for Biodiversity sequential tests should be applied:

- Retain, enhance or create features of nature conservation value and avoid harm
- Mitigate for impacts to features of nature conservation value
- Compensation for the loss of features of nature conservation value.



Heronry and squacco heron, Crossness, Bexley



3 Ensuring access to and protection of the natural environment



Ordnance Jetty, Greenwich Peninsula

Signposts

- Biodiversity By Design TCPA
- Design for Biodiversity Guidance LDA
- Bexley Biodiversity Action Plan





Above: Ringing a barn owl chick at Crossness
Left: Deptford Creek

Reducing the negative impact of development on the local environment 4

Noise

Policy context

- PPS1, PPG24
- The London Plan Policy 4B.6

4.1 Excessive noise can impact upon health, productivity and quality of life at home, in the workplace or at school. There are a number of design and layout principles that can reduce the adverse impacts of noise. The balance between noise reduction and other needs should be struck on a place-specific basis, taking account of potential changes in noise sources, and in competing needs, over the lifetime of the development.

Guidance 8

Sound quality - the overall soundscape should be considered at the early design stage, identifying any sound features or 'soundmarks' of special interest.

Noise mitigation through good design - uses likely to generate significant noise should be separated from those areas requiring quiet, by the greatest practical distances. Where this is impractical, uses likely to generate greatest noise should be separated from areas requiring quiet by screening, isolation or other acoustic design methods.

Noise generating activities - Noise generating activities should be identified and low noise alternatives used where practicable. (Sources of noise generating activities include air handling equipment, pumps, fans, vehicle manoeuvre, loading/ unloading, etc.) Human voices can cause nuisance - for example, school playgrounds, sporting venues and late night entertainment.

Planning of buildings and rooms - buildings and rooms whose uses are not susceptible to noise should be located to act as screens or baffles between noise sources and quiet areas. Also there is a need to consider juxtaposition in 'stacking' for example placing bedrooms of one flat below the living area of another flat is likely to generate noise problems. Windows or ventilation system design should incorporate acoustic features to address noise, especially at night.

Acoustic absorbency within 'courtyard' areas should normally be maximised, by, for example, use of dense vegetation and acoustically soft ground.

Positioning of building services - building services such as air extract ducting should be positioned away from sensitive windows and properties and be isolated from the structure to prevent structural noise. Particular care should be taken to avoid or attenuate fan and vent noise on the 'quiet side' of buildings with passive alternatives sought wherever possible.

4 Reducing the negative impact of development on the local environment

Signposts

- Building Regulations, Part E, ODPM
- Planning Policy Guidance 24: Noise, ODPM 1997
- Sound Conscious Design; Urban design examples

Air pollution

Policy context

- PPS1 PPS3
- UDP Policy ENV41

4.2 Improving the efficiency of plant will generally lead to lower emissions; approximately 20 per cent of the oxides of nitrogen emitted in London are directly from buildings, mainly from the burning of natural gas.

Guidance 9

Developers should ensure that building services plant has the lowest emissions possible and will not present a health risk.

Building services should be readily accessible so that they can be easily maintained and regularly checked and cleaned to ensure they are operating efficiently and do not present a health risk. Emissions of carbon monoxide are a particular issue.



Efficient combined heat and power plant

Signposts

- CIBSE Guide: Section A1 Environmental Criteria for Design CIBSE

Light pollution

Policy context

- PPS1, PPS23

Reducing the negative impact of development on the local environment 4

4.3 Light pollution is a significant issue in populated areas. Light pollution wastes energy, can disturb wildlife, obscures the night sky and can disturb neighbours. By using directional lighting light pollution and energy cost can be reduced. Solar powered lighting schemes can be installed at a significantly lower cost than grid-connected systems, while helping to meet Bexley's greenhouse gas reduction targets through the use of renewable energy.

Guidance 10

- Only use lighting where and when necessary, using an appropriate strength of light and adjusting light fittings to direct the light where it is required.
- Use solar powered lighting and other energy saving devices wherever possible.
- Effective illumination should be well directed and almost invisible from a distance.
- The illumination should be appropriate to the surroundings and character of the area as a whole.
- Avoid "over lighting" and use shields, reflectors and baffles to help reduce light spill to a minimum.
- Use specifically designed equipment that, once installed, minimises the spread of light above the horizontal.
- Direct light downwards wherever possible to illuminate its target, and not upwards.
- Provide lighting that does not glare on approach and that places light onto the ground and not into the sky where it is wasted. In other cases lowering the angle of the beam will stop light from overshooting the building onto the sky.
- To minimise glare, ensure that the main beam of all lights directed towards any potential observer is kept below 70 degrees. The higher the mounting height, the lower the main beam angle should be. In places with low ambient light, glare can be very obtrusive and extra care should be taken in positioning and aiming.
- Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit.
- For domestic and small scale security lighting use 'Passive infra Red Sensors.'
- Avoid disturbing wildlife with light pollution.
- Avoid introducing light into watercourses and adjacent river corridors to protect wildlife.
- For development adjacent to sensitive areas a lighting survey should be carried out to show that the lighting scheme for the development will not be greater than LUX level 0-2.
- Artificial lighting should be directional and focused with cowlings to light sources in close proximity to the river corridor and natural environment.

Signposts

- Guidance notes for the reduction of obtrusive light. Institute of Lighting, Engineers, GN01 2005

4 Reducing the negative impact of development on the local environment

Flooding

Policy context

- PPS1, PPS25 paragraph 16, Annex D. Practice Guide Companion to PPS25 Chapter 3 and PPS12
- The London Plan Policy 4C8, 4C6, 4C7
- Bexley UDP Policy G8

4.4 Much of London is situated on a floodplain and tidal water levels in south east England are rising each year. Flash flooding can occur almost anywhere, especially in built up areas with a high proportion of impermeable surface. Predicted climate change with increases in storm episodes and sea level rises mean that it is vital that developers address a development's surface water run-off. Drainage requirements should be informed by the site Flood Risk Assessment.



Greenwich Millennium Village

4.5 To meet its obligations under PPS25, Bexley Council has participated in the East London Strategic Flood Risk Assessment and will prepare more detailed flood risk assessments for areas of the Borough where major development is envisaged.

4.6 These will inform the Sustainability Appraisal of its plans. Policies will be framed for the locations of development that avoid flood risk to people and property where possible. When necessary, the Council will require planning applications to be supported by site specific flood risk assessments. A sequential approach to risk is advocated in PPS25 and will be applied by Bexley Council. There is a web link at the bottom of the list of signposts where flood map information can be found.

4.7 By incorporating sustainable urban drainage systems (SUDS) as an alternative to traditional approaches to managing runoff from buildings and hardstanding, the total amount, flow and rate of surface water that runs directly to rivers through stormwater systems can be greatly reduced, thereby preventing flooding incidents and pollution of waterways. A simple contribution to SUDS can be provided by the installation of water butts. BREEAM set a target for 50% or 75% for previously developed sites.

4.8 SUDS are not appropriate for use in all areas, for example in areas with high ground water levels or clay soils which do not allow free drainage. As with conventional drainage SUDS also require regular maintenance to ensure their effectiveness.

4.9 On-site Stormwater Detention (OSD) is an option where sustainable drainage systems are not practicable due to soil and ground conditions. This is normally achieved by

installing large diameter pipes, culverts or tanks. The basic principle of on-site storage is that during heavy rain, surface water run-off from roofs, car parks and large paved areas is directed to a storage tank. Water is stored and then normally discharged to the main sewer using a suitable flow control device At the end of the heavy rain, the storage tank is typically emptied through use of a gravity or pumped system, ready for the next storm. Alternatively, stored water can be used for garden irrigation, which involves a pump drawing water from storage tanks/ pipes and a filter. An outfall will, however, still be required to avoid overflow, if stored water is not fully used. These systems can be used in conjunction with SUDS techniques that also achieve water quality and if possible amenity benefit. Rainwater harvesting (water butts etc.), green roofs and permeable paving to a storage tank are SUDS techniques that may be appropriate in this situation.

4.10 See Section 19 of this document on flood resistant design and Section 12 on water.

4.11 There is a need to avoid unacceptable impacts on the environment such as sewage flooding of residential and commercial property, pollution of land and watercourses plus water shortages and associated low pressure water supply problems.

4.12 Measures will be needed by catering establishments to avoid fats, oils and grease blocking drains and sewers. This can lead to sewage flooding and pollution to local watercourses.

Guidance 11

The Council will require a site flood risk assessment to accompany proposals for sites located within flood zone 2 and flood zone 3 as defined by PPS25 and all large scale developments where surface water run-off could cause flooding in more vulnerable areas. All causes of flooding including flooding from sewers needs to be taken into account.

Flood risk assessment should include proposals to mitigate the effects of flooding and Flood Resistant Design.

The capacity of existing water and sewerage utilities infrastructure needs to be taken into account when new development is proposed and is included in the sustainability appraisal.

Flooding from sewers needs to be taken into account especially for basements.

Catering establishments should install a properly maintained fat trap. Waste oil should also be collected by a contractor, especially to recycle for the production of bio diesel.

In producing a site-specific flood risk assessment, developers should have regard to the requirements of PPS25, and in particular Annex E. Paragraph E3 details the minimum requirements for flood risk assessments. The developer should consult the Environment Agency for advice in the first instance, as design requirements to protect from flooding and manage surface water will be informed by the flood risk assessment. Areas subject to sewer flooding, ground water flooding and other sources should be treated as if in Zone 3 and be subject to the sequential test.

4 Reducing the negative impact of development on the local environment

Guidance 12

Wherever possible multiple benefits from SUDS should be sought, such as wildlife improvements and water conservation. SUDS should also be linked to large scale catchment based flood management. If SUDS cannot be provided on site, consideration should be given to making a contribution to off site SUDS.

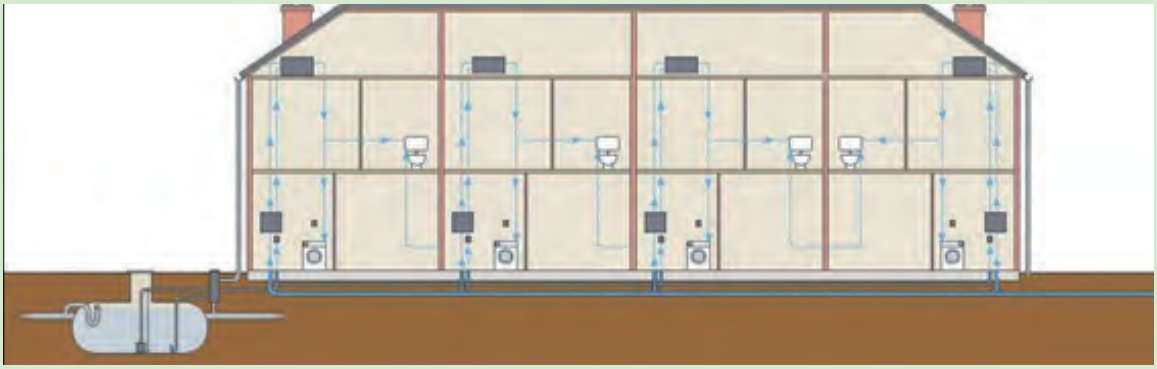
Developers should provide information to enable Bexley Council to undertake the site exception where appropriate. The developer should demonstrate a reduction in flood risk for the site, in order to pass part of the exception test. This should form a major part of the site specific flood risk assessment.



The following SUDS technologies should be considered:

- rainwater harvesting
- greywater recycling
- permeable surfaces and filter drains
- filter strips and swales
- infiltration devices
- basins and ponds
- green and brown roofs

Rainwater harvesting



Suitable arrangements will have to be made to fund regular maintenance of SUDS in the future.

SUDS should be considered for new discharges of surface water run-off from roads, vehicle parking and public amenity areas, providing there are adequate measures to protect groundwater and the site is not in an inner Source Protection Zone (SPZ1). Groundwater from an SPZ1 is abstracted for human consumption.

Wherever possible, SUDS should be integrated within the layout of the development site. However, it may be appropriate to develop SUDS over a wider area serving a number of sites, each development making a contribution to the implementation and management costs of off-site SUDS.

The land implications of SUDS should be identified early in the design of site layout.

Reducing the negative impact of development on the local environment 4

Guidance 12

The developer should seek the advice of the Environment Agency and Bexley Council's Highways and Amenities Department on the design criteria and performance parameters at the outset.

Submission of a technical appraisal of the proposed SUDS will be required to demonstrate it will meet the agreed criteria.

Provision for adequate maintenance of the SUDS must be made from the outset.

Calculations should take account of the unavoidable climate change anticipated in the locality over the lifetime of the development.

Flood defences should be protected.

Householders are discouraged from paving over front gardens with materials that increase surface water run off.

There is also a requirement to reduce the rate of surface water discharge to the greenfield run off rate where possible by on site attenuation for up to the 1 in 100 year rainfall event, plus allowance for climate change. See section 6 on Flood Resistant Design. Flood resistant design is a mitigation measure which would form part of a flood risk assessment.

Water from the roof or any part of the premises should be prevented from being discharged onto the footway or highway.

It is the responsibility of the developer to make proper provision for surface water drainage to ground or water courses or surface water sewer. It must not be allowed to drain to the foul sewer, as this is a major contributor to sewer flooding.



Sedum landscape, Holland



Green roof bus shelter, Sheffield

4 Reducing the negative impact of development on the local environment

Signposts

- PPS25 Development and Flood Risk
- Interim code of practice with model planning agreement.
- SUDS Design Manual and SUDS Best Practice Manual.

- Sustainable Waste Management in Land Use Planning. www.ciria.org
- Environment Agency SUDS planning guidance.

- British Council of Offices and Corporation of London: Green roofs - research advice note 2003
- Living roofs: Mayor of London and AUU. 2004.

- Sustainable Urban Drainage Systems: CIRIA report C609 March 2004. www.ciria.org
- Preparing for Floods DTLR February 2002.

- Strategic Planning for Flood Risk Association of British Insurers July 2004. www.abi.org.uk
- Flood risk maps www.environment-agency.gov.uk/subject/flood
- For information on Source Protection Zone (SPZ1) see www.environment-agency.gov.uk
- Additional information on Green Roofs from City of London – Research Advice Note on Green Roofs. 213.86.34.248/NR/rdonlyres/3B5270D2-3B8B-4BD6-9422-7FF2D321120C/0/DP_PL_a5greenroofs.pdf
- PPS12
- Development and Flood Risk. The Exception Test - Paragraph 18-20 and Annex D9-D14.
- Development and Flood Risk: A Practice Guide Companion to PPS25 - The Exception test para 3.5-3.9

Microclimate

Policy context

- PPS2
- The London Plan Policy 4B6

4.13 Significant amounts of new development, especially tall buildings can have a marked effect on local climatic conditions. These negative effects can be mitigated through careful consideration of the design.

Reducing the negative impact of development on the local environment 4

4.14 While many urban rivers have been engineered in the past they still provide a valuable corridor through predominately urban environment. The encroachment of development degrades both the character of the river by fragmenting that corridor and foreclosing any opportunity for enhancement of the river environment.

4.15 The siting of a tall building directly adjacent to the river can degrade it by potentially damaging the existing (or potential) habitat quality through shading, potentially discouraging usage by some species of wildlife and showing disregard for the river as a natural feature and should be avoided.

Guidance 13

Avoid creation of wind tunnel effect - this is particularly marked where a design creates a canyon effect that funnels winds to cause strong and very localised wind effects.

Carry out a wind environmental assessment for buildings over 10 stories to compare the wind environment to be created with that existing.

The wind tunnel test should be designed to predict the wind velocities occurring in the public realm and accessible landscaped areas for comparison against the Lawson criteria. The Lawson criteria define acceptable windiness for different activities such as sitting walking and standing. Avoid creation of deep shadows particularly over water bodies – these can have a significant effect on the biodiversity in the water and consequent hydrological effects.

Improve local climatic conditions by the retention of natural vegetation and well designed landscaping. This can result in reduced wind speeds, appropriate shading and shelter, increased moisture retention and even local cooling of the air. The design should take into account details of surrounding landscape that affect wind patterns and solar gain.



Passive solar design using vegetation

The siting of a tall building directly adjacent to a river should be avoided.

Signposts

- Daylight and Sunlight BR209BRE
- Information on Lawson Criteria

4 Reducing the negative impact of development on the local environment

Cultural heritage

Policy context

- PPG15, PPG16
- The London Plan Policies 4B10, 4B.11 and 4B.12
- Bexley UDP Policies ENV46, ENV52 and ENV53

4.16 Bexley's cultural heritage has social, environmental and economic significance. This aspect needs to be taken into account when considering sustainable design. For instance, a wind turbine or photo voltaic panels may not be appropriate if installed on a listed building.

Guidance 14

The preservation and enhancement of statutory and locally listed buildings, archaeological sites, historic parks and other cultural heritage features will need to be taken into account when considering sustainable design and construction, in order to preserve both the embodied energy these constructions represent and to maintain a sense of cultural identity for the borough and its residents.



Photovoltaics, St. Peters church, Brockley

Energy and carbon emissions

Policy context

- PPS1; PPS22; written ministerial statement on 8th June 2006 which set out the governments expectation that all LPAs should include policies in their development plans which require a percentage of the energy in new developments to come from on-site renewables; Energy White Paper; Government Climate Change Strategy; Supplement to PPS1: Planning and Climate Change Consultation; Code for Sustainable Homes; Building a Greener Future: Towards Zero Carbon Development. The Government intends all new homes to be zero carbon by 2016. PPS3.
- The London Plan Policies 4A.8, 4B.6, 4A.7, 4A.9 and 4A.10; The Mayor's Energy Strategy

5.1 Energy use affects all aspects of sustainable development. Energy is used for transportation, for heating, lighting and ventilation, for the provision of water, for the procurement of materials and for landscaping, construction and demolition, and waste disposal. Different materials have different levels of embodied energy and waste should be minimised.

5.2 Energy is used to provide building services such as heating, cooling, hot water, lighting and for powering other appliances. Encouraging energy efficient, low carbon development as part of sustainable design is an important part of the UK strategy to reduce emissions.

5.3 Improved energy efficiency within the future housing stock will also contribute to reductions in fuel poverty.



wind turbine

5.4 Awareness also needs to be raised of how much energy is being used. This will hopefully encourage people to be more energy efficient

Guidance 15

At least 10% of energy needs of a development need to come from renewable sources. The Draft Further Alterations to London Plan target is 20%. Developers are encouraged to provide 20% of the energy needs of a development from renewable sources. This Guidance will be reviewed following the adoption of the London Plan. See guidance 18 and 19.

5 Conserving resources and reducing carbon emissions



Photovoltaics, Holland

Guidance 16

Bexley Council requires that all development follows the principles of the energy hierarchy, as defined in Green Light to Clean Power: The Mayor's Energy Strategy shown below:

Use less energy - 'be lean'	⇨	Incorporate passive heating and cooling Improve insulation Install energy efficient lighting and appliances
use renewable energy - 'be green'	⇨	On-site: install renewable energy technologies, such as solar water heating, photovoltaics, biomass heating/ CHP and wind turbines Off-site: import renewable energy generated elsewhere
Supply energy efficiently - 'be clean'	⇨	Cut transmission losses through local generation Use combined heat and power and community heating



Photovoltaics and solar panel Upland Primary School, Bexleyheath

5.5 Green/brown roof and/or walls on a building act as a thermal insulation providing a cooling effect in the summer and a potential contribution towards reduction in heat loss in winter. Vegetated roofs are also very beneficial when used in conjunction with solar panels for renewable energy as they regulate the temperature improving the efficiency of the panels.



Green wall, O2 dome, Greenwich

Guidance 17

The following principles of Passive Solar Design (PSD) should be applied to a development during the design stages:

- Orientation - The capture of solar gain can be maximised by orientating the main glazed elevation of a building within 30 degrees of due south
- Room layout - Placing rooms used for living and working in the south facing part of the building will reduce reliance on artificial lighting and heating methods
- Avoidance of overshadowing - Careful spacing of buildings should seek to minimize overshadowing of southern elevations, particularly during the winter when the sun is low
- Window sizing and position - In housing, smaller windows should generally be used in north facing elevations to prevent excessive loss of heat
- Natural ventilation - Atria and internal ventilation stacks projecting above the general roof level can be used to vent air as the building warms during the day, with cool air being drawn in through grills in the building façade
- Lighting – In offices the avoidance of deep-plan internal layouts and the use of atria, roof lights and light reflecting surfaces can help reduce the need for artificial lighting
- Thermal buffering - In order to reduce heat losses, unheated spaces such as conservatories, green houses and garages which are attached to the outside of heated rooms can act as thermal buffers

5 Conserving resources and reducing carbon emissions

Guidance 17

- Landscaping - Landscaping, including the use of earth bunds, is often used as part of an overall PSD approach providing a buffer against prevailing cold winds and shading for summer cooling
- Green / brown roofs and/or walls



Passive stack ventilation, Horniman Museum, Forest Hill

Guidance 18

The following energy efficiency measures and technologies must be considered at the earliest stages of design:

- Selection of heating system (includes community heating system)
- Super insulation
- Lighting and appliances
- Glazing
- Ventilation
- Cooling
- Controls
- Green / brown roofs and/or walls



Brown roof, Laban Centre, Deptford

5.6 Decentralised energy schemes make more efficient use of primary energy than large scale generation via the national grid. They can be suitable for all scales of development. They can incorporate the use of renewable sources of energy.



Green roof, Barclays Bank, London



Guidance 19

In providing renewable energy the following approach should be taken:

- Ensure building is energy efficient by design (e.g. incorporate passive solar design)
- Calculate predicted energy (electricity and gas) usage for the building
- Calculate predicted CO2 emissions associated with the building (using CO2 multiplication values for electricity and gas)
- Select renewable energy technologies and calculate CO2 emissions offset through their application
- Calculate % of CO2 emissions offset through use of renewable energy technologies

Proposals should demonstrate the expected energy and carbon dioxide savings from energy efficiency and renewable energy measures incorporated in the development - against minimum building regulations. The renewable energy target is only applied to the residual energy output once these measures have been applied.

The following renewable energy technologies need to be considered:

- Solar water heating
- Wind turbines, especially larger scale communal turbines
- Photovoltaics
- Biomass heating
- Biomass combined heat and power
- Ground source heating
- Air source heat pumps
- Ground source cooling/ borehole cooling



Ground works for ground source heating

For all new housing reference should be made to the Energy Saving Trust (EST) best practice standard. This requires a reduction in carbon emissions of 25 percent compared to the Building Regulations Part L1A (2006)

5 Conserving resources and reducing carbon emissions

Guidance 19

In new development gas and electricity meters should be located in a prominent position instead of being hidden away in a cupboard. This will enable energy usage to be easily monitored.

- All developments should demonstrate that their heating, cooling and power systems have been selected to minimise CO2 emissions
- The heating and cooling infrastructure should be designed to allow the use of decentralised energy - including renewable generation and for it to be maximised in the future
- Developments should evaluate combined cooling , heat and power (CCHP) and combined heat and power (CHP) systems and where a new CCHP/CHP system is installed as part of a new development, examine opportunities to extend the scheme beyond the site boundary to adjacent areas
- Below is set out the order of preference that should be applied when choosing heating and cooling systems
  - connection to existing CCHP/CHP distribution networks
  - site-wide CCHP/CHP powered by renewable energy
  - gas fired CCHP/CHP or hydrogen fuel cells, both accompanied by renewables
  - communal heating and cooling powered by renewable energy
  - gas fired communal heating and cooling





Biomass hopper (above) and biomass boiler (right), St. Peters Church, Brockley





Above: Solar thermal tiles
Left: Flat plate solar thermal panels, Westerham, Kent

Signposts

- CIBSE Guide: Energy Efficiency in Buildings Guide F
- The Standard Assessment Procedure (SAP) ODPM 2001
- Part L Building Regulations ODPM
- London Renewable Integrating renewable energy into new developments: A toolkit for planners, developers and consultants September 2004
- Planning Policy Statement 22: Renewable Energy ODPM 2004
- Best practice guidance to PPS22: Renewable Energy ODPM 2004
- Creative Environmental Networks
- Energy Performance in Buildings: EU Directive 2002/91/EC
- Information on renewable energy sources, for example solar panels, wind turbines, combined heat and power plants (CHP).
- Sustainable Design and Construction SPG - GLA - Appendix D - Template for energy assessments

Materials

Policy context

- PPS1
- The London Plan Policy 4B6

5.7 Reusing and recycling construction materials is the most sustainable choice. Where new materials are used, consideration should be given to local sourcing, the energy used in their manufacture and their toxicity.

5 Conserving resources and reducing carbon emissions

Guidance 20

When processing and using materials, the following should be considered:

- Maximise the re-use of existing building or materials such as slate or clay roof tiles and wooden structural beams
- Reduce waste by specifying and purchasing only what is needed for the projects and ensuring demolition waste is managed in line with the waste hierarchy detailed in the London Plan
- Use materials with low life cycle environmental impact, consider the impact of material extraction, processing, manufacture, transport, use and disposal. This applies to landscape materials and buildings
- Minimise the use of products containing CFC's, PVC and formaldehyde glued chipboard
- Maximise use of recycled materials or materials from sustainable sources
- Minimise use of materials such as aluminium, unless a whole life energy or technical case exists for its use
- Procure local materials whenever practical to reduce transporation impacts
- Maximise the proportion of materials and components that can be re-used at the end of the buildings life – by designing for deconstruction and assembly. Avoid the use of composite materials where possible
- Use an appropriate mix of materials specified to support sustainability objectives such as passive solar design and noise attenuation whilst considering their aesthetic qualities.



Wool insulation, Creekside, Deptford

5.8 The degree of work required to retain a building and achieve a worthwhile up-lift in environmental performance is often at least as expensive as replacement and rarely achieves an equivalent performance.

Guidance 21

The re-use of existing buildings should, where other policies permit:

- maximise the re-use of the buildings including the basements and roof spaces;
- investigate the opportunities to incorporate mixed-uses within buildings, particularly public access uses (retail, leisure etc) at ground floor level;
- where other policies allow, consider increasing the floorspace of the existing building through additional floors and/or extensions;
- review the function of any open land within the site; and
- ensure that the works do not restrict the occupation of the building by other uses in the future, i.e. create a building with greater flexibility for future re-use.

It is recommended that a cost value energy audit be carried out when the re-use of a building is being considered.

Guidance 22

Developers should:

- consider the use of pre-fabricated elements in order to reduce total energy used in the construction phase, speed up assembly, improve quality and minimise defects and wastage;
- consider the source location of pre-fabricated elements to minimise transportation;
- design new buildings for flexible use and consider the use of grid structure to provide a consistent and generic internal environment;
- use non-load bearing partitions;
- integrate additional service capacity and ceiling heights to facilitate changes of room use and servicing requirements;
- avoid specifying materials that contain or emit toxic substances during building occupation wherever possible; and
- consider renewable district heating schemes for large scale developments.

Signposts

- Green Guide to Specification, Jane Anderson and David Shiers BRE 2002
- Recycled Content Toolkit, WRAP – web based tool for assessing recycled content in construction projects
- www.greenregister.org.uk

5 Conserving resources and reducing carbon emissions

Water

Policy context

- PPS1
- The London Plan Policy 4B6

5.9 The effects of climate change on Bexley are likely to further reduce supply and increase demand. Buildings and landscaping are major water consumers and building design should incorporate measures to avoid water wastage. Appropriate specification of bathroom and kitchen devices and appliances can help to achieve major savings in water consumption throughout the life of the building. Larger developments can also make use of water recycling systems or underlying groundwater resources to provide water for functions such as toilet flushing.

5.10 Water should be used wisely.

5.11 Groundwater is a resource that needs to be protected and managed. Groundwater can be polluted through discharge of effluent to ground and bad piling and drainage design. It can also be polluted by inappropriate storage of construction materials.

5.12 There are four water abstraction boreholes in the borough. The sensitive areas around these abstractions are shown by source protection zones. Bexley also contains part of a source protection area where the abstraction borehole is located in Dartford

5.13 See Section 7 on Flooding and Section 4 on Microclimate.

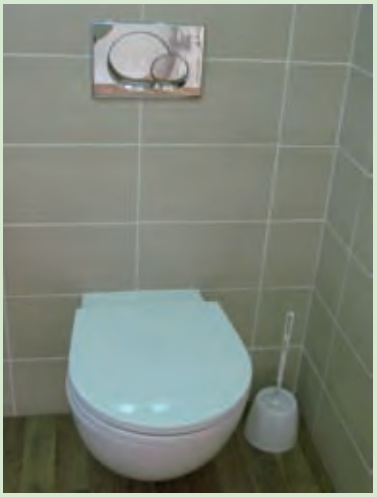
Guidance 23

The adoption of water efficient practice in new developments is strongly encouraged.

Developers should install the following water saving devices:

- dual flush toilets with flush volumes of 2 to 4 litres;
- waterless urinals - especially in buildings with high occupancy rates such as schools, hotels or offices;
- spray or aerated taps;
- water saving white goods;
- aerated spray showerheads and not power showers; and
- water re-circulation, recycling and water recovery systems rather than backwashing or rejecting water to waste for high water consuming systems such as swimming pools.

To avoid duplication Registered Social Landlords should provide evidence that they have met the water saving requirement for the Code for Sustainable Homes.



Dual flush toilet

Guidance 24

Proposals should make use of alternative water sources where possible and consider the following.

- Grey water recycling for toilet flushing, cooling tower or water to be used by boilers, landscaping and on-site water storage for fire fighting. Dual piping and appropriate valves filters and signage would be required. Water tanks could be sunk into the ground to collect grey water.
- Rainwater Harvesting using large surfaces such as roofs and using this rainwater to flush toilets, water gardens and supply washing machines.

Address future maintenance arrangements in the earliest project planning stage.

Inappropriate piling and surface water drainage should be avoided in the five source protection zones within Bexley.

Low flow tap





Grey water recycling

Guidance 25

Groundwater extraction from boreholes will help to reduce the problems of rising groundwater in Central London. Water from boreholes is generally at a stable and relatively low temperature - around 13°C - and can be used for cooling (replacing traditional refrigeration) although not at low enough temperature to provide dehumidification. Water from boreholes can also be used as greywater. However, water quality varies across London and regular monitoring is required for compliance with Environment Agency regulations. Also, with increasing drier summers and higher temperatures, ground water cooling may not be a reliable or sufficient source of cooling in the future.

5 Conserving resources and reducing carbon emissions

Guidance 25

In the context of groundwater, Developers and Architects should refer to the Environment Agency's new Groundwater Protection: Policy and Practice (GP3).

Signposts

- ciria for model maintenance agreements for rainwater harvesting and greywater
- BREEAM and Ecohome standards.
- CIRIA (2006) 'Water key performance indicators and benchmarks for offices and hotels.' www.ciria.org
- To receive a hard copy of Environment Agency publications about water conservation email savewater@environment-agency.gov.uk
- For information on Source Protection Zones see www.environment-agency.gov.uk/maps/info/groundwater/?version=1&lang=_e

Ensuring comfort and security in and around the development

Overheating and internal air quality

Policy context

- PPS1
- The London Plan Policy 4B6
- draft Further Alterations to the London Plan Policy 4A.5iv

6.1 Internal overheating needs to be avoided. Mechanical air conditioning uses significant amounts of energy and generates heat. It also contributes to further overheating.

6.2 Exposure to airborne pollutants released from within buildings can result in health impacts including Sick Building Syndrome - a complex problem caused by a range of factors. The most common impacts are odours, eye irritation and respiratory problems. Adverse health within buildings can be caused by asbestos, volatile organic compounds, carbon monoxide and fine particles.

Guidance 26

- Developers should consider designing out potential internal air quality and heat problems through natural ventilation systems.
- Developers need to demonstrate how development can be made heat resilient in design, construction and operation.



Earth walls, Greenwich Peninsula



Passive stack ventilation, BedZED development of homes, community facitites and workspace at Wallington, South London

Signposts

- Building Regulations Part F

6 Ensuring comfort and security in and around the development

Natural light



Policy context

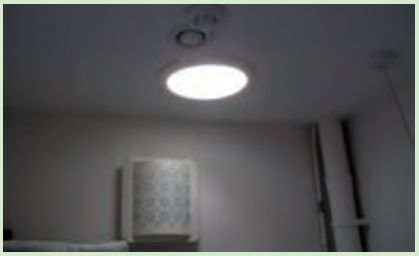
- PPS1
- London Plan 4B.6

6.3 A lack of natural light in winter can have adverse health effects.

Guidance 27

Developers should consider:

- When developing deeper building plots, the inclusion of internal atriums and at the smaller scale sun pipes directing sunlight into the building
- Artificial lighting to be able to be supplemented in winter with light stimulation in the ultraviolet 280-400 nm range



Sun tubes, Creekside, Deptford

- Artificial lighting with high frequency control gear by daylight sensors.

Accessibility

Policy context

- PPS1
- London Plan 4B.1, 4B.4 and 4B.5



6.4 Many buildings and environments are still not designed to accommodate the wide-ranging needs of disabled people, people with young children and older people. Access needs are often an afterthought, added on at a late stage of the detailed design, rarely included as a requirement in the initial brief at the beginning of the process and resulting in undignified, segregated and inferior provision.

6.5 Homes should be designed to Lifetime Homes standards so that life can be made as easy as possible for as long as possible.

Guidance 28

The Council requests that accessibility extend beyond this remit currently addressed in Building Regulations.

- All development should meet the principles of inclusive design; to be used safely and easily by as many people as possible without undue effort, separation, or special treatment.

Ensuring comfort and security in and around the development

6

Guidance 28

- New development should be accessible for people walking and cycling and travelling by public transport.
- Safe and convenient pedestrian, cycle and wheelchair access should be provided into the site and pedestrian and wheelchair access into the building and around the site itself.
- Appropriate convenient access should be provided within buildings for both the occupiers and visitors. Measures to facilitate such access should not be separate from general access arrangements.
- E-enabling by the use of IT systems to facilitate virtual access should be considered
- Housing should be designed to Lifetime Homes standards.
- Development should maximise opportunities to orientate buildings and streets to minimise summer and maximise winter solar gain, use trees and other shading; green the building roof, envelope and environs, and wherever possible incorporate a range of public and/or private outdoor green spaces such as gardens and roof spaces.



Sun screens, Greenwich Millennium Village



Green roof and water collection, Creekside, Deptford



6 Ensuring comfort and security in and around the development

Secure design

Policy context

- PPS1
- London Plan 4B.6

6.6 The adoption of sound urban design principles can contribute significantly to a safer environment. Appropriate measures in the design, layout, siting and landscaping of developments can minimise the risk of crime and maximise security.

6.7 See Chapter 3 for information and guidance on community safety and open space.

Guidance 29

The following issues should be considered in designing the development.

- Opportunities to incorporate passive surveillance of streets, spaces, parking and servicing areas.
- A 'perimeter block' approach wherever practicable and appropriate, comprising frontages where the public realm is readily overlooked from adjacent properties and the rear gardens are private secure areas which are difficult for third parties to access.
- Strong demarcation between public and private space.
- Public areas are well lit and landscaping does not obscure views into and out of the space.
- Developments are constructed of vandal resistant materials, and that maintenance arrangements are in place.
- Installation of sprinkler systems and hard wire smoke alarms where feasible.
- Developers should consult the Crime Prevention Design Adviser at Bexley Council and discuss how security is to be addressed within their development prior to a full application being submitted.
- Parking courts should be avoided unless gated with access control.
- Walkways should be avoided.
- The Secured by Design standard should be the minimum standard that developers aspire to.
- Developments should be constructed to the same level of security across the whole regardless of whether it is commercial, domestic, private or social housing.

Signposts

- Bexley Council, Design for Living, Bexley's Residential Design Guide SPD, 2006
- London Plan 4B.1, 4B.5 and 4B.4

Ensuring comfort and security in and around the development

Safe routes to public transport

Policy context

- PPS1

6.8 Developments that impact on public transport provision, either through the creation of new routes or by increasing its usage should ensure that access to public transport is safe.

Guidance 30

Developers should ensure that developments that will impact upon public transport provision have access that is:

- clearly marked and easily accessible by all sections of society;
- in a location that is overlooked by active frontages, on well-used and well-lit routes;
- away from features landscaping and vegetation that could provide screening or a place that allows people to hide; and
- avoids narrow walkways.

Safe and secure parking

Policy context

- PPS1
- London Plan 3C.3

6.9 Development proposals can contribute to safety by ensuring that access to parking, servicing and storage areas are safe and secure.

Guidance 31

Developers should consider:

- locating surface parking areas within the private defensible space of a residential development on the street or in a well surveyed parking court overlooked by active building frontages;
- ensuring that parking, servicing and storage areas for cars, bicycles and other means of personal transport are well illuminated;
- wherever possible providing bicycle facilities inside a building or close to the main entrance, lit and unobstructed; and
- designating bays for disabled people and people with small children close to the main entrance of buildings.

6 Ensuring comfort and security in and around the development

Guidance 31

Parking areas should be to the Park Mark Standard as set by the British Parking Association as a minimum level.

- Parking courts should be avoided.
- Garage parking is the safest - best not in blocks away from dwellings; in-curtilage is the next best thing.
- Bicycle storage should be inside the building or immediately outside where it can be seen easily.
- Bicycle stands with covers are not acceptable.



Flood resistant design

Policy context

- PPS1, PPS25 Annex D and PPS12
- London Plan 4C.8
- Development and Flood Risk: A Practice Guide Companion to PPS25 - A Living Draft

6.10 The Government is developing the concept of flood compatible and flood resistant development. Some forms of development may be located beside rivers or within flood plains. These should be designed so that they can be flooded without causing any undue damage. The sequential test in PPS25 should be applied. The Environment Agency works to ensure all development proposals adequately consider flood risk.

6.11 In other areas development can be designed to be flood resistant. For example putting living accommodation on the first floor or building on stilts or raising the ground floor above the level liable to flood. Roof drainage can also be designed to cope with the higher levels of rainfall and increased occurrence of storms expected from climate change.

6.12 See Section 4 of this document on flooding. Flood resistant design is a mitigation measure which would form part of a flood risk assessment.

Guidance 32

The following flood resistant design measures should be considered for development in a flood plain.

- Solid floors rather than suspended floors.

Ensuring comfort and security in and around the development 6

Guidance 32

- Use treated timber to resist waterlogging or marine plywood for shelves and fittings
- Fit electric, gas and phone circuits above expected flood level.
- Fit one-way auto seal valves on WCs.
- Use water resistant alternatives to traditional plaster or plasterboarding for internal wall finishes.
- Do not use chip board or MDF (eg in kitchen units).
- Avoid fitted carpets on ground floor.
- Raise floor levels above flood level.
- Parking at ground level where there is adequate flood warning.
- Avoid single storey developments and basements.
- Incorporate flood resistance and resilience.

Signposts

- PPS25 Practice Guide Companion - Chapter 5 especially 5.36 to 5.45

Waste and recycling

Policy context

- PPS1, PPS10
- The Mayor's Waste Strategy

6.13 Sustainable waste management involves producing less waste, and dealing better with the waste that is produced. The waste hierarchy provides a framework for sustainable waste management.

6.14 The design of a development is critical to ensure that sustainable waste management can be achieved.

6.15 As growth takes place so does the production of waste water / sewage. More sewage sludge will then be produced at Crossness Sewage Treatment Works which will require treatment / disposal.

6.16 Site Waste Management Plans are being developed and will provide a structure for systematic waste management at all stages of a project's delivery. They are designed to have a major impact on the industry as currently 13 million tonnes of unused building material are discarded as waste every year.

6 Ensuring comfort and security in and around the development

Guidance 33

At the design stage the following waste hierarchy should be applied.

- Reduce the amount of waste generated
- Re-use
- Recycle
- Recovery of energy and materials
- Disposal - the least desirable option

At the design stage development proposals should consider the following issues.

- Dealing with hazardous waste on site.
- Re-use and recycling of construction and demolition waste on site.
- Maximising use of recycled materials.

The integration of sustainable waste management principles should include:

- the design of suitable individual or shared waste sorting and recycling facilities;
- siting of recycling facilities should follow consideration of vehicular access to the site and potential noise impacts of amenity; and
- provision of composting facility in properties with gardens or landscaped space.



Composter

The carrying out of Site Waste Management Plans is encouraged to improve environmental performance.

Separation of waste should be as, or more, convenient than storage options for residual waste. This applies to both individual and shared storage facilities, and might also be reflected in the storage capacity for each type of waste (for example, larger storage bins for diverted waste streams than for residual waste, to promote diversion.

Signposts

- Demolition Protocol, ICE and London Remade 2003
- Site Waste Management, Planning, Voluntary Code of Practice 139/04, Environment Agency
- Bexley Council, Design for Living, Bexley's Residential Design Guide SPD, 2006

Minimising the adverse effects of the construction on site and surroundings 7

Considerate construction

Policy context

- PPS1
- London Plan 4B.6

7.1 The impact of the construction process needs to be minimised to in order to reduce impacts on people and the environment. See Guidance 33 on applying the waste hierarchy during construction and demolition.

Guidance 34

Biodiversity on site should be protected and enhanced through:

- protectiion of areas of biodiversity that are to be retained and enhanced from harm during construction - including existing trees and waterside zones through secure fencing;
- avoidance of soil compaction and pollution of soils and water; and
- supervision by trained staff, or a qualified ecologist when construction activities require temporary access over, or removal and replacement of habitat.

Where protected species are involved, there may be a statutory requirement for obtaining a licence and the work may need to be undertaken in a particular season. Such restrictions can be quite wide (for example all nesting birds are protected from disturbance under the Wildlife and Countryside Act 1981, as amended).

- Innovative design

Signposts

- Bexley Biodiversity Action Plan

Guidance 35

Developers will be expected to achieve a level of performance equivalent to that required under the Considerate Constructors Scheme.

Bexley expects this to be supported by a commitment to achieve certification under the Considerate Constructors Scheme.

Guidance 36

Developers will be expected to identify potential sources of dust and other air pollution as early as possible and implement the following dust control measures.

7 Minimising the adverse effects of the construction process on site and surroundings

Guidance 36

- Activities that may affect air quality or generate dust should be located away from sensitive human receptors (e.g. hospitals, schools, housing) and ecological resources whenever possible.
- Completed earthworks should be sealed or replanted as early as practicable.
- Where practicable, stockpiled materials should be located to take account of the prevailing wind and any sensitive receptors. Stockpiles should be dampened.
- Dust sources such as skips should be covered.
- Roadways (including haul roads), construction sites and dust generating activities such as stone cutting should be dampened and swept when required.
- Sites should be designed to accommodate wheel washer facilities as appropriate.
- Low emission vehicles and plant equipment should be used particularly for on-site generators.
- Controls also need to be in place during demolition. Dampening down during demolition activities can assist with preventing dust pollution.
- Use energy efficient and low emission equipment, including the vehicles that transport materials and personal to and from the site.
- Minimise construction noise and disruption through the specification of techniques such as the use of framed construction and pre-fabricated components.
- Limit both the level and duration of noise.
- Consult with Bexley Environmental Health Officers at an early stage.
- Compost organic waste on site to supplement topsoil for landscaping.
- Conserve topsoil on site with as little disturbance as possible.
- Access surrounding new development should be safeguarded to protect the amenities of nearby residents and users of local facilities and businesses.
- New development should have appropriate fencing and site hoarding to protect local amenities and deter anti social behaviour such as vandalism, fly posting and graffiti.
- See Guidance on archaeology in the section on cultural heritage in Chapter 4.
- Wherever possible local labour should be used; developers should contact the Council's Strategic Planning and Regeneration Department regarding the 'Resource Plus' local labour scheme.
- See the section on water in Chapter 5 regarding Source Protection Zones.
- Registered Social Landlords should provide evidence that Code for Sustainable Homes level 3 and the Considerate Constructors Scheme have been complied with to avoid a separate audit.

Signposts

- http://www.ccscheme.org.uk/
- Best Practice Guidance on Control of Dust and Emissions. GLA and London Councils.

Encouraging sustainable living through building design and information provision 8

Applying the waste hierarchy during construction and demolition

Policy context

- PPS1, PPS23
- The London Plan Policy 4B6

8.1 Many aspects of the construction process can have a significant adverse impact on the quality of the site and its surroundings. Through careful and considerate planning, these impacts can be reduced.

8.2 As part of the construction and demolition phase the treatment of waste is a crucial issue. The waste hierarchy provides a framework for sustainable waste management that is applicable during the construction and demolition phase.

8.3 Sufficient information is needed so that developments are used in the correct way and sustainable design features deliver maximum benefits

Guidance 37

Developers should prepare a waste management plan in line with the waste hierarchy.

- Reduce the amount of waste generated
- Re-use
- Recycle
- Recovery of energy and materials

Where development has been designed with care and consideration for its occupiers and the environment, it is essential that developers provide comprehensive information and advice for its ongoing management.

Use the river where possible for the transport of waste materials from development sites

Signposts

- Demolition protocol ICE and London Remade 2003
- Site Waste Management Plans, Voluntary Code of Practice, 139/04, Environment Agency
- New Waste Policy 5 - London Plan Housing Provision Targets - Waste and Minerals Alterations (December 2006)

8 Encouraging sustainable living through building design and information provision

Sustainable forms of transport, information provision and locally sourced labour

Policy context

- PPS1
- Bexley UDP Policies T17, ENV39, E1, SHO2, SHO4, SHO9 and TAL1

8.4 Carbon dioxide emissions from petrol-based transport are one of the contributors to greenhouse gas emissions and hence climate change.

8.5 Labour from local sources is more sustainable and should lead to less pollution from journeys to building sites as workers can use more sustainable modes of transport. Locally sourced materials are also more sustainable.

8.6 Water and rail transport are more efficient ways of transporting goods in terms of energy use. Water being the most efficient.

Guidance 38

- Residential on-site parking provision must not exceed the maximum levels stipulated in Bexley's Unitary Development Plan (UDP)
- Travel plans will be required for major developments incorporating measures to encourage use of sustainable transport options.
- Facilities can be provided in developments to support different transport modes such as the provision of bicycle racks and secure storage or charging points for electric cars and car clubs. Workspaces with showers should also be considered.
- The development should include a network of safe pedestrian and cycle routes which follow desire lines, safe crossing points across all roads and the design of pavements to enhance the interaction of people.
- The preparation and submission of travel plans.
- Wherever possible local labour should be used. Developers should contact the Council's Strategic Planning and Regeneration Department regarding the Council's 'Resources Plus' local labour scheme.
- Car sharing and car clubs should also be encouraged.
- The river should be used where possible for the transport of materials to development sites.
- Water transport of bulk materials should be maximised.

Appendix A

Sustainable design and construction checklist

A.1 Each planning application is to be accompanied by a sustainable design and construction proposal, which should describe how the principles of sustainable design and construction have been applied to the development. The Council has developed, for this purpose, a sustainable design and construction checklist, which should be used as a basis for preparing the proposal.

A.2 The checklist describes the key principles of sustainable design and construction and also the level of detail required in the proposal. In certain circumstances, the developer may need further information or external support in order to achieve compliance with a policy. Further information sources and support services have also been provided.

A.3 In addition to the further information and support services provided in the checklist, the EU has produced a number of directives and the DCLG a number of planning policy statements and building regulations on subject areas relating to sustainable design and construction. See Appendix C for further information.

A.4 Bexley Council is committed to monitoring the compliance of development with policy. Monitoring methods have been developed and will be implemented by performing impromptu checks both during the construction process and once the project is completed.

A.5 A template for the sustainable design and construction proposal has been provided in Appendix B

Objective 1 - Ensuring land is safe for development		
Key principles	*Action required*	*Further information / support*
Treat land contaminated prior to development (where applicable)	Bexley Council requires site investigation where land contamination is suspected. Where contamination is found, the Council will encourage on-site treatment in preference to cover systems or off-site disposal. Prospective developers are advised to consult with the Environmental Health Division at an early stage, if contamination is suspected, for advice on whether site investigations will be required.	The DETR Circular 2/2000 Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990 gives statutory guidance on the new regime for the treatment of contaminated land, as set out in Part IIA of the Environmental Protection Act 1990. The DEFRA (2004) Model Procedures for the Management of Land Contamination provides a technical framework for applying a risk management process when dealing with land affected by contamination. The following websites provide information on land contaminated policy and remediation: www.ciria.org, www.defra.gov.uk, www.environment-agency.gov.uk, www.dclg.gov.uk and www.silc.org.uk

Appendix A

Sustainable design and construction checklist

Objective 2 - Ensuring access to and protection of the natural environment		
Key principles	*Action required*	*Further information / support*
Enable easy access to the natural environment/ open spaces and, wherever possible, provide new and enhanced green spaces to serve the community	1. Ensure no net loss of publicly accessible open space but aim to achieve a net gain of publicly accessible open space 2. Aim to create open space that meets the need of biodiversity and people through provision of: allotments; areas of wildlife habitats; and access to green space for those without gardens. 3. Climate change over the next 50 years should be considered when choosing species for landscape design	The ANGsT tool developed by the Centre for Regional Ecology provides a practical approach to green space provision. The Guide to Preparing Open Space Strategies sets out practical guidelines on the methodology and content of an Open Space Strategy within the London context. It provides advice on assessing the quantity and quality of open spaces and in identifying the needs of local communities and other users of open spaces. The Guide to Preparing Play Strategies, produced in partnership with London Play and its colleagues in the play sector - is a key part of the Play Strategy for London. It is a companion guide to the Mayor's Guide to Preparing Open Space Strategies.
Enhance biodiversity	1. Secure ecological data through a scoping study, ecological survey and impact assessment (refer to LDA Design for Biodiversity guide) 2. Ensure no net loss of biodiversity on the site but aim to achieve a net gain of biodiversity through: creating, restoring or balancing wildlife habitat on site; incorporating vegetation into built structures, such as green roofs, green walls, balconies or terraces; and incorporating appropriate nesting boxes and roosting structures 3. Describe how ongoing ecological management of the wildlife habitat will be achieved 4. Where net loss of biodiversity cannot be avoided, describe how loss will be fully mitigated 5. Advice on ecology (where required) is to be sought from individuals of recognised organisations e.g. Association of Wildlife Trust Consultancies (AWTC), a member of the Institute of Environmental Management and Assessment (IEMA), a member of the Institute of Ecology and Environmental Management (IEEM), or a member of the Landscape Institute (LI) with appropriate qualifications)	With a few simple key steps, developers can ensure that they comply with biodiversity legislation and achieve best practice. An overview of the process by which developers can achieve these objectives is presented in the Guide for Biodiversity produced by the LDA. The guide outlines the critical drivers and principle processes which promote industry best practice. The London Biodiversity Partnership is a group of public, private and voluntary organisations, with the core aim to conserve and enhance the capital's wildlife and natural places for future generations to benefit from and enjoy. For up to date, comprehensive information and advice about green roofs, visit Livingroofs.org, a non-profit organisation established to promote, advise upon and seek research into green roofs and similar structures within the context of urban and rural regeneration. www.livingroofs.org/ The British Council and the Corporation of London has produced a research advice note on green roofs.

Appendix A

Sustainable design and construction checklist

Objective 3 - Reducing negative impact of development on the local environment		
Key principles	*Measurin compliance*	*Further information / support*
Mitigate noise impact	1. Demonstrate that adverse impacts of noise have been minimised, using measures at source or between source and receptor (including choice and location of plant or method, layout, screening and sound absorption) in preference to sound insulation at the receptor, wherever practicable 2. For residential development, achieve BS 8233:1999 (Table 5) 'good' standards for external to internal noise and improve on Building Regulations (2003) Part E for internal sound transmission standards by 5dB (See BRE Ecohomes.	The Greater London Authority has prepared a number of sound conscious urban design factsheets, which illustrate a range of ways in which buildings and public spaces can be designed to improve city soundscapes. They include see-through walls, which screen noise, water features masking noise in urban squares and parks, innovative paving, which creates changing soundscapes for walkers, and designing an outdoor performance space to give high quality sound with less amplification.
Mitigate light pollution	1. Describe how light pollution (which can cause significant adverse impact on residential amenity or biodiversity) has been avoided through using lighting only where and when necessary, using an appropriate strength of light and adjusting light fittings to direct the light to where it is required. 2. External lighting should be energy efficient and solar powered wherever possible	The Institute of Lighting Engineers has produced a Guidance Note on Light Pollution which provides advice on how to reduce the problems of unnecessary, obtrusive light.
Prevent flooding, water pollution and impact on drainage systems	1. Estimate waste water and surface water run-off impact on drainage system 2. Wherever practicable, use SUDS to provide attenuation of water run-off to either natural water-courses and/ or municipal drainage systems by 50% at peak times. Ensure multiple benefits of SUDS are sought, such as wildlife improvements. 3. Describe how ongoing maintenance of SUDS will be managed	The Environment Agency web site provides comprehensive information on SUDS, including: Details of the various techniques used in SUDS drainage Details of key groups involved in SUDS Information on research currently being undertaken in the field Links to relevant web sites: www.environment-agency.gov.uk The CIRIA SUDS web site has been established to disseminate and promote good practice in the implementation of sustainable drainage in the built environment. www.ciria.org/suds/ For up to date, comprehensive information and advice about green roofs, visit Livingroofs.org a non-profit organisation established to promote, advise upon and seek research into green roofs and similar structures within the context of urban and rural regeneration. www.livingroofs.org/

Appendix A

Sustainable design and construction checklist

Objective 3 - Reducing negative impact of development on the local environment		
Key principles	*Measurin compliance*	*Further information / support*
Avoid negative microclimatic effects	1. Prove how negative impact on the microclimate of existing surrounding public realm and buildings has been mitigated 2. For tall buildings, illustrate how the Lawson criteria for wind comfort and safety has been met	BRE has produced a guide entitled Daylight and Sunlight BR209 BRE. This guide gives advice on site layout planning to achieve good sunlighting and daylighting, both within buildings and in the open spaces between them. Other sections give guidance on passive solar site layout, on the sunlighting of gardens and amenity areas, and briefly review issues like privacy, enclosure, microclimate, solar dazzle, road layout and security. www.bre.co.uk/

Objective 4 - Conserving natural resources and reducing carbon emissions		
Key principles	*Action required*	*Further information / support*
Use less energy	1. Illustrate in the proposal how energy demand for the development has been reduced by applying: • Passive solar design principles • Energy efficient measures and technologies	The Energy Saving Trust has produced a best practice guide on passive solar estate layout. A number of guides have been produced on ventilation and cooling: • Good Practice Guide 290. Ventilation and cooling options appraisal. A client guide. www.energyaction.org.uk • Good Practice Guide 291. A designers guide to the options for ventilation and cooling. www.energyaction.org.uk • Natural ventilation in non-domestic buildings. Application Manual AM10: CIBSE 1997. www.cibse.org There are large number of organisations/ programmes providing impartial support in the field of energy efficiency: Practical Help: a free enquiry service providing up to 2 hours support (per enquiry) for local authorities and housing associations offering realistic solutions for promoting and implementing sustainable energy policies and measures to reduce carbon dioxide. Also provide referral service to other EST programmes. The Energy Efficiency Best Practice in Housing programme: provided by the Energy Saving Trust, this is the Governments principal energy efficiency information, advice and research programme for professional organisations involved in all aspects of housing. Carbon Trust Design Advice: sustainable energy design advice for developments. Subject to an approved application, clients are offered a free initial design consultancy on a building project. Further consultancy, with partial funding, may be available.

Appendix A

Sustainable design and construction checklist

Objective 4 - Conserving natural resources and reducing carbon emissions		
Key principles	*Action required*	*Further information / support*
Use renewable energy	1. Carbon emissions from the total energy needs (heat and power) of the development should be reduced by at least 10% and preferably 20% by the on site generation of renewable energy. The proposal should illustrate how this will be achieved.) The definition of a major development is that used currently by the ODPM PS2 form that each district planning authority must use to report general developments: 1. For dwellings: where 10 or more are to be constructed (or if number not given, area is more than 0.5 hectares). 2. For all other uses: where the floor space will be 1,000sq metres or more (or site is 1 hectare or more). Area of site is that directly involved in some aspect of the development. Floor space is defined as the sum of floor area within the building measured externally to the external wall faces at each level. Basement car parks, rooftop plant rooms, caretakers' flats, etc. should be included in the floor space figure. 2. All external lighting is to be solar-powered, wherever possible 3. Developments not initially incorporating solar technologies should be of suitable design and orientation to support then later	Creative Environmental Networks (CEN), a not for profit organization based in South London can provide impartial advice and assistance in meeting the building integrated renewable energy policy. For more information about their developer support service, contact CEN on 020 8683 6694 or visit the CEN web site. London Renewables has produced a toolkit for planners, developers and consultants giving detailed guidance and information on incorporating energy efficient and renewable energy technology and design into developments. Grants for renewable energy are available from: www.clear-skies.org https://energysavingtrust.org.uk/advice/solar-panels/ Solar water heating systems are eligible for enhanced capital allowance.
Supply energy efficiently	1. Illustrate in the proposal how the use of CHP technology or a community heating scheme has been explored (major developments only)	Carbon Trust Energy Services offers expert advice and support for those wishing to set up energy services schemes including affinity deals, community-based energy services and residential CHP. For those interested in pursuing an Energy Services approach, up to one free day consultancy is available. CEN operates a CHP Energy Services programme, undertaking assessment and implementation of CHP projects. For further information, contact CEN on 020 8683 6653 or visit the CEN website. CHP systems are eligible for enhanced capital allowance.

Appendix A

Sustainable design and construction checklist

Objective 4 - Conserving natural resources and reducing carbon emissions		
Key principles	*Action required*	*Further information / support*
Use materials with low lifecycle impacts and toxicity impacts	1. 100% of timber products to be obtained from sustainable sources (CSA, FSC, MTCC, PEFC, SFI) and balance from a temperate source 2. Insulation materials must not contain substances known to contribute to stratospheric ozone depletion or have the potential to contribute to global warming. Insulation materials to be listed in proposal 3. PVC windows should not be used 4. Low emission finishes, construction materials, carpets and furnishings should be used wherever practical 5. Recycled aggregates to be used, wherever possible for road sub surface and parking areas. Proposal to illustrate % of recycled aggregate	BRE has produced the Green Guide to Specification, which provides an environmental rating for housing construction materials and a quick and easy way for designers and specifiers to assess their options. www.bre.co.uk
Use local materials	1. 30% of materials by mass used in the development to be sourced from within 35 miles of the site	N/a
Use water conservation devices	1. Development to include 100% inclusion of water saving devices, e.g. low flush toilets and spray taps 2. 100% metering of new property is required	Envirowise offers UK businesses free, independent, confidential advice and support on practical ways to increase profits, minimise waste and reduce environmental impact, including advice on water saving. Certain water saving devices are eligible for enhanced capital allowance.
Use water recycling techniques	1. Use rainwater harvesting in gardens and soft landscaping where appropriate 2. Use of greywater for all non potable purposes should be explored	For further information about rainwater harvesting and grey water recycling visit the Environment Agency website at www.environment-agency.gov.uk

Appendix A

Sustainable design and construction checklist

Objective 5 - Ensuring comfort and security in and around the development		
Key principles	*Action required*	*Further information / support*
Manage internal air quality	1. All plant and machinery should be accessible for easy maintenance and be regularly maintained	Exposure to airborne pollutants released from within buildings can result in health impacts including Sick Building Syndrome. This syndrome and its prevention is addressed in the following publications: • HSE Guidance, SIR No 10, Sick Building Syndrome: a review, 1988. www.hse.gov.uk • CIBSE Guide, Environmental Criteria for Design – Section A, 1999. www.cibse.org • A Palmer & R Rawlings BSRIA, Building related sickness: causes, effects and ways to avoid it, 2002.
Bring natural light into the building and control artificial lighting	1. Apply principles of passive solar design to reduce reliance on artificial light 2. Where workspaces rely on artificial light consider augmentation in the UV 280 – 400nm range	The Installers Guide to Lighting design. Good Practice Guide 300.
Make the building accessible to all	1. All residential development should meet Lifetime Home standards 2. All developments should include an Access Statement 3. Easily accessible live IT data points to living room and bedrooms in each dwelling should be incorporated	The following publications address accessible and inclusive environments: • CABE, Building for Life Standards, 2003. • GLA, Accessible London: Achieving an Inclusive Environment. SPG to the London Plan, 2004. • Centre for Accessible Environments, Access Audits: a guide and checklists for appraising the accessibility of buildings, 2004 edition. www.cae.org.uk • British Standards Institute, BS 8300: Design of buildings and their approaches to meet the needs of disabled people, 2001. • Stephen Thorpe, National Wheelchair Housing Association group, Home Housing Trust, BRE, Wheelchair Housing Design Guide, 1997. www.bre.co.uk
Apply the principles of flood resistant design (where applicable)	1. Consider the flood risks (current and future) associated with the development and apply the principles of flood resistant design where necessary	The following guides provide information on flood resistance: • DTLR, Preparing for Floods, February 2002 (provides information on how to improve the flood resistance of houses and small business properties). • Association of British Insurers, Strategic Planning for Flood Risk, July 2004 www.abi.org.uk

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Sustainable design and construction checklist

Objective 5 - Ensuring comfort and security in and around the development		
Key principles	*Action required*	*Further information / support*
Adopt best practice in the secure design of the development	Developments should incorporate principles of 'secure by design' and proposers of development should consult the Community Safety Partnership to design public space	The following publications address security around the development: Association of Chief Police Officers Project and Design Group, Secured by Design, 1994. www.securedbydesign.com Secured by Design is the UK flagship initiative supporting the principles of designing out crime. It is a corporate title for a family of national police projects involving the design for new homes, refurbished homes, commercial premises, car parks and other police crime prevention projects. It is primarily an initiative to encourage the building industry to adopt crime prevention measures to assist in reducing the opportunity for crime and the fear of crime, creating a safer and more secure environment. RVG Clarke and P Mayhew, Designing out crime, HMSO, 1980.

Objective 6 - Minimising the adverse effects of the construction process on site and surroundings		
Key principles	*Action required*	*Further information / support*
Reducing Adverse Impact of Construction Process on Quality of Site and its Surroundings	1. Waste Management: Reduce waste during construction and demolition phases and sort stream waste on site. Proposal to include a waste management plan, which should demonstrate how the waste hierarchy will be applied during the construction process 2. Air Quality: Ensure adequate air pollution monitoring is carried out within and/ or around the construction site to monitor the effect of activities on site. Agree monitoring with local authority 3. Equipment: Ensure equipment, including vehicles used to transport materials and people, is efficient and well-maintained to minimise emissions 4. Building Green: Aim to disturb as little topsoil as possible and compost organic waste on site to supplement existing topsoil 5. Biodiversity: Give physical protection to existing trees and waterside zones during construction. Where construction activities require temporary access over, or removal and replacement of, habitat these operations should be supervised by trained staff, or a qualified ecologist. 6. Considerate Contracting: Proposers of major developments should sign up to the Considerate Constructors Scheme, which addresses noise and pollution impacts	CIRIA has published a seminar entitled Biodiversity and Construction: working with wildlife (E3217). The seminar examines ways in which construction clients and their project teams can improve and monitor project performance in relation to ecological impacts and biodiversity. Case studies and benefits of implementing good practice are also highlighted. The Considerate Constructors initiative, started in 1997, is a voluntary Code of Considerate Practice, which is adopted by participating construction companies, and everyone involved on the construction site. The scheme promotes competent management, efficiency, awareness of local environmental issues and above all neighbourliness during the construction process. www.considerateconstructorsscheme.org.uk

Appendix A

Sustainable design and construction checklist

Objective 7 **Encouraging sustainable living through building design and information provision**		
Key principles	*Action required*	*Further information / support*
Provide internal and external recycling facilities	1. Provide internal and external facilities to recycle at least 35% of household waste. By 2015 this should rise to 60% 2. Discuss local shared recycling facility/ kerb side collection requirements with local authority waste management team	Contact the council's waste management team for further information on local recycling facilities and waste management requirements for new developments.
Reduced car parking for locations that can support it.	Reduced car parking in locations that meet all of the following criteria: • Within a Controlled Parking Zone (CPZ) • 800m walking distance to train station or 400m to a major bus route providing a 7-day service including evenings with a minimum weekday frequency of 8 buses/ trains per hour • 400m walking distance to a UDP protected shopping centre	n/a
Provision of cycle storage and low carbon vehicle nodes	1. Illustrate how the development has included a network of safe pedestrian and cycle routes (where applicable) 2. Provide cycle storage, ensuring safe access for 10% of staff (office) or 95% of dwellings. Workspaces with showers should also be considered to allow cycling to work. 3. Investigate potential for low carbon vehicle nodes	Carclubs.org.uk is a charitable organisation funded by the Department of Transport which also works with the Countryside Agency. The organisation provides information and advice, a forum for interested parties and case studies. It can also provide practical support and services to developers.
Provide information packs and instruction manuals to building occupiers	Develop non technical building services packs/ manuals for information provision to building occupiers on: • Maintenance requirements for heating, cooling, ventilation and water recycling systems • Management requirements for SUDS • Recycling facilities • Local public transport and cycle/ low carbon vehicles	n/a

Appendix B

Sustainable design and construction proposal template

Proposal template
Sustainable Design
1 Ensuring land is safe for development
2 Ensuring access to and protection of the natural environment
3 Reducing negative impact of devlopment on the local environment

Appendix B

Sustainable design and construction proposal template

Proposal template
Sustainable Design
4 Conserving natural resources and reducing carbon emissions
5 Ensuring comfort and security in and around the development
sustainable construction
6 Minimising adverse effects of the construction process on site and surroundings

Appendix B

Sustainable design and construction template

Proposal template
Sustainable Design
7 Encouraging sustainable living through building design and information provision

Appendix C

Sustainable design and construction: Directives, Policy Statements and Building Regulations

Objective	EU / DCLG Publications
Ensuring Land is safe for development	• Planning Policy Statement 23: Planning and Pollution Control • Building Regulations, Part C –Site preparation and resistance to moisture
Ensuring access to and protection of the natural environment	• Planning Policy Guidance 17: Planning for Open Space, Sport and Recreation • Planning Policy Guidance 9: Nature conservation
Reducing negative impact of devlopment on the local environment	• Planning Policy Guidance 24: Planning and Noise • Building Regulations, Part E – Resistance to the passage of sound • Planning Policy Statement 25: Development and Flood Risk
Conserving natural resources and reducing carbon emissions	• EU Energy Performance of Buildings Directive • Planning Policy Statement 23: Renewable Energy (Companion Guide to PPS22) • The Planning Response to Climatic Change; Advice on Better Practice. ODPM/ Welsh Assembly/ Scottish Executive • Building Regulation, Part L – Conservation of Fuel and Power
Ensuring comfort and security in and around the development	• Building Regulations, Part F - Ventilation • Building Regulations, Part M - Access to and Use of Buildings • Safer Places – the Planning System and Crime Prevention. ODPM and Home Office
Minimising adverse effects of the construction process on site and surroundings	n/a
Encouraging sustainable living through building design and information provision	n/a

Appendix D

Useful websites

Sustainable Construction: Practical guidance for planners and developers, which aims to assist in the task of delivering more sustainable buildings. This is the outcome of a research project core funded by the DTI.

Other useful websites include:

www.aecb.net	Association for Environmental Concious Building
	Beddington Zero Energy Development
www.bre.co.uk	Building Research Establishment
www.cabe.org.uk	CABE: Commission for Architecture and the Built Environment
www.carbontrust.co.uk	Carbon Trust
www.cibse.org	CIBSE: Chartered Institution of Building Services Engineers
	Combined Heat and Power Association
www.constructingexcellence.org.uk	Constructing Excellence
	Energy Efficiency Advisory Service
https://energysavingtrust.org.uk/	Energy Saving Trust
www.greenbuildingstore.co.uk	Green Building Store
www.integerproject.co.uk	Integer: Intelligent and Green
www.livingroofs.org	Living Roofs
	Rethinking Construction
	Sustainable City Initiatives
www.sustainablehomes.co.uk	Sustainable Homes
www.cityoflondon.gov.uk	Tall buildings

Appendix E

Putting a price on sustainability: study results

Naturally ventilated office - % increase in capital cost					
Location	BREEAM score (and rating) for the base case	% increase for pass	% increase for good	% increase for very good	% increase for excellent
Poor	25.4 (pass)	0%	0%	2%	-
Typical	39.7 (pass)	-	0%	0%	3.4%
Good	42.2 (good)	-	-	0%	2.5%
Note: A small overall cost saving was identified resulting from the removal of air conditioning equipment in the computer / server room, thereby enabling increased performance at no extra cost					

Air conditioned office - % increase in capital cost					
Location	BREEAM score (and rating) for the base case	% increase for pass	% increase for good	% increase for very good	% increase for excellent
Poor	20.3 (unclassified)	0%	0.2%	5.7%	-
Typical	34.6 (pass)	-	0%	0.2%	7.0%
Good	37.1 (pass)	-	0%	0.1%	3.3%

Domestic dwelling - % increase in capital cost					
Location	BREEAM score (and rating) for the base case	% increase for pass	% increase for good	% increase for very good	% increase for excellent
Poor	22.1 (unclassified)	0.1%	0.9%	3.1%	-
Typical	27.6 (unclassified)	0%	0.4%	1.7%	6.9%
Good	29.7 (unclassified)	0%	0.3%	1.3%	4.2%

LIFT Health Centre - % increase in capital cost					
Location	BREEAM score (and rating) for the base case	% increase for pass	% increase for good	% increase for very good	% increase for excellent
Typical	27.6 (good)	-	-	0%	1.9%
Good	29.7 (good)	-	-	0%	0.6%

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