

Guidance for
**Sustainable
Design**

in the National Parks of Wales

Spring 2009



BRECON BEACONS
NATIONAL PARK



Parc Cenedlaethol
Arfordir Penfro
Pembrokeshire Coast
National Park



SNOWDONIA
NATIONAL PARK

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Guidance for sustainable design in the National Parks of Wales

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Who should use this guide and why

Developers and land owners

The guide will give you an understanding of how the Park Authority will look at your application with regard to its sustainability before you purchase land or devise proposals and will assist in the appraisal of your scheme.

Designers

The guide will assist the design process by clarifying the standards of materials and performance expected. In addition it will assist in the preparation of access and design statements to support an application.

Development Plan makers

The guide will provide the basis for evaluating the effectiveness of policies and interventions. It will also assist with the preparation of site briefs.

Development Control/Management officers

The guide will provide a manual to help assess design statements submitted with planning applications, offering advice on making informed decisions about an application's sustainability.

1 Sustainability in the Welsh National Parks

Although sparsely populated the National Parks of Wales are regarded as 'pinnacles in Welsh landscape quality and heartlands of Welsh culture'.¹

The National Parks of Wales have the potential to enrich the lives of people in Wales; contributing to the economy and wellbeing of the nation. They are cultural and productive landscapes which have been moulded by people over millennia; the interaction of people and place is central to their character and their designation.

Purpose of this guidance

The aim of this guidance is to promote high quality, sustainable design that enhances the natural beauty, wildlife and cultural heritage of the National Parks of Wales. The approach taken in this guidance is based on the traditional design principles which have culminated in locally distinctive, resource efficient buildings inextricably linked with their landscape. The aim is to encourage the design of a new generation of contemporary, high quality buildings based on the principles of intelligent siting, climate responsive structures, using sustainably sourced materials.

This guidance has been updated following an extensive consultation exercise held during the spring of 2007. It is a generic piece of guidance which will be used by development control staff to assess planning applications in the National Parks of Wales alongside associated design statements. Its content will form the basis of more specific advice and policy which will be incorporated into each National Park's Local Development Plan.

Background

We are facing huge environmental challenges, most notably climate change, brought about by unsustainable human activity over the last two centuries, such as the unregulated emissions of climate-altering gases. These climatic changes are harming the systems on which we currently depend for food, transportation and shelter. However, 'There is still time to avoid the worst impacts of climate change if we take strong action now.'²

Better design and construction techniques could help lower harmful emission, whilst also offering economic and social benefits through more sustainable supply

systems, improved energy efficiency, aesthetic improvements to our future built heritage and enhanced community cohesion.

Currently more than half of all resources are used for the construction of buildings. 45% of the energy generated globally is used to heat, light and ventilate buildings. A further 5% is produced during their construction.

If this pattern of consumption were repeated on a global scale, we would require the resources equivalent to 3 of our worlds to support our existence. This level of consumption is unsustainable.

Building a Future for Wales, WWF & WSA 2005.



¹ Review of National Park Authorities in Wales prepared for the Welsh Assembly Government, 2004.

² Stern Report, 2006

2 Sustainable development and planning guidance

In essence, sustainable design equates to nothing more than applied common sense and respect for the traditional principles of good design.

Design quality is not just defined by how a structure looks, but by how it functions and meets the social, economic and environmental needs of the people it serves. Good design also allows for a structure that is flexible to change and future alterations in its use.

This guidance is accompanied by a Sustainability Matrix (Appendix 1) which provides the framework for preparing a design statement. The Sustainability Matrix is designed to be user friendly and to prompt positive actions in sustainable design, whatever the scale of project. The National Parks' ambition is to promote high quality, sustainable design. This guidance sits alongside other design advice literature specific to each National Park.

Sustainability and place

Conservation of each National Park's special qualities and local distinctiveness is paramount. Place making is about ensuring that an area retains its unique character. However, this principle is not contrary to good, contemporary design. The guidance encourages the use of appropriate aspects of local design traditions to produce contemporary buildings. In the preparation of this guidance the aim has therefore been to dovetail these critical issues of sustainability and place-making within the particular context of development in the National Parks.

Planning Guidance

The context and justification for this guidance is derived from National Planning Policy and reflected in respective planning policy documents. This guide has been prepared to amplify the planning policy of the National Park of Wales on sustainable design. Reference should be made to the relevant Local Plan, Unitary Development Plan or Local Development Plan of the respective National Parks.

This guide sets out:

- The role of planning powers in relation to sustainable design and development.
- The principles of sustainable design in the context of planning in the National Parks of Wales.
- The sustainable design aspects to be incorporated in any development at the planning application stage.

Welsh Assembly Government Advice - Design

This guidance is framed within National Design Policy and in particular PPW Technical Advice Note 12: Design, in so much as sustainable design "is at the heart of the design process" Tan 12, 2002.

In addition, note has been made of the Environmental Strategy 2006 Action Plan and the Ministerial Interim Planning Policy Statement 01/2008 "Planning for good design". Close reference has been made to the Code for Sustainable Homes, published by the Welsh Assembly Government in 2008 and Improving your home: A Climate Change Guide.



3 Advantages of sustainable design and development

Achieving sustainable design should not be an optional extra to development. High quality sustainable design and development are essential if long term damage to the environment and economic fabric of the National Parks is to be minimised. Sustainable design can also make developments more marketable.

A scheme based on the principles of sustainable design will have the following advantages:

- The running costs of a development will be much reduced.
- Design approaches providing for sustainability and incorporating appropriate renewable energy should not add prohibitively to capital costs when valued over the life of the building.
- The development will meet the needs of the local community through addressing local as well as global needs. Currently the Home Information Pack requires an Energy Performance Certificate, which rates how efficient homes are on a scale of A-G. (Properties marketed for sale in England and Wales need a Home Information Pack).

Many of the requirements of sustainable design can be addressed through sensible siting and passive design - measures which add little or nothing to the capital cost of a scheme. The provision of sources of renewable energy will add to the capital cost of a scheme, but should be balanced with lower future energy costs and lower environmental impact.



4 Definitions, planning policy and structure

4.1 Sustainable development and the National Parks of Wales

The definition of sustainable development most commonly used and adopted by the UK government is: 'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

<http://www.sustainable-development.gov.uk/index.asp>

Building upon this definition, the National Parks of Wales have adopted the following definition: Sustainable Development in the National Parks of Wales should ensure a better quality of life, not just now but for future generations as well. It should combine protection of the environment, creation of distinctive place, sensible use of natural resources and social progress.

National and international policy supports these aims, and since devolution the Welsh Assembly Government has a duty to foster sustainable development.

Definition – Design

For the purposes of this guide and in line with Planning Policy Wales, design is taken to mean, 'a collaborative, creative, problem solving process - embracing architecture, landscape, infrastructure and urban design – that determines the quality of our environment and that can provide the basis for its sustainable future'. Tan 12, 2002

4.2 Marrying design principles, policy and design guidance

The principles of sustainable design most relevant to the National Parks of Wales, such as conservation and enhancement of local distinctiveness, have been structured and grouped in this document in a way which allows developers and their design teams to respond to sustainability through the design process. These headings were identified in a series of sustainable design workshops involving all key stakeholders in the development process, held in each of the National Parks as part of the consultation process.

Common themes that emerged during these workshops were,:

- Energy use
- Materials and resources
- Landscape and biodiversity
- Place and local distinctiveness
- Robust building

Community elements of design and matters influencing the appropriate location of development also featured strongly during the consultation workshops. However, the breadth of issues requiring consideration under this heading, for example local service provision and Welsh language considerations, are complex and varied, often extending beyond the remit of the design process and planning policy. Therefore, this guide does not attempt to replicate other existing policies and strategies which deal with these community and locational elements. Applicants are asked to refer to each National Park's Development Plan for clarification on these issues, in addition to related national policy.



5 Building our sustainable future

5.1 A lost tradition

Traditional methods of construction in the National Parks of Wales can be characterised by an understanding of the siting, form, materials and techniques. These techniques were shared locally by builders, designers and occupiers through necessity. However, with the advent of cheap energy and the ability to access materials from anywhere, these skills are less and less demonstrated today. This has resulted in the homogenisation of design between the National Parks.



5.2 Ways of building

There are dangers in the literal use of traditional and vernacular aspects of design, resulting in romanticised or nostalgic buildings. Examples of these can be found throughout the National Parks of Wales, and whilst this approach may mitigate the worst aspects of poor design, it is leading to a uniformity of building appearance in all areas.



5.3 A possible model

This guidance does not seek to propose one design solution for all areas, or promote a single type of aesthetic. However, it does promote a more thoughtful approach to the design of buildings in the National Parks of Wales. The traditions of sensible siting and orientation which make the most of the local topography to maximise sunlight and minimise exposure should be at the forefront of design practice, as should the use of locally produced and sourced sustainable materials and energy sources. This will involve changing both thinking and practice, placing responsibility on developers and designers to interpret the principles of good sustainable design to meet the demands of their site. Such an approach may also provide new training opportunities and skilled employment for local companies.



Respecting distinctiveness

"The look of Wales is becoming more uniform. Standard building types are often failing to reflect traditional local building styles."

People, places, futures: The Wales Spatial Plan

6 Principles of sustainable design

For ease of use, this guidance is structured around the key principles of sustainable design. Each section begins with the issues relating to design decisions. These are cross referenced to planning policy and establish the key stages in the design process - from strategy to detail. All sections are broadly split into three elements – the first briefly provides an introduction to the relevant issues. Secondly, the approaches that developers and designers may employ to ensure sustainable design are introduced- wherever possible these are supported by illustrative material. Thirdly, each section provides bulleted prompts for designers aimed at highlighting the key issues raised.

6.1 What is a Design Statement?

The National Park Authorities will expect the applicant to use the Design Statement as their opportunity to demonstrate:

- The design principles and concepts behind the proposal;
- How these are reflected in the development's

location, layout, density, scale, detailed design and landscape;

- How the design relates to its site and the wider context;
- How the development will meet the Development Plan design policies; and
- How the development has addressed the sustainability issues raised in this guidance. See Appendix 1 for elements to be included within the statement.

The level of detail expected will be proportionate to the scale and type of development proposed. In some cases a short written explanation may suffice, in others detailed illustrative material in plan, elevation and section may be required. They should be 'living' documents which deal with all the relevant aspects of design throughout the process and life of the development.

What will be achievable in respect of each design principle will depend on the circumstances of each scheme, its site and its setting.

Key principles of sustainable design

Key Principle	Aims
1. Energy	<ul style="list-style-type: none"> • Energy consumption and climate altering gas emissions should be minimised by good siting and best use of materials and energy sources. Use of on site or locally generated energy from renewable sources is encouraged, in line with the principles set out in national planning policy.
2. Materials and Resources	<ul style="list-style-type: none"> • Local materials from sustainable renewable sources should be used; and the use of materials from unsustainable sources and all waste in construction should be minimised. Recycled materials and secondary aggregates are also encouraged.
3. Water Use	<ul style="list-style-type: none"> • Water saving devices and sustainable drainage systems should be employed where appropriate.
4. Landscape and Biodiversity	<ul style="list-style-type: none"> • New development should enhance the quality of landscape, ecology, biodiversity and cultural heritage.
5. Place and Local Distinctiveness	<ul style="list-style-type: none"> • Distinctiveness is that quality that characterises place. Buildings and building groups should be responsive to context and local distinctiveness.
6. Robust Building	<ul style="list-style-type: none"> • Buildings should be designed to cope with climate, future needs and uses and be capable of improvement over time. Accessibility for all is also a key consideration. • A home working space should be considered for inclusion in any design as home working becomes more commonplace.



6.2 Energy

The problem defined - background and measures

At present, the majority of the UK's energy comes from burning fossil fuels, mainly for heating buildings. The UK Government aims to reduce carbon dioxide emissions by at least 60% by 2050. The guidance that follows is set in this context and is founded on two main principles: to conserve and use energy efficiently and to promote the use of appropriate renewable energy.

Designers are encouraged to undertake energy assessments for developments. Designers could use the British Research Establishment's BREEAM standard, as advocated by the Welsh Assembly Government, or other similar standards, such as the PassivHaus system. These standards will provide tangible grades of energy performance for each development.

Within the National Parks of Wales all planning applications should be accompanied by:

- A sustainable design statement.
- An integrated energy strategy as part of the design statement, which addresses both energy consumption and possible production. It should promote:
 - (1) Reducing energy demand
 - (2) Low carbon energy supply – ideally from renewable energy sources
 - (3) Appropriate renewable energy generation.

It is acknowledged that some development proposals will be for structures that use little energy, for example porches and garages. However, even small developments should seek to improve where possible a building's energy performance and improve its aesthetic qualities. Applications for new extensions must demonstrate their additional energy requirements and consider opportunities for the installation of renewable energy systems.

Prompts for designers

- Is your building sited and orientated to take advantage of solar gain and shelter?
- Has your building been designed for thermal efficiency?
- Have you carefully placed and sized openings to cater for solar gain and thermal efficiency?
- Is your building predominantly daylight?
- Does your building have adequate thermal mass?
- Can your building be detailed for ventilation and minimal air leakage?
- What measures are you taking for the provision of energy from renewable sources e.g., ground source heat pumps?
- Have you considered future energy requirements, and perhaps the building could link into a community energy project in the future?
- Flexibility in heating sources in the future, e.g. a chimney for a wood burner, space for tanks or fuel storage.
- Will the heating system be sited in the most effective place? Are you considering options to reduce heat loss – such as limiting pipe lengths?

6.2.1 Energy solutions - design principles

Heating costs can be reduced through good siting, design, adoption of ventilation principles and draught proofing. The following options should be considered as a means of improving a building's energy performance.

Passive design

This means designing with climate in mind so that a building can benefit from aspects such as solar gain (the ability of a structure to absorb the temperature from the sun), daylight and natural ventilation, whilst providing shelter and comfort inside and outside buildings. Designs must balance solar exposure with surface heat losses and internal gains. The daily and

annual movement of the sun should be considered, as solar gain's benefits can vary depending on building use and times of building occupation.

The following issues should be addressed through the design process:-

Siting

Buildings and extensions should be sited to optimise 'free' aspects of climate. These include useful solar gain, shading and sheltering, useful wind and ground conditions. Larger windows should face the south, and smaller windows to the north. Take care, however, to avoid unacceptable overlooking.

Traditionally, buildings were sited to take advantage of these aspects; the principle of 'wrap up warm and face south' is evident throughout the traditional architecture of the National Parks.

Energy use and amenity value can also be improved by considering how siting, layout and landscape may shelter buildings from cold windy conditions that often prevail in exposed elevated rural and coastal sites. Landscaping and native tree planting can be used for shelter belts.

Alternatively, having the most efficient insulation and producing electricity using renewable technology can mitigate the negative aspects of poor siting.

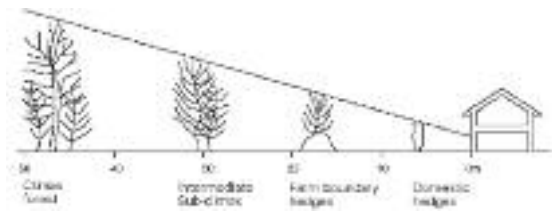
Mass

When buildings are designed to collect solar gains, though southerly facing windows, consideration must be given to the provision of adequate thermal mass in the building in order to store the solar heat during winter day time, and release it during the night. When the principle of thermal mass is used correctly it can result in a reduction of the need for heating (and cooling) systems.

Form

Whilst compact building forms are more energy efficient, this efficiency may be undone when rooms are so deep that they require mechanical ventilation and electrical lighting. Traditionally, buildings were designed to be responsive and provide comfort and efficient energy use by natural ventilation and day-lighting.

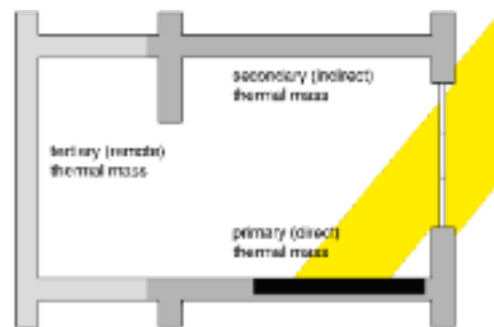
This suggests that building form and layout will be based on shallow building depths with occupants never more than 6m from an opening window. Where deeper rooms are required, the building



Vegetation: distance from vegetation and its height will affect the amount of solar gain a building receives and provide shelter from wind



Siting: buildings should be positioned to optimise free aspects of climate, such as sun, wind and topography



Thermal mass: collecting heat from solar radiation to prevent excessive temperature swings

section should be designed to enable roof or clerestory lighting.

Building envelope: walls, floors and roofs

Well insulated and well detailed building envelopes must be used to prevent heat loss. It is considered good practice to exceed the minimum standards set by building regulations. However it is also important to prevent unwanted heat gain.

In converting or retrofitting existing buildings, care must be taken to prevent loss of thermal mass. This often occurs when buildings are insulated on the inside face of masonry walls and floors.

Openings: doors and windows

Windows - As well as providing for views and daylight, windows also let a lot of heat out of the building in cold weather. Location, size and type of glazing is important.

To improve energy efficiency, smaller windows should be placed where practicable on north elevations and larger windows on southern walls. There may be exceptions to this general rule, for example offices, which need to ensure acceptable levels of daylight for employees.

Windows should ideally be double or triple-glazed with low- E glass to provide better than building regulation insulation standards. Timber window frames of adequate durability have better thermal and environmental properties than other materials used for windows.

However, installing such windows may be inadvisable in historic properties or in Conservation Areas. In such circumstances, the use of insulated shutters, coupled with secondary glazing may be advisable.



Repair

Traditional sash windows can be repaired and draught proofed by skilled craftspeople. Reusing and recycling existing windows is always advisable as it negates the use of new materials, and may conserve a building's traditional appearance.

Conservatories

While conservatories are often, but not always permitted development, it is important to note that heated, unventilated conservatories which are sited incorrectly have negative effects on energy efficiency and will therefore increase heating costs. Conservatories should be south facing with good ventilation and of timber construction.

Roof openings

Roof-lighting can be used effectively to provide daylight to deep plan buildings. Care must be taken in positioning and sizing the opening and the roof light system. Some readily available proprietary roof lighting may not be visually acceptable in Conservation Areas or prominent locations in the National Parks.

Wind towers and chimneys may be used to promote natural ventilation, but again note should be made of the possible inappropriate form of some in sensitive contexts.

Airtightness and ventilation

Ventilation systems should be designed and not rely on accidental leaks resulting from poor design. In low energy, low thermal capacity buildings unwanted air leaks can have a dramatic impact on heating costs. There must be evidence of a designed ventilation system.

Mechanical systems: heating, lighting, power

Ensure that systems are supplied with effective controls so that building users can effectively manage the energy use of the building.

Low energy lighting should be given preference alongside the installation of A-rated appliances which will contribute to reducing energy demand and costs.

6.2.2 Renewable energy

Even if the proposal is an extension or renovation, consideration should be given to energy efficiency and the installation of appropriate renewable energy systems. **All developments should consider incorporating renewable energy technologies, but what will be appropriate will depend on individual circumstances.**

Renewable energy sources:

Solar

In addition to passive solar design, there are active systems, including solar hot water (water heated by solar energy), and photovoltaic cells (which convert light to electrical energy). Solar water systems are generally mounted on south facing roofs and can largely offset the cost of hot water. Solar water heating is a cost effective renewable technology, and relatively simple to install. It is particularly useful for larger family homes or small groups of dwellings.



PV or photovoltaics need daylight to convert light energy into electric energy. Again these are ideally sited facing south and with no overshadowing. Whilst PV is currently expensive to install, prices are expected to fall, and it may be installed incrementally over time to provide more energy.

Wind

While solar energy may not be guaranteed all year round, wind power is more reliable in elevated, exposed western areas of the UK. Not all wind turbines need to be large and intrusive; small domestic installations can be quite unobtrusive. In sensitive landscapes and Conservation Areas the visual impact of masted turbines will be an issue and great care needs to be taken in siting.

For an average three bedroom home a 1.5 – 3 kw turbine will make a significant contribution to energy needs. However there are draw backs. Turbines attached to buildings can cause damage through vibration, while poorly sited turbines suffer from turbulence and intermittent air flows; this can be exacerbated in mountainous areas.

Biomass

Biomass is the term used to describe fuel derived from renewable biological sources, such as wood pellets or chips. Modern biomass boilers are efficient and easy to maintain. If biomass heating is, appropriate, designers need to consider fuel storage and the need for a specially designed flue or chimney.

Water

Generating energy through water, or hydro power, is an age-old, proven technology. Small scale hydro power has been recognised as being extremely efficient with low environmental impacts. Owing to their topography, large parts of the National Parks of Wales are ideally suited to appropriately scaled run-of-the river hydro power schemes. Micro-hydro schemes can be an attractive and cost effective means of producing electricity in areas with suitable water flow. Abstraction licences are required for hydro power schemes and potential ecological impacts need to be considered.

Heat Pumps

Heat pumps use relatively constant ground or water temperature to provide summertime cooling and winter heating through heat exchanging pipes laid underground. These heat exchangers could either be air to ground or water to ground. Once installed, they are relatively low maintenance and are best suited to under floor heating/cooling systems for new or renovated buildings.

Air Source Heat Pumps

Air source pumps require less space than ground source pumps as no underground pipes need to be installed. There are two types of air source pump: air to air heat pump and air-to-water pump. Both types transfer external air temperature to the other medium – a process with the ability to heat or cool buildings.

District Heating and Combined Heat and Power

There is scope for incorporating CHP (Combined Heat and Power) and district heating in larger development schemes. Providing heat and electricity to a development, these systems can be very efficient, provide local jobs and have huge benefits to the local economy and environment. A central boiler, for example a wood chip boiler, with distribution pipes could heat a number of dwellings.

Designing for renewable energy

	Site Characteristics	Resources and Servicing	Project Size and Function
Solar Water Systems	Not shaded by trees, buildings, hills.	Ideally roof mounted at 45° from horizontal facing due South.	Can provide up to 70% of domestic hot water. Ideal for larger residential or small groups of homes.
Solar PV	Not shaded by trees, buildings, hills.	Optimum location 45° from horizontal facing due South. Can be integrated with roof or free standing. Does not need direct sunlight.	Suitable for variety of project scales and types. Consider whole life cost and pay back times.
Wind	Exposure to wind – minimal buffering. Elevated or marine locations could be suitable. Ensure scale of installation is visually appropriate to surroundings.	Turbines vary in scale. Can be building mounted or free standing.	The first constrain is Wind availability. Further to this it depends on scale of turbine and the turbulence of available wind flow. Small, unobtrusive turbines suitable for domestic scale. Larger turbines suitable for larger scale projects or groups of housing.
Biomass Fuels	Proximity to fuel resource. Access for fuel delivery and ash removal. Space for fuel storage. New properties should be designed with chimney/flues visually appropriate to surroundings.	Reliable and preferably local source of biomass fuel: logs, wood chips, pellets, bio-diesel etc. Delivery of fuel and removal of ash waste	Depending on system used. May require a minimum energy output level to be suitable. Small projects may not have space for fuel storage.
Micro Hydro	Dependent on availability of suitable water resource,	The type of turbine suitable for a particular project will depend on the height from which the water travels (the 'head') and the flow rate of the water.	Range from a few hundred watts for domestic schemes up to around 300kW for commercial systems.
Ground source heat pumps	Adequate area which can be excavated.	Best with under floor heating system.	

Design statement requirements: Energy

Type of Development	Energy statement ³	Siting & building orientation ⁴	Renewable energy potential ⁵
Dwellings 10+	✓	✓	✓
Dwellings 3-9	✓	✓	✓
Dwellings 1-2	✓	✓	✓
Extensions	✓	✓	*
Non-Residential Major	✓	✓	✓
Non-Residential Minor	✓	✓	✓
Minerals and Waste	✓	✓	✓

6.3 Materials and resources

The problem defined - background and measures

The construction industry is a major consumer of land and raw materials and a major contributor to waste production. Around 50% of all global materials are used in construction. Building materials have an embodied energy content related to extraction, processing, manufacture, transportation, maintenance and demolition. Materials should be selected from natural, renewable or recycled resources and be locally sourced. With material wastes from construction amounting to around 400 million tonnes in the UK each year, design statements should consider waste minimisation.

Measures

Calculations demonstrating savings in embodied energy are complex. However, by taking some simple steps such as reducing site waste and selecting materials with a low embodied energy rating, a significant contribution to improving sustainability can be made. The right materials, along with correct siting can significantly cut space heating costs.

Economy in the use of land

It is important that developments are not wasteful in their use of land, and that all available land is used to enhance its sustainability, for example through energy generation, habitat creation or by providing outdoor amenity.

Re-use of existing buildings

The re-use of existing buildings is generally encouraged within the framework of national and local planning policy in order to provide development

opportunities and to sustain traditional buildings, landscape and townscape.

Design for re-cycling and modern methods of construction

Materials can be selected to ensure they can be reused or recycled in the future. Likewise, the current promotion of modern methods of construction for speed and resource efficiency may also have added value in terms of sustainability.



Straw bale and local timber: fresh uses for the 21st Century

³ **Energy Statement** – An energy statement, detailing the energy requirements of buildings, should be included with submissions. It should include a SAP rating produced by a qualified SAP assessor. Any occupiers should be provided with a written statement that informs them of all energy saving measures present within the development, and encourages them to install energy efficient household goods.

⁴ **Siting and building orientation** – layout addresses orientation. Homes facing within 45° of due South, or building design so that the majority of large windows are south facing. Ensure maximum utilisation of solar energy for lighting and solar gain. This should be clearly indicated on any plans, alongside a written explanation of how solar gain has been maximised if required.

⁵ **Renewable energy potential** – all new buildings, including extensions to living space, should consider the potential for installing renewable energy technologies.

Prompts for designers

- Can recycled or reclaimed materials from accredited sources be used?
- What proportions of the materials for your building are to be locally sourced?
- Are the materials from renewable or 'certificated' sources?
- Have you checked your contractor's waste policy?
- Have Sustainable Drainage (SUDs) principles been applied to the scheme?
- Have water-efficient appliances been specified?
- Have compost toilets or bio-digesters been considered?
- Is mains sewerage available? If on-site sewage disposal is required, what measures have been taken to address potential pollution of ground water?

Building materials

Building materials should be long lasting, locally sourced and from renewable or re-cycled sources; such materials include those salvaged from demolished buildings – this can help tie-in newly constructed buildings with their surroundings. However, such materials need to be verified to ensure they have not been removed from vulnerable buildings or stone walls.



Re-use of existing building combined with use of traditional clom walled and thatch roof extension

Local materials

Local materials have traditionally contributed to distinctiveness and sense of place. The use of local materials is to be encouraged, provided they are fit for purpose within the principles of sustainable design.

Low-impact building materials

New building materials should be selected on the basis of sustainable supply and minimal embedded energy in production and transportation. Timber is a relatively low impact, renewable material, but care must be taken that it is sourced from sustainably managed forests.

Other low-impact materials may come from natural sources for example, sheep's wool insulation, hemp

thermal insulation, turf roofs and straw bales.

Alternatively they may be derived from materials and components that are low energy in manufacture or processing.



The use of locally produced low-impact materials and new techniques may produce appropriate contemporary buildings (Coed Cymru wood store, Pembrokeshire)

Turf roofs use a waterproof membrane to allow vegetation, such as Sedum, to grow. They have many benefits including reducing heating and cooling costs, providing habitat, reducing water runoff and helping developments to blend in with the landscape.

Think very carefully before using high energy, polluting materials such as uPVC, that are not disposable or re-useable at the end of the building or component life. Such persistent, synthetic materials must be avoided. Timber and aluminium-cladding window frames could be used as a sustainable alternative.

Recycling Facilities

Each development should provide ample recycling facilities. This includes internal and external (if there is a doorstep collection) space for recycling bins and waste segregation. Bin stores will minimise the visual impact of the bins on the surrounding area and should be sited in such a way that they are easily accessible from the home and the collection site.

Materials and Waste Statement

A written statement detailing all materials to be used during construction should be provided alongside a justification of why they've been chosen – with samples if required. All materials should be sourced with sustainability in mind and recorded within the waste and minerals statement, for example; any timber used should be from a sustainable source. Lifetime costs of the materials should be considered, bearing in mind the costs of the material at all stages of its life, including maintenance and disposal/salvage. Waste minimisation during construction should be a priority and detailed measures should be included. All matters relating to on-site waste minimisation and materials selection should be discussed with contractors as soon as practical to ensure they are able to provide the necessary services.

Design statement requirements: Materials and Resources

Type of Development	Materials & Resources	
	Recycling Facilities	Materials & Waste Statement
Dwellings 10+	✓	✓
Dwellings 3-9	✓	✓
Dwellings 1-2	✓	✓
Householder		✓
Non-Residential Major	✓	✓
Non-Residential Minor	✓	✓
Minerals and Waste	✓	✓

6.4 Water

Water conservation and management

In spite of the wet temperate climate experienced in the National Parks of Wales, water remains a valuable resource. Rainwater harvesting systems to supply water for non-drinking applications should be incorporated into all schemes where possible.

Simple design measures which should be considered include:

- water efficient taps and showers and low or dual flush toilets.
- a rainwater collection system.
- Avoid specifying power showers.
- Install a 'greenwater' or 'greywater' system for flushing toilets and washing machines.

In developments where larger areas of roof or paved surfaces are planned, a sustainable urban drainage system (SUDS) should be designed to ensure controlled surface water runoff. This may be combined with a green system to help regulate water flow from the roof to the drainage system. Also, where access to mains drainage is difficult, grey water recycling and a reed bed drainage system should be considered.

Efficient reuse of water

Rainwater harvesting ('greenwater') for non-drinking purposes and a 'greywater' system (using water from dishwasher and machine washing) for toilet flushing should be considered at an early stage in the design process. Developers should provide occupiers with information on fixtures and fittings designed to reduce the use of water (e.g. dual flush toilets) and details of a rainwater harvesting and/or grey water reuse system.

SUDS

Developers should use appropriate SUDS technique to assist in containing rainfall from a 1 in 100 year storm event. Consult a hydrologist on the various options and technology available to reduce surface run-off and promote reuse. Such methods include green paving, green roofs and collection of run-off water from roofs. If appropriate, measures should be implemented within the design of the development on an individual plot basis.

Design statement requirements: Water

Type of Development	Water	
	Efficient re-use of water	SUDs
Dwellings 10+	✓	✓
Dwellings 3-9	✓	✓
Dwellings 1-2	✓	
Householder	✓	
Non-Residential Major	✓	✓
Non-Residential Minor	✓	✓
Minerals and Waste	✓	✓

6.5 Landscape and Biodiversity

Landscape

National Parks are essentially cultural landscapes. Their building blocks are provided by internationally renowned geology and natural heritage. Landforms have subsequently been moulded by millennia of human habitations – farmland, buildings and settlements, roads, hedges and walls. They are re-writable canvasses which reflect how peoples’ values and activities change and interact with the physical environment.

Buildings and settlements contribute significantly to the character of our landscapes and to the rich diversity of qualities that make them special.

Strategies for future management of the National Parks and their special landscape qualities are set out in their respective National Park Management Plans. Good building design must be sensitive to the character of its landscape setting, and must seek to enhance rather than detract from its special qualities.

Biodiversity & geodiversity

Biodiversity is the term used to describe the rich diversity and variety of life on Earth. Geodiversity describes the rocks and processes that have shaped the landforms that characterise the National Parks of Wales. Both contribute hugely to the special qualities of the National Parks.

Development has a vital role to play in the conservation and enhancement of bio and geodiversity, and ensuring continuity and enhancement of habitats will be increasingly important if species are to adapt or move in response



The National Parks contain a rich array of historic landscapes and ecologies

to climate change. Careful thought needs to be given, from design to execution, to avoiding and minimising damage to the natural environment. Opportunities for positive contributions should also be taken.

How can development have a negative impact on bio and geodiversity?

Potential negative impacts can include:

- Outright destruction or damage to semi-natural habitats, such as woodlands and flower rich meadows.
- Loss or damage to wildlife “corridors”, such as traditional field boundaries and rivers, which provide colour to our landscape and link remaining areas of semi-natural habitats, providing routes for bats, birds, small mammals and invertebrates.
- Loss or damage to geological features, for example through quarrying and landscape restoration schemes.
- Loss of traditional bat roosts and bird nesting sites through the demolition or conversion of old buildings. Disturbance to bats and nesting birds is illegal.
- Fragmentation of semi-natural habitats and wildlife corridors through the building of new roads, pipelines, etc.
- Disturbance to wildlife and the landscape quality from the introduction of lighting into a previously unlit area.

Such concerns are not limited to “greenfield” sites, as previously developed land, such as old airfields, quarries and industrial sites, can be valuable to wildlife.

Designing for bio and geodiversity: good practice and innovation

With care and understanding, new development need not result in damage to the natural environment. The application of good practice and a commitment to innovative design solutions can bring substantial benefits for bio and geodiversity.

Remember; make early contact with your National Park planners, both to ensure that you are complying with the laws protecting wildlife and for advice on making the most of your scheme.

Measures

A three point approach is proposed:

- Information – applicants should contact the Park Authority to request site information related to ecology, geology and archaeology.
- Avoidance or mitigation of harm – this is an absolute minimum measure within the National Parks.

- Design for enhancement – this is good practice and may include measures for new habitats with protection and interpretation of geology or archaeology

Designers should refer to Supplementary Planning Guidance, or other forms of guidance, for biodiversity protection and enhancement opportunities for their relevant National Park.

Prompts for designers

- First, find out which habitats, species and other features exist on the site, and if required have a professional survey carried out.
- Assess the impacts of your proposals on the natural environment, and seek guidance on how damage can be avoided or, at the very least, minimised. Retain existing trees and hedges wherever possible.
- Consider how a new or converted building could provide roosting and nesting opportunities for bats and birds. Features like dedicated bat lofts or swift nest boxes/bricks recessed into the roof space could make a significant contribution to local biodiversity.
- Consider landscaping for wildlife: planting trees and shrubs that are native to the area to augment existing trees, hedges and woodland edges, and providing sources of nectar for butterflies and insects. The result – a colourful and exciting garden, which the birds and bats will also love.
- Consider the impact of external lighting on the surrounding area, and seek out designs that minimise “backscatter” and general light pollution.
- Consider how to minimise the effect of water run-off from hard standings into ditches, rivers and streams.
- Explore ways of protecting and enhancing any habitats and geological features that are individual to your site as an integral part of the design of your scheme.
- Where exterior or street lighting is required consider how light pollution disturbance can be minimised, for example by use of a full cut off fixture and a low pressure sodium light source.

Landscape character

Demonstrate how the development contributes to landscape character and also provide a suitable landscaping scheme.

Protect and Enhance

Any harm to biodiversity should be avoided⁶. However loss of habitat can occasionally be unavoidable. In such cases any loss should be more than compensated for; these measures, for example tree planting, creating a wildflower meadow or placing of nesting boxes must be documented with appropriate evidence. Additional trees and hedgerows should be planted with appropriate native species and existing trees accommodated⁷. Green corridors⁸ must be protected and if possible enhanced. Biodiversity must also be considered at the

construction stage, and measures must be presented displaying adequate care for the environment during any particularly disruptive phases of construction.

⁶ Please consult the Countryside Council for Wales for details of protected species and habitats.

⁷ Please consult the Park Authority regarding which trees may be protected by Tree Preservation Orders. It is an offence to fell trees protected under such regulations.

⁸ Green corridors is the term used to describe the links between two different habitats used by a species, An example of a 'green corridor' could be a hedgerow, river or woodland that connect a species roosting site and its feeding ground.

Design statement requirements: Landscape and biodiversity

Type of Development	Landscape & Biodiversity	
	Landscape character	Protect & Enhance
Dwellings 10+	✓	✓
Dwellings 3-9	✓	✓
Dwellings 1-2		✓
Householder		✓
Non-Residential Major	✓	✓
Non-Residential Minor	✓	✓
Minerals and Waste	✓	✓

6.6 Place and Local Distinctiveness

'Local planning authorities have an important role in securing the conservation of the historic environment while ensuring that it accommodates and remains responsive to present-day needs. This is a key aspect of local authorities' wider sustainable development responsibilities.'

Planning Policy Wales (p.65)

The problem defined - background and measures

The design of new buildings must enhance the quality of their surroundings, being sympathetic to the immediate and wider context. This does not eliminate contemporary design; rather it should promote it.

Buildings, building groups and settlements must respond to their landscape settings and their visual,

aesthetic, historical, cultural and ecological aspects. However creating new, modern contexts can also be encouraged, by designing a modern sustainable building which differs from the historical aesthetic of an area, but contributes to the landscape and ecology.

Measures

Your Design Statement should demonstrate an integrated and inclusive approach to sustainable design, proportionate to the scale and type of development proposal. Statements should deal with all relevant aspects of design throughout the process and the life of the development, clearly stating the design principles adopted and including illustrative material in plan, elevation and section where relevant.

- **All proposed schemes should be taken through the Planning Authorities pre-application process.**

- For small scale developments, illustrated design statement must be produced dealing with form, scale, mass and materials. Applications should include scheme design drawings at an appropriate scale in the context of their surrounding landscape and adjoining buildings.
- In addition, for other developments, a comprehensive illustrated design statement must be produced dealing with form, scale, mass and materials.
- The conversion or change of use of a building must be considerate to its architectural and historical qualities.
- See matrix for further details of what needs to be included in the design statement for each development.

Prompts for designers

- Is your design responsive to context?
- Is the building visible in the landscape or townscape and what is your approach to this?
- If within a settlement or building group, how does the proposal relate to the pattern of the settlement?
- If in the countryside, how does the proposal relate to land form?
- Are the overall scale, layout, form and materials sensitive to local context?
- Think about future proofing by allowing for further incorporation of renewable energy.

Design Principles

A variety of information on settlement character may be available to help applicants in designing their schemes to ensure that they sit comfortably in their surroundings. These may include formal Village Design Statements and Conservation Area Statements and Proposals, together with LANDMAP and local landscape and settlement character statements.

LANDMAP is a national, web based information system, devised by the Countryside Council for Wales (CCW), for taking landscape into account in decision making. It presents in a structured form a great deal of information about all elements that contribute to the landscape character of a particular area, which will be invaluable to designers in preparing their schemes.

Cultural heritage

Providing development with a distinct identity may be achieved by incorporating aspects of site, landscape and ecology into design. Site specific design addresses these aspects in order to enhance rather than diminish local distinctiveness.

Patterns of historic settlement are often still evident

within existing towns and settlements. Where new buildings or groups are planned they must not obscure these patterns but should seek to enhance them. For example, within a medieval street plan, development should follow remains of burgage plots or strip fields. New development can enhance and interpret place in this way. Particular care must also be taken with proposals that may impact on Listed Buildings and their settings.

Areas in the National Parks of Wales have been identified within the 'Register of Landscapes, Parks and Gardens of Special Historic Interest'. Where new development falls within these areas it must take particular account of the identified special qualities of the landscape.

Scale, mass and form

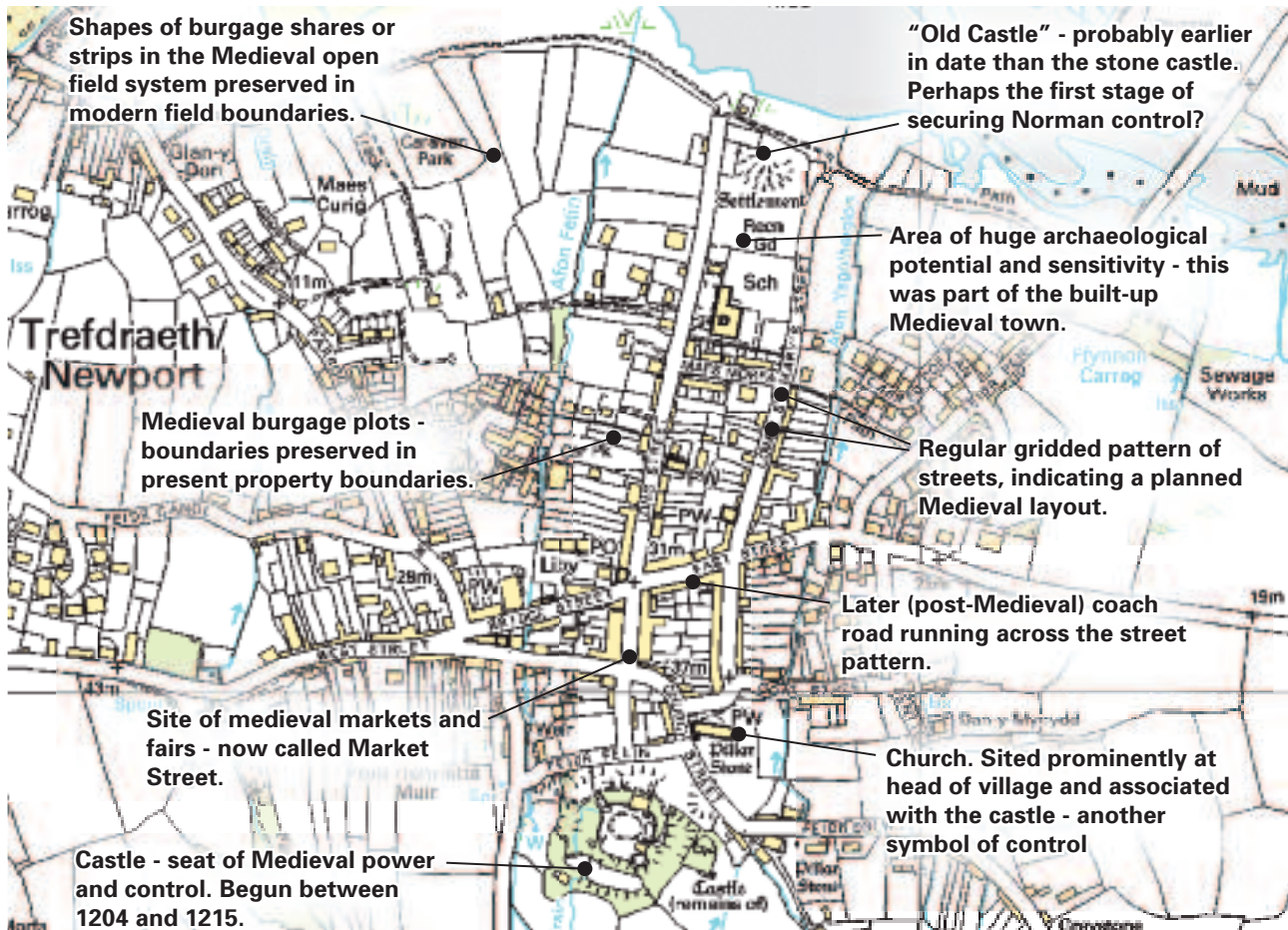
Development should respond to the physical characteristics of a site, respecting the height, sight lines, building lines, historic development patterns and orientation of development within the locality. Building heights should be considered in relation to street, courtyard or fore-court.



Scale, mass and form must be carefully judged whether designing in settlements or projects in the landscape

Continuity and enclosure

Traditionally, buildings in the National Parks have been designed to provide for security and shelter of inhabitants inside and outside the building. Building groups often rely on enclosure through buildings, walls or landscape.



Analysis of historic maps can identify patterns of settlement that should be acknowledged and respected in design proposals

Material qualities and detail

Care should be taken in choosing materials in terms of texture, colour, scale and detail. In certain contexts the visual integrity depends on the use of just one material, while others are dependent on variations in colour or a richer palette of material and detail.

Accessibility

Routes to enable clear links for pedestrians, cyclists and vehicles should be identified and designed at an early stage. Safe routes to public transport should be provided within larger developments. Whilst ease of vehicular access and car parking are important, the delicate scale and form of important settlements and landscapes are an overriding concern in the National Parks and should be respected. In designing for legibility, public space should be considered as a sequence of events, e.g. landmark, silhouette, enclosure, vista, focused view, etc.

Diversity and compactness

A mix of uses can enrich, rather than diminish the sense of place and local distinctiveness. This may be achieved horizontally in layout, and vertically with different uses at various levels.

Small rural settlements may depend on mixed uses, tenures and property types to sustain them.

Compactness in design may also help to optimise land use and provide for sense of place wherever appropriate. This should be balanced with designing for pleasant outdoor areas, including making appropriate space for trees and hedges.

Consideration of place and local distinctiveness

Include a paragraph in your Design Statement describing how the surrounding area has been considered and all measures taken to maintain the local distinctiveness of the surrounding area. The development should fit within the context of the area in which it is sited.

Provide a safe route to public transport

Where links to the public transport network are possible, every effort should be made for the development to facilitate its usage. This should include well-lit paths that can be used by people of all physical abilities to get to stops and stations, along with clear signage.

Design statement requirements: Place and local distinctiveness.

Type of Development	Place & local distinctiveness	
	Consideration of place and Local distinctiveness	Provide a safe route to public transport
Dwellings 10+	✓	✓
Dwellings 3-9	✓	✓
Dwellings 1-2	✓	
Householder	✓	
Non-Residential Major	✓	✓
Non-Residential Minor	✓	
Minerals and Waste	✓	

6.7 Robust Building

In the context of this guidance, **robustness** means 'long life - loose fit' buildings. These qualities ensure a building or development can adapt to changing needs.

Steps towards robust construction:

- In general, buildings should be designed for a long life.
- Space standards or strategies should be capable of accommodating change.
- Dwellings should pay regard to the requirements of lifetime homes.
- If they are for a deliberately short term use (eg less than 20 years) then they should be designed for re-use or re-cycling.

'The *Lifetime Homes*⁹ standard identifies 16 features designed to make homes more flexible and accessible. They include: level access to front and back doors; a car parking space that can be enlarged if necessary; wider interior hallways and doors; enough turning space for a wheelchair; easy-to-open windows with low sills; and sockets and switches at heights that are convenient to reach. The specification also ensures that handrails, hoists and lifts can be easily installed, if necessary.'

<http://www.jrf.org.uk/pressroom/releases/240297.asp>

Home working space

With increasing opportunity to work from home, providing a space for home working in each dwelling would be advantageous; it is a requirement of the Sustainable Design Matrix (Appendix 1). Working from home has many benefits, enabling family friendly working hours, reducing commuting pressures and the associated expenses and travel time.

Prompts for designers

- What is the design life of the proposed building?
- Does the quality of material and detailing match the needs of the proposed design life?
- Has potential expansion or change of use been considered in the design of the building and does the design strategy take this into account?
- Which parts of the building are permanent and which can be more easily changed?
- Consider elements of future proofing within the design.

⁹ <http://www.lifetimehomes.org.uk/>

Design for climate change

Climate change is predicted to bring more severe weather events. Therefore, the building fabric should be designed to cope with spells of hotter, wetter and windier conditions. Materials should be selected with durability and care of maintenance or replacement in mind. Buildings should be capable of adapting for passive cooling.

Efforts should be made to plan and design for climate change by:-

- preparing a Flood Consequences Assessment and mitigation through siting or design.
- Including sustainable urban drainage systems in appropriate cases.

Secured by design

All developments should be designed for neighbourhood surveillance without compromising privacy. Window and door openings should be carefully detailed for security. On larger developments the Police Architectural Liaison Officer should be consulted.

Flexibility for the Future

Encourage buildings to be built to the Lifetime Homes Standard, or at least to incorporate appropriate standards. Also consider security issues.

Health and Wellbeing

The development must provide adequate private and public open space for residents – each development must meet the National Park Authority’s standards for each dwelling.

Home working space

Plans for home working should be included; such rooms should have sufficient power sockets, telephone points and internet access points (broadband internet availability should be checked and mentioned) to allow for home working. The room should also be planned to be of sufficient size to allow a desk and storage drawers. An office may be incorporated into another room: however the kitchen, bathroom, or main bedroom is not a suitable room for home working.

Design statement requirements: Robust building.

Type of Development	Robust Building		
	Flexibility for the Future	Health & Wellbeing	Home working space
Dwellings 10+	✓	✓	✓
Dwellings 3-9	✓	✓	✓
Dwellings 1-2	✓	✓	✓
Householder	✓	✓	
Non-Residential Major	✓		
Non-Residential Minor	✓		
Minerals and Waste	✓		

Appendix 1 - The Sustainable Design Matrix

For each application, any item with a tick in the box should be considered in your Design Statement. If a development cannot meet the non-statutory requirements, you should provide clear and substantiated evidence to explain your decisions. It is advised that such steps will need to be mitigated against improvements elsewhere in the development e.g. if an aspect of biodiversity enhancement cannot be achieved, the development should strive for improved energy efficiency and waste management. However, this will not negate meeting statutory legislation, for example those relating to building regulations and biodiversity protection.

Type of Development	Energy			Materials & Resources		Water		Landscape & Biodiversity		Place & local distinctiveness		Robust Building		
	Energy statement	Siting & building orientation	Renewable target	Recycling Facilities	Materials & Waste Statement	Efficient re-use of water	SUDs	Landscape character	Protect & Enhance	Consideration of place and local distinctiveness	Provide a safe route to public transport	Flexibility for the Future	Health & Wellbeing	Home working space
Dwellings 10+	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dwellings 3-9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dwellings 1-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Householder	✓	✓	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-Residential Major	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-Residential Minor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Minerals and Waste	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Energy Statement

Provide an energy statement, detailing the energy requirements of the building and also steps taken to minimise energy use throughout. It should include a SAP rating produced by a qualified SAP assessor. The occupiers of the development should be provided with a written statement informing them of all energy saving measures present within the development, and encouraging them to install energy efficient household goods only, such as A rated kitchen utilities.

Siting and building orientation

Layout addresses orientation. Homes facing within 45° of due South, or building design so that the majority of large windows are south facing, ensure maximum utilisation of solar energy for lighting and solar gain. This should be clearly indicated on any plans, alongside a written explanation of how solar gain has been maximised, if required.

Renewables

Consider opportunities for incorporating renewable energy within the development. Extensions and other householder schemes should consider whether they can contribute to the energy needs of the main building too. Extensions should not add to the existing energy requirements of buildings. All developments should seek to facilitate the easy installation of more renewable technologies at a later date. In larger developments perhaps, a community renewable energy project could be undertaken, such as a small combined heat and power plant or hydro electricity scheme where appropriate.

Recycling Facilities

Each development should provide ample recycling facilities. This includes internal and external (if there is a doorstep collection) space for recycling bins. Bin stores will minimise the visual impact of the bins on the surrounding area and should be sited in such a way that they are easily accessible from the home and the collection site.

Materials and Waste Statement

Provide a written statement detailing the material to be used during construction (we encourage local materials, timber from certified sustainable sources and recycled/reclaimed materials). All materials should be sourced with sustainability in mind and recorded within the waste and minerals statement. Lifetime costs of the materials should be considered, bearing in mind the costs of the material at all stages of its life, including maintenance and disposal/salvage. The Lifecycle in terms of

environmental impact should also be considered and documented. The materials section should also set out what options have been considered and explain why the chosen materials were selected. Waste minimisation during construction should be a priority and detailed measures should be included. A list of materials and techniques should be included, with samples if required. Using the 'considerate constructors' scheme is encouraged. All matters relating to on-site waste minimisation and materials selection should be discussed with contractors as soon as practical to ensure they are able to provide the services.

Efficient reuse of water

Rainwater harvesting ('greenwater') for non-drinking purposes and a 'greywater' system (using water from dishwasher and machine washing) for toilet flushing should be considered at an early stage. Developers should provide occupiers with information of fixtures and fittings designed to reduce the use of water (e.g. dual flush toilets) and details of a rainwater harvesting and/or grey water reuse system.

SUDs

Developers will use appropriate SUDs technique to assist in containing rainfall from a 1 in 100 year event. Consult a hydrologist on the various options and technology available to reduce surface run-off and promote reuse. Such methods include green paving, green roofs and collection of run-off water from roofs. If appropriate measures should be implemented within the design of the development on an individual plot basis.

Landscape character

Demonstrate how the development contributes to landscape character and also provide a suitable landscaping scheme agreed with the LPA.

Protect and Enhance

Any harm to biodiversity should be avoided¹⁰. Where loss of habitat is unavoidable any loss should be more than compensated for; through measures such as tree planting, creating a wildflower meadow or placing of nesting boxes, which must be documented with appropriate evidence. Existing trees should be retained and additional trees and hedgerows should be planted with appropriate native species¹¹. Green corridors¹² must be protected and if possible enhanced. Biodiversity must also be considered at the construction stage, and measures must be presented displaying adequate care for the environment during any particularly disruptive phases of construction.

Consideration of place and local distinctiveness

Include a paragraph in your design statement describing how the surrounding area has been considered and all measures taken to maintain the local distinctiveness of the surrounding area. The development should fit within the context of the area in which it is sited.

Provide a safe route to public transport

Where links to the public transport network are possible, every effort should be made for the development to facilitate their use. This should include well-lit paths that can be used by people of all physical abilities to get to stops and stations, along with clear signage.

Flexibility for the Future

Encourage buildings to be built to the Lifetime Homes Standard or at least to incorporate appropriate standards. Also consider security issues.

Health and Wellbeing

The development must provide adequate private and public open space for residents – each development must meet the National Park Authority's standards for each dwelling.

Home working space

Plans for home working should be included: such rooms should have sufficient power sockets, telephone points and internet access points (broadband internet availability should be checked and mentioned) to allow for home working. The room should also be planned to be of sufficient size to allow a desk and storage drawers. An office may be incorporated into another room; however the kitchen, bathroom, or main bedroom is not a suitable room for home working.

¹⁰ Please consult the Countryside Council for Wales for details of protected species and habitats.

¹¹ Please consult the Authority regarding which trees may be protected by Tree Preservation Orders. It is an offence to fell trees protected under such regulations.

¹² Green corridors is the term used to describe the links between two different habitats used by a species. An example of a 'green corridor' could be a hedgerow, river or woodland that connect a species roosting site and their feeding ground.