

**Joint Unitary
Development Plan**
FOR Pembrokeshire 2000-2016

Supplementary Planning Guidance
***Building in a
Sustainable Way***

**Adopted by Pembrokeshire County Council
5th December 2005**



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I. INTRODUCTION

This document entitled 'Building in a Sustainable Way' is adopted as Supplementary Planning Guidance by Pembrokeshire County Council in order to promote sustainable development. It is aimed at encouraging developers and applicants to consider sustainable development from the earliest stage of the design process and go beyond minimum standards.

Definition of Sustainable Development

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

1987 World Commission on Environment and Development

The guidance seeks to secure greater environmental sustainability in all new developments, refurbishments and alterations to existing buildings. Sustainability in relation to minerals and waste developments will be dealt with in a separate Supplementary Planning Guidance document.

The guidance is not prescriptive. It develops the principles and requirements of sustainable development, but recognizes that the suitability of sustainability measures will vary depending upon the site characteristics, individual circumstances and available technology. The Development Control system by itself cannot achieve sustainability. Many aspects of sustainable design are requirements of building regulations, however they are minimum standards and the Welsh Assembly Government encourages developers,

particularly with regard to energy efficiency, to exceed those requirements. It is therefore important that planning officers, building control officers, and applicants work together to ensure sustainable practices are incorporated in to every aspect of construction. Whilst planning conditions and planning obligations can include many sustainability-related requirements such as use of design details, materials, traffic controls and the provision of facilities this SPG seeks to raise awareness of all the factors that can help improve the sustainability of a proposal.

This guide is supplementary to the relevant policies of the adopted Joint Unitary Development Plan (JUDP) (see appendix I for a list of relevant policies from the JUDP). This Supplementary Planning Guidance entitled 'Building in a Sustainable Way' will form a material consideration in the determination of planning applications by the Authority and so it is important for applicants to show that regard has been given to the contents of this guidance in proposals. It will be used along with national guidance, development plan policies and other supplementary planning guidance documents.

This guidance only applies to areas of Pembrokeshire which are outside of the National Park.

1.1

Policy Context

European and National Context

The Kyoto Protocol 1997 achieved commitment from developed countries to make legally binding reductions in their greenhouse gas emissions in order to address climate change. The European Union introduced a Strategy for Sustainable Development, together with numerous directives to address environmental issues in development: for example, Environmental Impact Assessment.

Under Part 3, Section 39 of the Planning and Compulsory Purchase Act 2004, the National Assembly for Wales and the County Council, as the local planning authority, are obligated to contribute to the achievement of sustainable development in relation to the Wales Spatial Plan or a Local Development Plan.

The Welsh Assembly has a duty under Section 121 of the Government of Wales Act (1998) to establish a scheme setting out proposals for the promotion of sustainable development in the exercise of the Assembly. Wales is one of very few Governments in the World to have such a constitutional duty. The Welsh Assembly Government's Sustainable Development Scheme 'Learning to Live Differently' (2000) has also committed the Assembly to promoting sustainable development. 'Plan for Wales' (2001) establishes the Assembly Government's priorities and targets which is underpinned by the principles of sustainable development.

This commitment to sustainable development is reflected in Planning Policy Wales (2003). Paragraph 2.1.1 states that "the Assembly will promote sustainable development, that is, development that

meets the needs of the present without compromising the ability of future generations to meet their own needs". Welsh Assembly Government guidance emphasizes the role of good design. Section 2.9 in Planning Policy Wales (2003) addresses the promotion of sustainability through good design. Paragraph 2.9.1 states; "good design can protect the environment and enhance its quality, help to attract business and investment, promote social inclusion and improve the quality of life".

Sustainable development is not solely concerned with the environment, but considers economic, social and environmental concerns and their interconnections. Sustainable development seeks to pursue a better quality of life for everyone, now and for future generations. An investment in sustainable design and construction will produce major savings over the life of a building by maintaining its attractiveness, increasing its longevity and reducing maintenance and running costs.

The UK Government's Sustainable Development Strategy entitled A Better Quality of Life (1999) and the Welsh Assembly's Sustainable Development Scheme, sets out 4 main aims of sustainable development:

- Social progress that meets the needs of everyone
- Effective protection of the environment
- Prudent use of natural resources
- Maintenance of high and stable levels of economic growth and employment

Planning Policy (Wales) states the planning system in Wales has a fundamental role in delivering sustainable development.

Development Plan Policies

This guidance is supplementary to the policies in the adopted JUDP.

The promotion of sustainable development is referred to throughout the emerging Joint Unitary Development Plan (JUDP). The JUDP is committed to the promotion of sustainable patterns of development as well as encouraging the sustainable design and construction of developments. In particular this guidance complements policy 76 in the JUDP entitled 'Design', but a number of other policies from the JUDP are also complemented. See appendix I for a full list of relevant JUDP policies.

1.2

The Importance of the Building Industry in Promoting Sustainable Development.

This guide has been produced in order to assist the construction of sustainable buildings. Climate change threatens the UK with increased risk of drought and flooding and predicted rise in temperatures. It is recognised that greenhouse gases are one of the main contributors to climate change, therefore the Government has committed to reducing the production of greenhouse gases, and in particular carbon dioxide. Nearly 50% of UK carbon emissions are from energy use in buildings. Sustainably located, designed and constructed buildings can play an important role in reducing carbon dioxide emissions.

Possible impacts of climate change include greater rainfall and increased risk of flooding which has an impact upon the

location of buildings and the way they are constructed. The predicted increase in temperatures will also change the way buildings are constructed. Buildings can maximise passive solar gain, but in order to reduce the risk of overheating during summer months adequate natural ventilation and natural shading must be incorporated into the design.

The design or layout of a building or site can minimise the energy requirements of the occupants, reducing the need for the use of finite energy resources, such as coal and oil, and minimising greenhouse gas emissions produced through the burning of fossil fuels. The incorporation of renewable energy sources within a development can provide energy without diminishing fossil fuel resources or contributing to greenhouse gas emissions. New buildings can considerably impact on natural resources such as the use of timber, building materials, land and water. Households use more than half the total water supplied. Giving consideration to the provision of water saving, recycling and storage equipment at the design stage facilitates a reduction in water usage by the occupiers. Construction contributes 30% of the country's waste. Buildings define our environment and the majority of the travel we do is between buildings. The successful integration of existing and newly created wildlife habitats into development schemes such as the use of ponds in sustainable drainage schemes can help achieve an attractive environment and can also play a key role in reducing pollution and flooding.

Building Regulations Part L deal with the conservation of fuel and power and developers will need to comply with these

regulations if building a new dwelling or a large extension. Developers are reminded that building regulations lay down minimum rather than maximum standards and are encouraged to build to a higher standard than set down in the regulations.

1.3 Applying for Planning Permission

Pembrokeshire County Council is committed to the promotion of sustainable development. Applicants seeking planning permission will be expected to demonstrate how they intend to minimise the environmental impact of a proposal. For proposals to build less than 10 dwellings and for non-domestic buildings under 1000 square metres a sustainable development checklist will be attached to planning application forms for applicants to complete. Proposals for developments of 10 or more dwellings are encouraged to submit a more detailed assessment with their planning application, in the form of an EcoHomes Assessment (prepared by the Building Research Establishment or a (BRE) accredited assessor). Non-domestic development over 1000 square metres will require an Energy Design Advice Report (prepared by the Carbon Trust Wales – see section 3 for further information). A response to that report describing how the proposal has taken account of its recommendations should also accompany the planning application. Applicants are also encouraged to include a BREEAM assessment (see section 3 for further information). In addition to the checklist, where a design statement is requested by the Authority it must include information on how the proposal will meet the requirements and advice set out in this Supplementary

Planning Guidance. An EcoHomes assessment or Energy Design Advice Report can be incorporated into the design statement.

The checklist (see appendix 2) is a practical way of testing the sustainability of proposals, by assessing them against key sustainability objectives and criteria. In cases where applications are not considered sustainable, applicants will need to be able to justify why sustainability measures were not considered in their proposal. The Energy Savings Trust's Energy Efficiency Best Practice in Housing Programme provides training on energy efficiency in housing developments and the Trust also provides a design advice service for larger housing schemes.

Developers/house builders can seek advice from these organisations when considering any proposal.

2. CHARACTERISTICS OF SUSTAINABLE BUILDING

For a building or development to be more sustainable, the social, economic and environmental issues must be addressed at the early site analysis and concept planning stage of a project as well as throughout the design and specification process. Attention to sustainable measures at an early stage is vital, because environmentally friendly detailing and specification cannot redeem a scheme if the basic concept has not addressed sustainability issues. Incorporating sustainable design into a building at the earliest stage will also reduce costs by enabling economies of scale for instance through bulk buying fittings and materials. The Building Research Establishment (BRE) estimates that the cost of achieving the highest, "Excellent" standard can cost between £1800 and £3000 per property. The average price of a house sold in Pembrokeshire in Oct - Dec 2004 was £160,833. Therefore construction costs would add between 1.1% and 1.8% to the average price. These costs are not regarded as insignificant, however, the cost is offset by the long term savings in energy and water efficiency. Not all buildings or developments will be able to meet all of the criteria. It may be inappropriate for some historic buildings to meet some of the criteria, nevertheless, the issues listed in this Supplementary Planning Guidance are wide ranging and will make a contribution to improving quality in the built environment as well as to wider sustainability issues.

2.1

Location

Development should seek to locate wherever possible in accessible locations, in order to minimise the need to travel.

Development should:

- Locate close to public transport facilities
- Provide access to shops and services within walking distance
- Provide access to cyclists
- Improve the environment for pedestrians
- Be accessible to people with disabilities

Climate change threatens the UK with increased flood risk. New development on land at risk from subsidence, coastal erosion or in flood risk areas such as on flood plains will not be permitted.

Where possible priority should be given to development on previously developed or brownfield land. Brownfield development has the following advantages:

- Reduces pressure on undeveloped greenfield land;
- Ensures development occurs in accessible locations near facilities and services;
- Utilises existing infrastructure and improves viability of public transport and other sustainable forms of transport such as walking and cycling;
- Assists social and economic regeneration;
- Enhances the appearance and image of towns;

- Promotes social inclusion as everyone has access to goods and services;
- Integrates working and living;
- Enables the reuse of materials where alternative use of existing buildings is no longer viable.

Where land is contaminated, a site assessment is required to show the nature and extent of contamination and satisfactory remedial works must be carried out prior to development commencing.

2.2 Mixed Use Development

Development incorporating a range of uses can provide a number of potential advantages in terms of energy efficiency and a reduction in the need to travel with opportunities for people to live, work and shop in one location. Mixed use development can make Combined Heat and Power (CHP) more viable due to different patterns of energy demand from the various users. For further information on CHP see section 2.9.

Development that integrates affordable, public and private sector housing can provide a variety of dwelling types, size and affordability, which can result in a robust, sustainable development with the following advantages:

- Increased vitality and viability of development;
- Increased natural surveillance throughout the day and night;
- Contribution to the creation of communities and social inclusion.

2.3 Sustainable travel

Proposals should, where possible, ensure development is accessible by sustainable forms of transport in order to decrease reliance on the private car. Promoting walking and cycling can provide health, financial and environmental benefits. The following is a list of considerations that can help assess, or improve, sustainability in transport terms:

Public Transport

The location and proximity to public transport is key to minimising car dependence;

Cycling

- Direct and safe cycle routes can link housing to employment, services and facilities;
- Provision of secure, covered, well lit cycle storage in convenient locations close to building entrances or inside buildings;

Walking

- Convenient, permeable and prominent pedestrian points in terms of signage, lighting and gradients;
- Minimal walking distances along desired routes;

Private Cars and Motorcycles

- Provision of appropriate levels of car parking provision in accordance with parking standards adopted by Pembrokeshire County Council.

- Speed reduction measures increase opportunities for pedestrians, cyclists and public transport. Measures that lower traffic speed contribute to the creation of safe places and reduce carbon dioxide emissions.
- For development proposals that would result in large numbers of people commuting and/or lead to local traffic problems, for instance new businesses, hospitals and schools, a green travel plan should be submitted with an application. A green travel plan can help to maximise the use of public transport, cycling and walking and use of alternatively fuelled vehicles where appropriate.

Home Zones

- Consider the introduction of Home Zones in residential streets. In a Home Zone the road space is shared between drivers of motor vehicles and other road users, with the wider needs of residents (including people who walk and cycle, the elderly and children) being accommodated.

Advantages of Home Zones:

- Contribution to highway safety.
- Encourages more people to use the street on foot or bicycle.
- Changes the perception of how the street environment can be used and allows greater scope for a wider range of activities in the street space that was formerly considered to be for exclusive use by vehicles.
- Transforms streets into a valued public space thus promoting

neighbourliness, fosters a sense of community and reduces social exclusion.

- Greater use of street space leads to an increase in natural surveillance and acts as a deterrent to crime.
- Potential to reduce congestion, noise pollution and improve air quality.

For more information see www.homezonenews.org.uk/

2.4 Site Planning

Careful consideration of the setting of development is vital in order to produce a development that is appropriate to the surrounding area. Using the features of the existing site to enhance the development will not only save money but also provide a more environmentally sensitive or sustainable response. A site context appraisal can help produce a development which is appropriate to its context. Elements of a site context appraisal can include:

- Ensuring the proposed building is appropriately orientated and sensitive to the natural features and microclimate of the site;
- Taking account of how the development relates to an existing settlement or important surrounding historic features or landscape. An assessment of the historic landscape should inform the choice of site and nature of development;

- Assessing the site's microclimatic character, taking into account exposure, shelter, natural shading of buildings, interaction of buildings, solar access through the seasons, atmospheric pollution, water and drainage and noise gradients across the site. This gives a basic picture of the qualities of the site and its potential;
- Minimising earth movements and excavations where possible in order to respect natural drainage systems;
- Minimising damage to the landscape and destruction of wildlife habitats;
- Respecting ground water levels and designing to manage surface water through natural processes (See section 2.11 for further information).
- Enlarge south facing windows. North facing windows should be kept to a minimum to provide for natural lighting and ventilation only.
- Locate main habitable rooms to the south side of the dwelling and the hallway, stairs, storage space, bathroom and kitchen to the north.
- Provide shelter from northerly winds. Avoid layouts that intensify wind tunnel effects or create frost traps.
- Consider overshadowing from buildings, trees and landscaping to achieve a balance between allowing passive solar gain but preventing overheating.

2.5 Building Orientation

Development that maximises natural sunlight and passive solar gain can reduce the need for additional lighting and heating, thus reducing the demands for energy. The following options can reduce demand for energy:

- Where appropriate orientate new buildings up to 30 degrees either side of south, to optimize solar hot water systems and reduce energy consumption by as much as 18%.
- Passive solar design tends to produce layouts whereby terraces are orientated on an E-W axis; detached or semi-detached dwellings can be located on N-S roads.

2.6 Building Density, Form and Height

Buildings should be designed to be appropriate in their context and take account of the surrounding buildings density, form and height.

This can be achieved by:

- Making efficient use of land by developing to a higher density, whilst still providing adequate amenity space.
- Designing to reduce the surface area for heat transfer through the building fabric by avoiding elongated thin forms, or spread out single stories and using compact forms.
- Linking buildings or attaching conservatories, garages, and porches to act as a thermal buffer and reduce heat loss from buildings.
- Considering building form and height to avoid the reliance on, or

the unnecessary use of lifts subject to encouraging the full use of buildings and meeting the needs of people with mobility problems.

- Designing roof overhangs to influence solar gain. Overhangs shade a house from excessive solar gain in the summer and allow sufficient sunlight to enter the building during winter months when the sun is lower.

2.7

Lighting

The use of natural lighting where possible can contribute to the creation of healthy buildings and reduce demand for energy.

- Consider the use of atria and light wells and sun tubes to maximise natural light.
- Time and intensity controlled lighting rather than general illumination can avoid unnecessary use, waste of energy and light pollution.
- Consider using low energy lighting such as compact fluorescent and LEDs (Light Emitting Diodes); compact fluorescent bulbs are readily available in many conventional bulb shapes and styles - an 11 Watt compact fluorescent bulb provides the equivalent light output to a 100 Watt tungsten bulb. LEDs are a relatively new technology in the mass lighting market and they consume less than 1 Watt per fitting. Compact fluorescent fittings last up to 10 times longer than conventional tungsten bulbs and LEDs have a life of 100,000 hours - it is unlikely an LED fitting

would have to be replaced during a lifetime of occupation, thus making significant savings in maintenance costs.

- Light coloured finishes improve lighting conditions and reduce the intensity of light required.
- External lighting provides a secure environment whilst avoiding light pollution and visual clutter through unnecessary lighting columns.

2.8

Ventilation

Proper ventilation maintains the circulation of fresh air, thus preventing the accumulation of damp and mould.

Ventilation can maintain healthy conditions, control humidity, reduce dust mites and disperse pollution. Where possible maximise natural ventilation, which uses the passive stack effect and pressure differentials to bring in cool fresh air from the outside through the building without the use of mechanical systems.

- Naturally ventilated buildings must incorporate openable windows with trickle vents and other means of outdoor air intakers including roof-mounted 'windcatchers' to include vertical and horizontal air flow. These measures can reduce demand for air conditioning and mechanical ventilation.
- Consider the interaction between energy and ventilation strategies to balance potentially conflicting demand.
- Where mechanical ventilation is required select a low energy mechanical system. Mechanical ventilation systems with heat recovery are used to filter, dry and

pre-warm air before circulating throughout a building.

- Minimise the use of air conditioning. Avoid the use of wet cooling where air conditioning is installed. Specify low energy, high efficiency plant, fittings and appliances.
- Plants and water provide air filtration and air conditioning. Water features can cool and plants provide filters improving air quality.

2.9

Heating and Insulation

A warm building is important to maintain comfortable, healthy living conditions. To enable optimum efficiency of heating use the smallest appropriate heating system. Install high efficiency fully modulating condensing boilers, which are about 90 per cent efficient, compared to standard boilers, which are approximately 70 per cent efficient. Avoid heating rooms unnecessarily and fit timers and individual radiator thermostats. Insulation is typically cheaper than energy provision in the medium to longer term, especially when designed into construction.

Numerous measures can be adopted in order to ensure a building is well insulated and can provide many benefits in terms of energy and cost savings. The list below gives some examples of what can be done to conserve energy:

- Lag hot water pipes, valves and hot water tanks to a high specification.
- Ensure loft and roof space is well insulated; consider sustainable natural fibre insulation products such as flax or sheep's wool.

- Insulate floors and cavity walls with blown fibre, flax, sheep's wool or recycled treated paper. Foam is not considered as sustainable.
- Fit double or triple glazed windows with low emissivity glass to reduce heat loss. In historic buildings it is preferable to fit secondary glazing.
- Incorporate high quality glazing to reduce unwanted solar gain.
- Consider using timber window frames which have good thermal resistance and are from renewable sources.
- Doors and windows can be draught proofed.
- The use of blinds, curtains and shutters can reduce heat loss.
- The incorporation of porches or air lobbies can prevent heat loss from buildings.
- Compact forms of development and flats, terraced and linked buildings reduce the external surface area for heat loss. Buildings and adjoining walls in link buildings can be sound proofed.

Consider renewable heating provision. Wood fired or wood derived fuel is an attractive option for heating with high efficiency and benefits to the local economy. Where appropriate, solar panels should be considered in all new buildings to provide hot water (see section 2.10 for further information).

**2.10
Energy**

Consider the incorporation of renewable energy sources in schemes. All planning applications for buildings of 1000 square metres or over, except housing, must be accompanied by an Energy Design Advice (or equivalent) report, as required by Technical Advice Note 8 entitled 'Renewable Energy'. Consider the most economical fuel for supplementary heating and maximise the efficiency of conversion and distribution.

- Where appropriate consider CHP (Combined Heat and Power) at micro level or as district heating schemes. A CHP plant is an installation where there is simultaneous generation of usable heat and power (usually electricity) in a single process. CHP schemes use the waste heat generated during the production of electricity to heat or cool buildings. CHP works best in mixed use developments where there are a number of energy and heat demands throughout the day that require a constant supply. These installations require specialist advice during the design phase.
- Solar panels can be installed on pitched roofs facing up to 40 degrees south. Solar water heating roof panels absorb solar radiation to heat water. A typical installed system can provide 30-50% of hot water needs over a year. Systems are long lasting and require little maintenance. Solar panels are appropriate for all types of residential development other than in circumstances where visual impact is critically damaging to a listed building, ancient monument or a conservation area vista.
- Photovoltaic cells convert solar energy into electricity. These can be incorporated on buildings as tiles, cladding or other roof covering. Photovoltaics may be appropriate for installation in office, retail (particularly larger supermarkets selling food) and industrial developments. Electricity generated can be stored in batteries, powered direct to some appliances or incorporated into the National Grid supply. Designing solar and photovoltaic panels into a scheme rather than retrofitting and achieving economies of scale on large schemes will reduce the costs of these features and grants may also be available.
- Small wind turbines can be installed on the roofs of houses to harness wind and generate electricity. Vibration from wind turbines should not be transmitted to habitable rooms. Medium sized turbines can generate an average of 15kWh per day, which is equivalent to an average household consumption.
- Ground source heat pumps (GSHPs) employ a geothermal resource – the ground, groundwater, or surface water – as both a heat source and sink. GSHPs use a reversible refrigeration cycle to provide either space heating or cooling. (A heat sink is a body of air or liquid to which heat can be transferred).
- Biomass is plant matter such as trees, grasses, agricultural crops or other biological material. The material can be burned to produce electrical power. Biomass generates about the same amount of carbon dioxide as fossil fuels, but every time a new plant grows, carbon dioxide is

removed from the atmosphere. The net emission of carbon dioxide will be zero as long as plants continue to be replenished for biomass energy purposes. Producing crops creates employment in the agricultural sector.

altering the ecology of watercourses and damaging established habitats through sudden increases in water flow. Surface water runoff can be prevented by the minimal use of impermeable, hard surfaces such as tarmac and concrete.

2.11 Water Conservation

Consider how best to conserve water resources and recycle water resources. Water consumption can be reduced by as much as a third with relatively simple measures:

- Use of efficient appliances which conserve water.
- Low flush or dual flush WCs.
- Waterless wall mounted urinals in commercial male toilet application require no water for flushing.
- Installation of flow restrictors, push taps or spray taps with automatic cut off.
- Install showers, but avoid power showers.
- Grey water/rainwater collection can be used for toilet flushing.
- A reed bed system for foul water treatment.
- Collection of rainwater for garden irrigation, car washing or air cooling.
- Water metering systems raise awareness of water use.
- Provision of water butts enable rainwater harvesting.

2.12 Sustainable Drainage

Surface water runoff can damage the environment by increasing pollution, the risk of flooding, reducing groundwater levels to the detriment of vegetation,

Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as Sustainable Urban Drainage Systems (SUDS). Technical Advice Note 15 entitled 'Development and Flood Risk' requires that SUDS be implemented in new developments wherever they will be effective. The overall objective of SUDS is to return excess surface water to the natural water cycle with minimal adverse impact on people and the environment. They reduce the potential for flooding and provide an opportunity for improved water quality and environmental enhancements such as wildlife habitats and landscape quality.

The main aims of SUDS is to:

- Manage the quantity of surface water runoff, reducing the impact of urbanisation on flooding.
- Slow the velocity of runoff to allow settlement filtering and infiltration.
- Protect or enhance water quality by providing treatment to collected surface water.
- Control the discharge of surface water into the subsoil or a watercourse.
- SUDS involve a move away from traditional piped systems and generally involve physical structures or devices built to receive surface water runoff.

A range of sustainable drainage options should be considered early in the design process:

- Capture water near the source to enable reuse or allow direct filtration into the ground e.g. rainwater reuse, soakaways.
- Permeable conveyance systems allow slow transfer of run-off water towards a watercourse allowing storage, filtering and some loss through evaporation and infiltration e.g. French drains and swales. Swales are broad, shallow grass ditches with gently sloping sides that reduce the flow of water and allow the settlement and infiltration of potential pollutants.
- Passive treatment systems use natural processes to remove and break down pollutants from surface water run-off e.g. reed beds, ponds and wetlands.

2.13

Landscape and Biodiversity

Landscape considerations are an integral part of the design process and should be a key design consideration at the outset of a development. Where possible retain and incorporate existing trees and hedgerows into the development. Opportunities for new planting on walls and roofs of buildings and between buildings should be maximised. High standards of landscaping are encouraged. However landscaping must be compatible with the objective of designing out crime and the creation of hiding places avoided.

Landscaping can:

- Increase habitats for wildlife and promote biodiversity.
- Provide shelter from severe winds and provide shading if suitably located.
- Filter out dust, pollutants and even viruses.
- Protect building materials by absorbing wind, ultra-violet radiation and rain.
- Enhance the local microclimate, provide shelter, shade and reduce surface water run-off.
- Provide movement, contrast, colour and seasonal interest.
- Enclose and enhance public open space and improve the visual amenity of the area.
- Provide thermal and acoustic insulation.

When refurbishing old buildings check whether bats are using the roof space as a roost. All species of bat in Britain are protected by law. It is illegal to disturb bats when they are roosting, and illegal to obstruct, damage or destroy the places where bats live. Nesting cavities for birds as well as bat roosts can be designed into structures. Further information is available from the Council's Ecologist.

The historic landscape and environment is a fragile, finite and non-renewable resource that needs to be considered in a sustainable way. Ancient monuments, the setting of ancient monuments and historic landscapes should be protected. Disturbance to archaeological remains above or below ground should be avoided.

2.14 Design Out Crime

Consider how opportunity for crime can be designed out of the development. Development designed to resist crimes such as burglary, vandalism and graffiti means less damage and less replacement and repair. The following design considerations can help.

- Maximise natural surveillance whilst maintaining adequate privacy.
- Ensure ownership of all spaces.
- Mix house types, sizes and affordability to secure occupation at different times of the day and provide natural surveillance by neighbours.
- Ensure fronts of houses are overlooked and entrances are visible from the main road.
- Install door and window locks.
- Locate public spaces in areas overlooked by neighbouring dwellings and visible from the highway.
- Vulnerable areas such as side and rear gardens need defensible barriers with walls or fencing. Enclose and interlock rear gardens. Avoid dwellings backing onto open space or footpaths.
- Dwellings with in-curtilage car parking arrangements are preferred. Where communal car parking areas are necessary they should be in small groups, close to and preferably within view from the owner's premises.
- Use directed lighting to increase security and reduce light pollution.
- Footpaths and cycleways should be clear of hiding places, well lit and direct.

- Landscape design should avoid the creation of potential hiding places or observation places. Thorn, rose and bramble hedges deter intruders.
- Avoid the creation of windowless elevations and blank walls adjacent to space to which the public have access. Do not create blind corners or hiding places.

For further information on designing out crime see www.securedbydesign.com

2.15 Flexible and Adaptable Buildings

Buildings can be designed for a long life, with ease of maintenance and adaptability to changing needs incorporated. Buildings must be accessible to all and consider the needs of those with visual and hearing impairments, those with limited mobility such as wheelchair users, elderly people and people with young children. Plan the building layout to facilitate future changes in requirements, possible expansion, sub division and future uses. Pitched roofs have potential to create additional rooms. Allow space for work at home, adequate amenity space and also land for services to be provided (e.g. food, waste processing). Flexibility will enable the building to be used for other uses subsequently. In housing 'Lifetime Homes' incorporate design standards which help to ensure that a home can meet the varying needs of different occupants in the same house or the changing needs through one family's lifetime.

For more information on Lifetime Homes visit www.jrf.org.uk

2.16

Materials

Consideration can be given to the source of the materials since transportation adds considerably to the impacts. Where possible locally sourced natural materials should be used in construction in order to minimise the amount of travel and pollution emitted into the atmosphere. This embodied energy needs to be taken into account in considering the energy use of the building over its lifetime. The use of a proportion of recycled materials in construction protects natural resources and limits the amount of material going to landfill. Buildings can be designed with deconstruction in mind and maximise use of recyclable materials by:

- Avoiding over-designed structures, footings, etc that may result in a waste of materials. Consider alternative foundation and structures where appropriate;
- Minimising the use of chemicals and hazardous materials and take advice concerning less toxic or more specific alternatives. Non polluting materials create a healthier environment (for further information see www.bre.co.uk);
- Designing for breathability to allow for the migration of water vapour through the component structure from the internal space to the external, controls the internal humidity;
- Using prefabricated and factory made components which reduces dust contamination on site;
- Maximising use of natural, locally sourced materials;
- Using timber with the Forest Stewardship Council trademark which guarantees the materials are from sustainably managed forests or timber from sustainable local sources;
- Installing timber window frames which have good thermal resistance and low emissivity glass reduces heat loss. Low emissivity glazing is double glazing where the outer pane is coated with a transparent layer that reflects back radiated heat;
- Ensuring external cladding on buildings takes account of the economic and environmental cost of power-washing buildings. Cladding that traps dirt should be avoided;
- Minimising construction waste;
- Allocating space for the future recycling of rubbish from the building, such as paper and glass, and a composting facility where appropriate;

Materials are also important in defining the look of a building and its elements, are critical in Conservation Areas and on Listed Buildings. Choose materials which are appropriate to the building's context and local vernacular. As well as aesthetic considerations there are issues about cost, durability, function, maintenance and availability. The Council, under JUDP policy wishes to encourage the use of materials that cause the least environmental impact. The Council will be guided by the Building Research Establishment's Green Guide to Specification (1998). This study evaluates the impact of different materials against a number of environmental issues. The Council will encourage materials, wherever possible, that have an 'A' rating in the guide. BREEAM credits those buildings where 80% by area of the main building elements score an 'A' rating.

**2.17
Waste**

The design of a building is critical to ensure that sustainable waste management can be achieved. Integration of sustainable waste management principles into design includes:

- Prefabricated components minimise waste generated on site
- Excavation earth should be used locally (preferably on site) not dumped
- Flexible design ensures a building can be reused more readily, has a longer lifespan and reduces the need for major refurbishment
- Provide storage and recycling facilities such as recycling bins or composting areas. In residential housing estates a central recycling facility should be provided.
- Provide a composting facility in properties with gardens or landscaped space

The protocol can be viewed at www.ice.org.uk. Developers should consider how they can:

- Reuse materials arising from demolition on site and use recycled materials brought in from sites in the local area.

**2.18
Re-use and recycle materials**

The processes involved in the production of construction materials will often have environmental implications. Many materials are quarried, others involve high energy use in their manufacture such as aluminium and steel, or may involve destruction of habitat such as tropical hard woods. Also large amounts of inert construction and demolition waste are landfilled or fly tipped. Re-use of materials will have a range of financial and environmental benefits. The Institute of Civil Engineers has produced a demolition protocol aimed at reducing the construction industry's demand for primary resources and improving sustainability.

3. HOW TO MEASURE IF BUILDINGS ARE MORE SUSTAINABLE

Many sustainable issues are currently covered by the JUDP and observing all the policies in the JUDP and other guidance will go a long way towards achieving sustainable objectives. The Building Regulations also have a significant part to play to ensure that buildings are accessible, properly insulated and with adequate ventilation.

3.1 Energy Design Advice Report, BREEAM and EcoHomes Assessment.

The authority will expect non-residential developments over 1000 square metres to have an Energy Design Advice Report prepared by the Carbon Trust. In addition, a good way of testing the environmental and sustainable credentials of a scheme is to submit it for a BREEAM assessment. BREEAM stands for Building Research Establishment Environmental Assessment Method. It is a well-respected and independently verified assessment of the environmental quality of the building. BREEAM assesses the natural resource used to construct a building, the energy and waste it consumes during its life, the quality of the internal environment, the ease of travel to the buildings and the way that a building affects its neighbours.

BREEAM schemes operate for new offices and major refurbishments, existing offices, new industrial units, new superstores.

The local planning authority encourages BREEAM assessments to accompany planning applications for schemes involving:

- new or refurbishment of offices over 1000 square metres
- industrial units over 1000 square metres
- supermarkets or superstore over 1000 square metres

The BRE have refined their assessment for housing developments under the EcoHomes rating scheme. Pembrokeshire County Council will encourage new residential development to meet the Very Good or Excellent standard under the respective BRE rating schemes.

A favourable assessment will be a material consideration in support of an application. In cases where an unfavourable report is received the applicant will be required to justify why they cannot incorporate sustainable development principles into the design, and if the Authority is not satisfied with the developers assessment planning permission may be refused.

Where the building types proposed are not covered by a BREEAM scheme, developers should at least consider setting targets for their development based on energy use, carbon dioxide emissions, use of green materials and water consumption.



APPENDICES

APPENDIX I. TABLE OF RELEVANT PLANNING POLICIES

Joint Unitary Development Plan Policy

2.1	Location	<ul style="list-style-type: none"> • Policy I Sequential Approach to Development • Policy I I3 Development and the risk of flooding • Policy I I4 Development on Contaminated Land • Policy I I5 Development on Unstable Land
2.2	Sustainable Travel	<ul style="list-style-type: none"> • Policy 96 Public Rights of Way • Policy 97 Cycleways • Policy 98 National Cycle Network schemes / other cycleway schemes • Policy 99 Traffic Management and Traffic Calming • Policy 100 Access to Development
2.3	Mixed Use Developments	<ul style="list-style-type: none"> • Policy 50 Affordable Housing
2.4	Site Planning	<ul style="list-style-type: none"> • Policy 76 Design
2.5	Building Orientation	<ul style="list-style-type: none"> • Policy 76 Design • Policy 78 Amenity
2.6	Building Density, Form and Height	<ul style="list-style-type: none"> • Policy 55 Proposed Housing Density – Minimum Density • Policy 76 Design • Policy 78 Amenity
2.7	Ventilation and Lighting	<ul style="list-style-type: none"> • Policy 76 Design • Policy 78 Amenity • Policy I I7 Light Pollution
2.8	Heating and Insulation	<ul style="list-style-type: none"> • Policy 76 Design
2.9	Energy	<ul style="list-style-type: none"> • Policy 62 Renewable Energy • Policy 63 Wind Energy Development • Policy 76 Design
2.10	Water Conservation	<ul style="list-style-type: none"> • Policy 76 Design • Policy I I0 Water Resources • Policy I I1 Sewage and surface water disposal facilities

Joint Unitary Development Plan Policy

- | | |
|---------------------------------------|---|
| 2.11 Sustainable Drainage | <ul style="list-style-type: none">• Policy 76 Design• Policy 111 Sewage and surface water disposal facilities |
| 2.12 Landscaping and Biodiversity | <ul style="list-style-type: none">• Policy 65 Protection of Biodiversity• Policy 66 Landscape Diversity and Traditional Landscape Features• Policy 71 Protection of Trees and Hedgerows |
| 2.13 Design Out Crime | <ul style="list-style-type: none">• Policy 76 Design |
| 2.14 Flexible and Adaptable Buildings | <ul style="list-style-type: none">• Policy 76 Design |
| 2.15 Materials | <ul style="list-style-type: none">• Policy 76 Design• Policy 92 Recycling of mineral waste |
| 2.16 Waste | <ul style="list-style-type: none">• Policy 131 Recycling and Civic Amenity Sites• Policy 132 Composting• Policy 134 Waste Treatment |



APPENDIX 2.

SUSTAINABILITY CHECKLIST FOR SMALL SCALE DEVELOPMENT

This checklist relates to any proposal to build less than 10 dwellings and for non-domestic buildings under 1,000 square metres. It will be used to assess the sustainability of your proposal and is arranged in the order of the headings set out section 2 of the SPG. The Council recognises that the characteristics of development vary widely and not all the criterion will be relevant to all developments. Also the list is not exhaustive. In the comments column explain how you intend to meet the criteria, or if you do not intend to, your reasons. You can also add examples of where you

think you have incorporated sustainability principles that are not on the list. The Council will take into account your response to the checklist when considering your application. It is therefore important that you complete and submit this form with your planning application. For large scale development of over 10 dwellings you should consider carrying out an EcoHomes assessment. For non-domestic development over 1000 square metres an Energy Design Advice Report will be required, prepared by the Carbon Trust Wales.

Sustainable Building Characteristics

Comments – How does your proposal incorporate these characteristics. If it does not please explain why you haven't incorporated them or why they are not appropriate.

Location

Is the proposal on brownfield or de-contaminated land or re-uses buildings? Is the site in the centre or edge of the settlement? Does it improve the vitality of the town centre?

Mixed Use Development

Does the proposal include a mix of housing types including affordable housing? Does it include employment, retail or community uses?

Sustainable Travel

Is the proposal within 400m of an existing or proposed bus stop or train station or involve improvements to pedestrian, cyclist and/or public transport facilities?

Site Planning

How does your proposal take into account exposure, shelter, use of gradients for drainage and incorporate landscape features of the site?

Building Orientation

Is the proposal south facing to maximise solar gain?

Sustainable Building Characteristics

Comments – How does your proposal incorporate these characteristics. If it does not please explain why you haven't incorporated them or why they are not appropriate.

Building Density Form & Height

Is the density 30 dwelling or more per hectare? Are they terraced, or compact in form reducing surface area for heat loss?

Ventilation and Lighting

Does the proposal use conservatories or atrium? Are window size and position used to maximise natural light, minimise heat loss and maximise solar gain? Is passive ventilation and heat recovery incorporated?

Heating and Insulation

Will boilers be installed with 80%+ efficiency or solar water heating or ground pumps used? Is it part of a district heating scheme? Is insulation above building regulation standards?

Energy

Will photovoltaics or a wind generator be included in the proposal?

Water Conservation

Do fixtures such as taps, toilets etc. have water saving features? Are greywater storage and distribution systems included?

Sustainable Drainage

Are sustainable drainage systems (SUDs) used?

Sustainable Building Characteristics

Comments – How does your proposal incorporate these characteristics. If it does not please explain why you haven't incorporated them or why they are not appropriate.

Landscape and Biodiversity

Have you included measures to improve biodiversity such as planting native species, building ponds as part of SUDs schemes, including bird and bat boxes? Have you minimised hard surfaces.

Design Out Crime / Community Impact

Does the proposal provide leisure or community facilities? Have you incorporated principles of "Secured by Design/Designing out crime?"

Flexible and Adaptable Buildings

Is roof space used or capable of conversion. Are there, demountable partitions to adapt room sizes?

Materials

Have you used recycled or natural materials from renewable sources where possible?

Waste

Are there waste separation and recycling facilities? How will you minimise construction waste or re-use materials?

APPENDIX 3. EXAMPLE OF SUSTAINABLE BUILDING/ENERGY SAVING CHECKLIST

Pembrokeshire County Council is committed to achieving sustainable development. As an example of best practice Pembrokeshire County Council's Construction Commissioning Division consider the following sustainable technology checklist at the feasibility stage of all in-house capital projects:

- Installation of Biomass Wood Pellet Boiler heating systems (CO2 neutral)
- Installation of High efficiency and fully modulating condensing boilers
- Rainwater harvesting
- Photovoltaic Panels/Cladding/Tiles
- Solar hot water panels
- Wind energy
- Natural ventilation
- Design for low volume water use – push taps, spray taps, infrared taps, low volume cisterns, water flow restriction etc.
- Dry/waterless urinals
- Connection to the public sewer
- U Values – designing beyond the requirements of the Building Regulations to 'over-insulate' and improve U-Values for floors, walls and roofs.
- Sustainable Materials – e.g. flax natural fibre insulation
- Lighting controls – 25% reduction in energy used for lighting
- Combined Heating and Power (CHP)
- Building Management Systems and controls
- Ground source heat pumps
- Biofuels
- Hydro electricity
- Biodigestion/biogas
- Fuel cells/Hydrogen power

APPENDIX 4. FURTHER INFORMATION DOCUMENTS

Planning Policy Wales 2002,
Welsh Assembly Government

A Better Quality of Life:
A Strategy for Sustainable
Development for the United
Kingdom, Department of
Environment, Transportation and
Regions, 1999

Building Regulation Approved
Document L Conservation of Fuel
and Power, Department of the
Environment, 1995.

Green Guide to Specification, An
Environmental Profiling System for
Building Materials and
Components, BRE Report 351,
1998.

Building Green A Guide to using
plants on roofs, walls and
pavements.

Sustainable Settlements A guide
for Planners, Designers and
Developers, 1995, Hugh Barton,
Geoff Davis and Richard Guise.

Terrence O'Rourke for DETR/DTI
(1999) Planning for Passive Solar
Design, BRESCU/BRE

Water Management in Buildings,
Evaluation of Various Water
Saving Measures, 2000, W
Thompson PCC Report

APPENDIX 5. CONTACTS

Association of Environmentally
Conscious Builders; Nant-y-
Garreg, Saron, Llandysul,
Carmarthenshire SA44 5EJ
Tel:01559 370908 www.aecb.net

Building Research Establishment
Environmental Assessment Method
BREEAM office Building Research
Establishment, Garston, Watford,
WD2 7JR www.bre.co.uk

Carbon Trust Wales, Albion
House, Oxford Street,
Nantgarw, Cardiff, CF15 7TR
www.thecarbontrust.co.uk/carbontrust/

Celtic Water Management,
Dolfedwen, Tresaith, Cardigan
SA43 2JG 01239 811465
www.celticwater.co.uk.
www.ukrha.org
www.3ptechnik.com

Centre for Alternative Technology
www.cat.org.uk

CIRIA Construction Industry
Research and Information
Association, 6 storey's Gate,
Westminster, London SW1P 3AU.
Tel 020 7222 8891
www.ciria.org.uk/suds/

Combined Heat and Power
Association, Grosvenor Gardens
House, 35-37 Grosvenor Gardens,
London SW1W 0BS Tel 0171
828 4077 www.chpa.co.uk

Design Advice Tel: 01923 664258;
www.energy-efficiency.gov.uk

Eco Centre www.ecocentre.org.uk
Information about renewable energy, including how to get a grant to convert your home

Energy Efficiency Best Practice Programme www.energy-efficiency.gov.uk

Energy Saving Trust, 21 Dartmouth Street, London, SW1H 9BP, www.est.org.uk

Friends of the Earth; www.foe.co.uk For a list of contacts for green electricity suppliers and compare cost visit www.foe.co.uk/campaigns/climate

Government Department for Trade and Industry www.dti.gov.uk/energy

Home Zones; www.homezonenews.org.uk/

Joseph Rowntree Foundation; www.jrf.org.uk

Info on how to recycle and reuse www.reuze.co.uk

Royal Institute of British Architects, 66 Portland Place, London W1N 4AD www.riba.org

Secured by design www.securedbydesign.com

Sustainable Construction www.sustainable-construction.org.uk/

Sustrans www.sustrans.org.uk Ideas about travelling without the car, mostly information about cycling.

West Wales Eco Centre, Lower St. Mary Street, Newport, Pembrokeshire SA42 0TS. www.ecocentre.org.uk

APPENDIX 6. GLOSSARY OF TERMS

Affordable Housing – Permanent housing provided for sale or rent at prices below the market rate. Affordable housing is provided to meet a specific local housing need which cannot be met by housing on the open market.

Biodiversity – The richness and variety of living things (plants, birds, animals, fish and insects etc.) which exist in a given area, and the habitats which support them.

BREEAM – (Building Research Establishment Environmental Assessment Method) Independent appraisal method to certify environmental performance of a building.

Brownfield Land – The term used to describe previously developed land. The Government has set a target of 60% of new housing being developed on brownfield sites to relieve the pressure on the countryside.

Carbon Index – A method of calculating carbon dioxide emissions associated with the space and water heating requirements of a building.

These requirements are calculated directly from the SAP of a building. The scale of Carbon Index ranges and ranges from 0 to 10. An index of 8 or more must be achieved to satisfy Part L Building Regulations.

Carbon Trust Wales – They provide design advice in a free ‘Building Design Advice Guide’ which contains a detailed overview on producing energy efficient buildings.

In addition, free initial face-to-face design advice is provided on building projects, with recommendations produced in a report.

EcoHomes – BRE assessment method similar to BREEAM for residential developments.

Embodied Energy – The total life cycle energy used in the collection, manufacture, transportation, assembly, recycling and disposal of a given material or product.

Greenfield Land – Land that has never been built on, usually grassland, farmland or heath.

Greenhouse Gases – A gas that contributes to global warming by absorbing infra red radiation leading to an increase in the Earth’s temperature.

Green Transport Plan – A plan produced by businesses/employers for managing transport impacts and giving staff and visitors better choices. It is ‘green’ because it aims to reduce car use and promote greener alternatives like walking, cycling, public transport and car sharing.

Grey Water – Any water that has been used in the home, except water from toilets is called grey water. Dish, shower, sink and laundry water comprises 50-80% of residential ‘waste’ water that can be reused for other purposes.

Listed Building – A building with special legal protection which is in the List of Buildings of Special Architectural and Historic Interest compiled by Cadw. Cadw is part of the Welsh Assembly responsible for the conservation, preservation and promotion of ancient monuments and historic buildings.

Local Agenda 21 – The process established as a consequence of the Rio Earth Summit in 1990 with the objective of seeking action on sustainable development issues at the local level.

Low Emissivity Glazing – Low emissivity glazing is double glazing where the outer pane is coated with a transparent layer that reflects back radiated heat. This greatly increases the insulation levels of the window.

Microclimate – A microclimate is where a certain area is able to maintain its distinct environmental conditions by virtue of its design in relation to its surroundings. Microclimates can be created using shading or ventilation.

Passive Solar Design – Passive Solar Design refers to the use of solar energy for the heating and cooling of buildings. Using this approach, the building itself or some part of it will take advantage of the natural energy in materials and air created by exposure to the sun.

Photovoltaic Cell (PV) – Convert solar energy into electricity. Interconnected cells are encapsulated into a sealed module that produces a voltage.

Renewable Energy – Energy which comes from natural resources that cannot be exhausted such as sun, wind, wave action and the fall of water

SAP - Government's Standard Assessment Procedure (SAP) energy cost rating (from 1 to 20) is used for housing. The rating

reflects the notional cost/m² of providing energy for heating and domestic hot water in a dwelling. SAP ratings form part of the calculation for the Carbon Index under the Building Regulations.

Sequential Test – A test applied when selecting a site for development. In order of preference: brownfield sites, centrally located sites in towns or villages and then sites on the edge of settlements.

Solar gain – The ability of a building to benefit from the heat generated by the sun.

Supplementary Planning Guidance – Supplementary Planning Guidance (SPG) are documents which include more detailed advice on specific policy areas and also include development briefs and design guides which set out site specific planning requirements or general advice which is too detailed to include in the Local Plan. SPG should be read in conjunction with the Joint Unitary Development Plan.

Surface Water Run-off – A discharge of water caused by rainfall falling on a hard surface, for example roofs and roads.

Sustainable Development – Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Traffic Calming – Methods of slowing down traffic, often in villages, such as road humps, surface treatment or road narrowing.

Unitary Development Plan – A statutory Development Plan which contains strategic and local policies and detailed proposals for the development and other use of land, including measures for improving the physical environment, the management of traffic and the conservation of the natural beauty and amenity of the land.

U-Value - The U-value (or heat loss factor) is the measurement used to express the thermal performance of a material. The lower the U-value the less heat is transmitted through the material. The U-Value is a measure of the rate of heat loss (measured in Watts) per unit of surface area (measure in square metres) for a temperature differential of 1 degree Kelvin (K) on either side of the material, hence W/m^2K . Target values for the whole building or elemental values; for dwellings – ground floor insulation (0.2-0.25); walls (0.35); doors and windows (average of 2.2 wood/PVC or 2.2 metal) and pitched roofs 0.16.

Vernacular – The style of architecture, use of materials or decoration of a feature associated with a location, culture or period of time.