Supplementary Planning Guidance:
Planning for sustainable development

April 2010

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www.gwynedd.gov.uk

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STATEMENT REGARDING CONSULTATION

1 The draft version of this Supplementary Planning Guidance (SPG) was subject to public consultation between 3 December 2009 and 14 January 2010. A public notice was published in the Caernarfon and Denbigh Herald and the Cambrian News on 3 December 2009 in order to raise awareness about the public consultation. Copies of the SPG were available to view in the main Council offices, in the public libraries and on the Council's website during the consultation period. Comments were invited from numerous individuals and organisations, which included the community councils. A summary of the representations that were received and the response to them can be seen in a document entitled "Consultation statement – December 2009".

2 The representations and the response to them were scrutinised by the Environment Committee on 9 February 2010. The SPG was adopted in the Council Board meeting on 9 March 2010.

INTRODUCTION, PURPOSE AND STATUS OF THE DOCUMENT

3 This Supplementary Planning Guidance (SPG) is one of a series of guidance notes which support the policies of the adopted Unitary Development Plan (UDP). Although decisions on planning applications will be based on the UDP's adopted policies (as indicated in part 38(6) of the Planning and Compulsory Purchase Act 2004), the content of the SPG is a material planning consideration.

4 Gwynedd Council is committed to the principles of sustainable development. The UDP promotes the concept of sustainable patterns of development as well as encouraging the sustainable design and construction of development.

5 This SPG seeks to:

- raise awareness of all the factors that can help improve the sustainability of a proposal
- secure greater environmental sustainability in all new developments, refurbishments and alterations to existing buildings.
- encourage developers and applicants to consider sustainable development from the earliest stage of the design process and go beyond minimum standards.

6 This guidance supplements policies B22 and C7 of the UDP adopted in July 2009. This guidance should be considered in conjunction with the UDP and other adopted SPG and in particular the Design Guide SPG.

7 This guidance will cover a wide range of sustainability issues in relation to land-use planning, accessibility, energy efficiency, drainage, water conservation, waste management, landscape and biodiversity.

8 Much advice and detailed information already exists on this subject. Consequently this SPG is intended to raise awareness of current sustainable design approaches, give 'general' advice on their application. Where appropriate other relevant SPGs and sources of more detailed information are referred to. It is intended to provide the national and local context and to outline the general approach and guide users to other documents which

provide more detailed technical information. For example information on energy efficiency and renewable technology is addressed in detail on the Energy Saving Trust website (www.energysavingtrust.org.uk)

PLANNING AND CLIMATE CHANGE

9 Climate change is one of the most serious challenges facing the world and action is required now to if more serious consequences are to be avoided in the future. It is suggested that Wales will experience higher sea levels, hotter, drier summers, wetter, milder winters with the possibility of temperature extremes and increased frequency and intensity of storms as a result of climate change. Whilst concentrated action is required at a world wide level it is recognised at both national and local level that everybody has an important role to play in tackling the causes (mitigation) and dealing with the consequences (adaptation) of climate. At a national level the Assembly Government is committed to taking action to reduce emissions of the greenhouse gases that cause climate change and to plan for, and respond effectively to, the change already underway.

10 The Assembly Government's commitment to reducing greenhouse gas emissions, maintaining existing carbon stores and ensuring effective adaptation is set out in 'Environment Strategy for Wales' (2006) and the related Action Plan summarises the impacts of climate change[1]. It is estimated that almost half of the Uk's carbon emissions comes from energy use in buildings. It is the aspiration of WAG for all buildings built from 2011 onwards to be zero carbon

PLANNING POLICY

National[2]

11 At a National level it is recognised that the planning system can make an important contribution to improving the sustainability of development and in tackling climate change.

12 The overarching policy for planning in Wales is 'Planning Policy Wales 2002 (PPW). Since its publication a number of Ministerial Interim Planning Policy statements have been published which replaces the advice given in specific sections of PPW. Of particular relevance to this SPG are:

- MIPPS 01/2008: Planning for Good Design
- MIPPS 01/2009: Planning for Sustainable Buildings

13 It is noted that both should be read along side each other. As part of the move towards more sustainable and zero carbon buildings in Wales. MIPPS 01/2009: expects that the following standards will be met:

- Applications for 5 or more dwellings received on or after **1 September 2009** to meet Code for Sustainable Homes Level 3 and obtain 6 credits under issue *Ene1 - Dwelling Emission Rate*

[1] Environment Strategy and Environment Strategy Action Plan http://wales.gov.uk/topics/environmentcountryside/epq/envstratforwales/?skip=1&lang=en
[2] PPW, TAN's etc. http://new.wales.gov.uk/topics/planning/policy/?lang=en

- Applications for 1 or more dwellings received on or after **1 September 2010** to meet Code for Sustainable Homes Level 3 and obtain 6 credits under issue *Ene1 - Dwelling Emission Rate*.
- Applications received on or after **1st September 2009** for non-residential development which will either have a floorspace of 1,000 sqm or more, or will be carried out on a site having an area of one hectare or more, to meet the Building Research Establishment Environmental Assessment Method (BREEAM) 'Very Good' standard and achieve the mandatory credits for 'Excellent' under issue *Ene1 - Reduction of CO2 Emissions*.

14 PPW (& MIPPS) is supported by **Technical Advice Notes** on relevant topics. Whilst most of the TANS are applicable to climate change and to sustainable design (e.g. TAN 5: Nature Conservation and Planning, TAN 14: Coastal Planning, TAN 15: Flood Risk and Planning, TAN 18: Transport, TAN 8: Renewable Energy) the following two are of specific importance to this guidance:

- TAN 12: Design (2009),
- Draft TAN 22: Planning for Sustainable Building (2009).

15 **TAN 12:Design (2009)** – this supplements the national planning policy as set out in MIPPS 01/2008: Planning for Good Design and provides guidance on the design solution and issues arising from environmental sustainability that will assist in meeting or exceeding sustainable building standards (see page 20 of TAN 12). Detailed guidance on 'Design and Access Statements' (DAS) is also included Appendix 1 of the TAN and covers:

- The requirements for a DAS under planning legislation,
- Role of the DAS
- Content of a DAS

16 **Draft TAN 22: Planning for Sustainable Buildings (2009)**[3] - sets out the procedural elements of meeting the national policy as set out in MIPPS 01/2009 and provides guidance on:

- Sustainable building standards (Code for Sustainable Homes[4], Building Research BREEAM[5], Stages of Assessment, Energy Performance Certificate)
- Reducing Carbon Emissions (policy requirements, the energy hierarchy, Design and Access Statements, policy constraints)
- Preparing development proposals (Key principals)
- The Policy Implementation Map
- Planning conditions and negotiations (The use of conditions to deliver sustainable building standards, exceptions)

Whilst TAN 22 has only been published in draft form for public consultation, it provides the procedural and technical context for MIPPS 01/2009 and will be a material consideration for the purposes of development control. For all developments which fall within the remit of the 'sustainable building standards' set out in MIPPS 01/09, the Council will expect developers to

[3] http://new.wales.gov.uk/consulations/planning/drafttan22/lang=eng
[4] For information on Code for Sustainable Homes see www.planningportal.gov.uk.)
[5] For information on the BREEAM standards see www.breeam.org

demonstrate that they have fully considered the procedural requirements of TAN 22. The requirements of TAN 22, whilst not obligatory, are also relevant to developments falling outside the remit of MIPPS 01/09 and should be considered accordingly in the preparation of their design proposals.

Local

17 The primary UDP policies in the context of this SPG are:

- B22 (Building Design)
- C7 (Building in a sustainable manner).

It should be emphasized that these policies should not be read in isolation and there are a number of other policies in the UDP which should be considered as part of the process of achieving a sustainable design solution.

18 **Policy B22 (Design)** - highlights a number of elements which are considered 'good' quality design principles. The principals and issues highlighted in the policy should be considered as an integral part of achieving a sustainable design solution. Policy B22 is supplemented by the 'Gwynedd Design Guide' 2002 and 'Landscape Character' SPG (2009), which provide further guidance on design related issues.

19 Policy B22 requires that a formal 'Design Statement' needs to be provided with the planning application in respect of specific types of development. More recent legislation now means that 'Design and Access Statements' (DAS) are now required to accompany most types planning applications (i.e. for outline and full applications but not those for the approval of reserved matters)[6]. Detailed guidance on DASs is included Appendix 1 of TAN 12: Design (2009). Also more detailed advice on the information required in the DAS in respect of reducing carbon emissions is outlined in paragraph 3.4 of Draft TAN 22: Planning for Sustainable Buildings.

20 **Policy C7 –** this policy outlines a number of sustainable design principles that need to be considered and applies to new developments, alterations, extensions and change of use to existing buildings. The Council expects developers to clearly demonstrate that these have been taken into consideration and have been incorporated into their proposals. Further guidance on the type of sustainable design principles that need to be addressed are outlined in this SPG.

21 In respect of sustainable building standards Policy C7 states that "that an Energy Design Advice Report will be required to accompany each planning application (apart from outline ones) for non-residential buildings over 1000 square meters". The national policy outlined in MIPPS 01/2009 post dates this aspect of policy C7. Gwynedd Council will therefore follow the procedural requirements as set out in Draft TAN 22. The Council expects all developments to comply with the relevant national sustainable building standard and will seek specialist advice before agreeing to any exceptions to the above standard.

[6] DASs are not required to be submitted with certain types of planning applications. These exceptions are listed in Section A1 of Appendix 1 of TAN 12: Design (2009).

CHARACTERSITICS OF SUSTAINABLE BUILDING

22 This section is applicable to all types and scale of developments and not just those outlined in MIPPS 01/09. All developers should examine whether there development can beyond the minimum requirements of both MIPPS 01/09, TAN 22 and building regulations. This section provides information on aspects of sustainable design and building and has been divided into the following categories:

- Land and buildings
- Transport and movement
- Energy demand
- Energy efficiency
- Resource consumption
- The natural environment
- Renewable and low carbon technologies
- Future adaptability of buildings

LAND AND BUILDINGS

23 Land is a valuable commodity and it is important that all developments make the best possible use of developable land and existing buildings. In all instances developers should aim to make the most efficient and optimum use of developable land.

24 **Previously developed land** - Much previously developed land is contaminated and developer should take into considerations. Consideration should also be given to the requirements of policy C3 (Re-using previously developed sites) of the UDP. Where land is contaminated, a site assessment will be required to show the nature and extent of contamination.

25 ***Re-use of existing buildings* –** priority should be given to maximising the re-use of existing buildings which can be refurbished or extended without the need for substantial use of new materials from primary resources. This can provide viable futures for listed buildings yet meet new needs. Developers should give priority to incorporating any existing buildings on site into their development proposal. Where demolition is necessary, developers should carry out a pre-demolition audit to identify those materials could be re-used or recycled on site

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

- Maximise the re-use of the buildings including basements and roof spaces;
- Consider the opportunities to incorporate mixed-uses within buildings, particularly public access uses (retail, leisure etc) at ground floor level;
- Consider increasing the floorspace of the existing building through additional floors and/or extensions;
- In the case of home extensions, consider the running cost benefits of undertaking energy efficiency improvements to the existing dwelling (e.g. replacing the heating system, replacing existing windows and doors for high performance units, upgrading insulation levels, draught proofing).

- Ensure that proposed internal layouts do not restrict the occupation of the building by other uses in the future, i.e. create a building with greater flexibility for future re-use.

27 ***Development density –*** achieving suitably higher development densities is important in order to make the best use of developable land. Particular consideration should be given to opportunities to significantly increase densities where accessibility to public transport networks/links. Development proposals should aim for the highest possible intensity of use allowed within the context set by national and local planning policies.

28 ***Efficient use of a site –*** developments should make the most efficient use of a site. The design process should include a commitment to designate all land within a site with a function. This should include the designation of land for uses such as 'open spaces of recreational value', waste collection and recycling facilities, renewable energy generating facilities (e.g. CHP), sustainable urban drainage, rain water harvesting.

TRANSPORT AND MOVEMENT

29 Developments which minimise the need for car travel and promote cycling, walking and public transport use can provide health, financial and environmental benefits and can lead to significant energy savings.

Encouraging sustainable transport and movement

30 A developer should demonstrate how the overall design layout promotes sustainable modes of transport and movement. The following is a list of principles that can contribute to encouraging sustainable transport and movement and should be considered, if the scale and location of the development makes it appropriate to do so:

Public transport

- Provide safe, convenient links to the public transport network

Cycling

- Provide direct, safe and attractive cycle routes that link housing to employment, services and facilities
- Provide prominent, secured, covered cycle storage in convenient locations close to building entrances or inside buildings
- Only provide joint pedestrian and cycle facilities where separate cycle facilities within the carriageway it not feasible; although pedestrian safety must not be compromised.

Pedestrian

- Provide convenient routes, which are easy, safe and attractive to use by people of all physical abilities,
- Provide clear sign posting and lighting where appropriate
- Provide links to key services such as shops, schools and doctors and public transport nodes
- Avoid steep gradients

- Consider the introduction Home Zones in residential streets that reduce the dominance of cars (see www.homezone news.org.uk)
- Consider the provision of sufficient space and services to allow the occupant to set up a home office

Private motor vehicles

- Provision of appropriate levels of parking provision in accordance with the parking standards adopted by Gwynedd Council
- Provision of speed reduction and traffic calming measures to promote pedestrian friendly environment
- Locating parking spaces to the rear properties to allow for pedestrian friendly site layout

ENERGY DEMAND

31 The first priority of any development should be to reducing the demand for energy followed by maximising energy efficiency and lastly using renewable/low/zeron carbon energy sources (i.e. the energy hierarchy).

Maximise the amount of 'free heat' that can be obtained from the Sun (i.e. passive solar design)

32 Sunlight through windows is a useful source of heat which can significantly reduce the need for conventional space heating. Careful site layout and design of new developments and alteration and extensions to existing buildings is essential if passive solar energy is to be exploited. Some of the principles that will improve a development's ability to make the best use of the sun's energy are listed below:

Site layout (primarily residential developments) -

- Where possible, buildings orientated within 30° of due south to maximise solar gain. The angle of the sun throughout the year should be considered to avoid the potential of overshadowing.
- Housing and road layouts should be designed to maximise the number of units with a north/south orientation. Residential roads running east-west produce housing plots with good solar orientation.
- Tallest buildings should be located to the north of housing
- Bungalows and detached houses should be located to the south of the site
- Overshadowing by adjacent buildings or by trees should be avoided where possible as this will reduce access to solar energy for heating and daylight (this may be harder in high density developments but can be minimized through good design).

To some extent the same principles involved in housing and road layouts apply to non residential development layouts.

Building design –

- Large areas of glazing should be located on the southern side and reduced areas of glazing located on the northern side. The benefits of locating larger windows on the south elevation to increase solar gain has to be weighed against greater heat losses in the winter and a risk of

overheating in the summer. Sloping roof lights facing the sun will increase the solar radiation received.

- Carefully designed conservatories and atria can contribute to the management of solar heat and ventilation. To avoid problems of excessive heat gains and losses they should be designed and used as intermediate spaces located between the building and the external environment. They can be designed to assist natural ventilation in the summer by drawing hot air upward to roof vents. During the spring and autumn they are valuable heat collectors but the net thermal benefits of conservatories will however be lost if they are heated for use during the winter.
- Interior spaces requiring the most light and heat should be located on the southern side, and spaces that require less should be located on the north side. Main living or working spaces with maximum occupancy should be located on southerly facing elevations to make the best use of solar gain. Rooms with lower occupancy - (e.g. toilets, cloakrooms and storage space) should be located on the northern side of the building since they require less heating. Rooms that contain machinery or equipment that generate heat should also be located on the northern sides of buildings. An open floor plan optimizes passive solar energy use and cellular spaces can be used to differentially control temperatures to meet the occupant's wishes.
- The use of high pitched roofs which overshadow neighbouring buildings should be avoided

33 *Commercial buildings* - The objectives and use of passive solar design in commercial buildings differs from those of domestic dwellings. As commercial buildings generate substantial amount of heat from occupants, lighting, and machinery it will be more important to prevent excess heat problems (e.g. by shading) during periods of high solar gain, with a greater emphasis on exploitation of daylight and natural ventilation. In commercial buildings passive solar design should seek to optimize the entry and dispersal of daylight in a building through careful placing and sizing of windows, the avoidance of deep-plan buildings and the use of atria and roof lights to bring light into the heart of the building.

Making the best use of the landscape and buildings as wind shelters

34 Even a well insulated building can suffer high heat losses if overexposed to the elements. Sheltering buildings effectively from the wind can reduce heat loss and minimize the effects of harsh environmental conditions. Some of the key principles to consider are:

- identify the positive aspects affecting the microclimate;
- identify the negative impact of existing surrounding features, including the impact of public realm and building on climatic conditions,
- where possible and appropriate, incorporate existing trees and hedgerows,
- where possible, shelter buildings from prevailing wind (mainly from the south west) and coldest winds (from the north),
- use tree planting, either individually or collectively to form shelter belts and distanced 3-4 times their mature height from south facing elevations.

- careful selection of the new tree species to plant is required, with consideration given their eventual height and their ability to screen effectively.
- give careful consideration to site layout (in particular high density developments) in order to reduce the potential for wind channeling by avoiding long and uninterrupted road passages, and be aware of localised wind currents that can create a poor micro climate through unexpected areas of higher wind speeds;
- care should be taken to ensure that new plantings will not result in unwanted shading of passive solar features, and planned or future solar water heating systems or photovoltaic panels, or interfere with the planned or future performance of wind turbines

Prevent Heat Loss from buildings

35 ***Insulation*** - Whilst different materials have different levels of thermal conductivity and therefore and as such the same thermal performance (U values) can be achieved with materials of different thicknesses, it is a good general rule to install as much insulation as practicable at the construction stage and go beyond the minimum requirements of Building Regulations[7].
Measures which can be adopted in order to ensure that a building is well insulated include:

- maximise insulation to roof, wall and floor
- use breathing, natural and low energy insulation products where possible
- combine adopted heating strategy with appropriate insulation system
- use tripple glazed windows or double glazed units, with a low-emissivity (low-E) coating (which reflects heat back into the building), and an argon filled cavity (less conductive than air). Secondary glazing is preferable in historic buildings

36 ***Ventilation*** - Buildings should be built as airtight as possible, and then ventilated in a controlled way. Ventilation and air infiltration can account for a considerable amount of heat loss in a building. With increased insulation reducing the air infiltration it is important that adequate energy efficient controlled ventilation is provided by other means.

37 The preference should be for some form of natural ventilation, such as cross ventilation or passive stack ventilation (psv). PSV ventilation allows exhaust air to rise up through the dwelling naturally using extract pipes that exit at the ridge of the roof. Its main advantage is that it uses no mechanical energy, has no moving parts and can replace mechanical ventilation for building regulation purposes. It requires adequate height to create a steady flow.

38 If psv is not sufficient to provide the fresh air requirements then mechanical ventilation with heat recovery (where heat exchanger is more than 65% efficient should be used).

39 If intermittent extract fans are required then they should be low energy fans with humidity sensors.

40 ***Natural daylighting*** - Minimising energy used in lighting becomes a key issue once housing is more energy efficient than current building regulations.

[7] Detailed guidance on thermal requirements are specified in part L of the Building Regulations.

Good levels of day lighting inside a building are important for reasons of health, general wellbeing, and fuel economy (less electric lighting). The aim should be to maximise daylighting while minimising artificial lighting. However, windows are also areas of relative heat loss, and the greater the area the greater the loss and a balance must be struck between providing daylighting and minimising heat losses. It is important to minimise this loss, particularly in a well insulated building, and so efficient glazing systems should be used.

ENERGY EFFICIENCY

41 Whilst 'energy efficiency' is an issue which can not strictly be regulated through the land use planning system, it is essential that consideration should be given to it at the initial design stage.

Using energy efficient appliances and products

42 ***Lighting*** *– The key principles are:*

- require Energy Saving Trust Recommended light fittings and lighting in all areas of the dwelling,
- consider the use of task lighting as opposed to background lighting and the installation of a lighting control system to avoid lights being left on unnecessarily,
- design commercial buildings that aim to maximise the use of natural daylight.

43 ***Heating -*** In well insulated buildings accurate sizing of heating systems becomes extremely important. To obtain optimum energy efficiency the smallest appropriate energy heating system should be used. With high insulation, a full central heating system may not be necessary. In many instances, point sources of heating rather than the standard package of central heating. Issues that should be consiered include:

- selecting the appropriate delivery system for heating
- specifing high energy efficiency space and water heating systems - avoid oversizing
- realising the full potential of renewable energy source
- incorporating effective and easily understood control systems
- use low temperature radiators to allow for a variety of low temperature energy sources.

44 ***Commercial buildings*** - Consideration should be given to the impact that electrical equipment may have on the working environment of the building and the need for an air conditioning system. Equipment with reduced power demand should be used and consideration should be given to locating equipment with high heat loads away from the main working areas.

RESOURCE CONSUMPTION

Reducing the use of resources

45 This can can be achieved by:

- Reducing the materials used during the construction process, and
- Enabling future occupiers of the building to reduce their consumption of resources during the lifetime of the building.

46 ***Existing buidings*** – Where possible, existing buildings on the site should be retained rather than demolished since the initial embodied energy used in its construction is largely retained, less energy is produced and less energy is consumed overall.

47 ***Materials*** - The decision about which materials to be used should be considered early in the design process. There should be a general presumption in favour of renewable resources and locally sourced sustainably produced materials. The use of scarce or non-renewable resources should be kept to a minimum, and the feasibility of using more sustainable alternatives should be constantly reviewed.

48 Development proposals should consider the following issues:

- Choose appropriate materials - select materials appropriate to the building use and locality, bearing in mind cost, durability, function, maintenance and availability issues. Choose materials which are appropriate to the building's context and local vernacular (e.g. listed buildings, conservation areas)
- Maximise the use of local materials – this reduces transport requirements.
- Maximise the use of re-used, reclaimed and recycled materials - whenever possible re-use existing materials or procure reclaimed and recycled materials. Consider using building materials made from construction and demolition waste in preference to primary aggregates.
- Maximise the use of materials from sustainably managed sources - for example the Forest Stewardship Council's Trademark label indicates that the wood comes from a sustainably managed forest.
- Maximise the use of materials with low embodied energy – this is the amount of energy required to extract, make and transport a product
- Maximise the use of materials that have low lifecycle environmental and toxicity impacts.
- Use materials efficiently – minimise the volume of materials used and avoid wasteful specification through a design that utilises whole units of construction materials.

49 ***Waste management*** - Sustainable waste management should be a critical component of any proposed development. Development proposals should consider the following:

- Use of pre-fabricated components to minimise waste generated on site,
- Allow 'flexibility' in design which will allow the building to be used more readily, a longer life span and reduces the need for major refurbishment
- Ensure that the finished development will include adequate storage space for separated materials to enable their storage for recycling, which is easily accessible to both collectors and occupants/users.
- Re-use or recycle construction and demolition waste, including recycled materials brought from other sites in the local area. Excavated material should be reused locally (preferably on site) not dumped.
- Unless there are exceptional circumstances, all buildings should be able to be serviced by a standard waste collection vehicle.

50 ***Water conservation*** - All our mains water supply is of drinking water quality. Water treatment is an energy intensive process which uses chemicals such as aluminium and chlorine to remove contaminants particularly from surface water. Yet only 10% of the water used is for drinking or cooking. Consideration should be given to steps/measures that can conserve or recycle water resources, particularly in relation to tasks which do not require high water quality. The steps/measures that should be considered include:

- Incorporating dual water supplies wherever possible, for example, the use of a rainwater harvesting system or grey water recycling for toilet flushing and washing clothes;
- Installation of low water use appliances such as low use washing machines and dishwashers;
- Installation of water efficient fixtures as low flush/dual flush (2-4 litres) WC cisterns, waterless mounted urinals and toilets, flow restrictors, push/spray taps with automatic cut off, showers (but avoid power showers);
- Installation of rainwater collectors and water butts for garden watering, topping up ponds or car washing

THE NATURAL ENVIRONMENT

Conserve and enhance the natural environment and biodiversity

51 ***Sustainable drainage*** - Development can have a detrimental impact on the water environment by increasing pollution, the risk of flooding, reducing groundwater levels (i.e. reduced natural infiltration) and can be detrimental to biodiversity (e.g. altering the ecology of watercourses and damaging established habitats).

52 Sustainable Drainage Systems (SUDS) offer a variety of engineering solutions,
both soft and hard, that can be employed as a means of managing and reducing surface water run off which might otherwise lead to flood risk and other environmental damage.

53 SUDS aim to control surface water runoff as close to its origin as possible, before it enters a watercourse by using techniques that mimic natural drainage processes rather than the traditional piped drainage systems. Sustainable drainage systems can help reduce the environmental impact of development and can also have ecological benefits. It moves away from the traditional piped systems and generally involves physical structures or devices to receive surface run off.

54 A range of sustainable drainage options that should be considered early in the design process. These include:

- preventive measures – e.g. rain-water recycling, good-practice design and maintenance;
- filter strips and swales – vegetated landscape features with smooth surfaces and a gentle downhill gradient to drain water evenly off impermeable surfaces, mimicking natural drainage patterns;

- filter drains and permeable and porous pavements – permeable surfaces to allow rainwater and run-off to infiltrate into permeable material placed below ground to store water prior to discharge;
- infiltration devices - below-ground or surface structures to drain water directly into the ground (soakaways, infiltration trenches, swales with infiltration and infiltration basins), which may be used at source or the runoff may be conveyed to the infiltration area in a pipe or swale;
- basins and ponds – structures designed to hold water when it rains; basins are free from water in dry weather, ponds contain water at all times and are designed to hold more when it rains; examples include retention basins, balancing/attenuation ponds, flood storage reservoirs, lagoons, retention ponds and wetlands/reed beds;
- green roofs – the plants and their growing medium (substrate) provides temporary storage of storm water. Deeper substrates offer greater SUDS performance and support greater plant diversity, thus improving the energy efficiency and biodiversity potential benefits. Green wall systems can also be designed to retain water and can contribute to SUDS.

Further technical advice can be obtained from the Environment Agency (www.environment-agency.gov.uk).

55 ***Landscape*** - Landscape considerations are an integral component of any design proposal and should be condsidered at the outset of design process. Developers should take the following into consideration as part of the design process:

- The retention and incorporation of existing landscape features, trees and hedgerows into their design schem wherever possible;

- Opporutnities to use landscape features, trees and woodlands to:
    - enhance visual amenities,
    - filter sound and particulate pollution,
    - create new wildlife habitats and promote biodiversity;
    - reduce surface water run off
    - reduce drainage costs
    - provide shelter and shading
    - reduce heating/cooling costs

- The use of of locally sourced indigenous species appropriate to the local ecology and the need to avoid planting on sensitive ecological sites;

- Compatibility of the landscaping scheme with the need of designing out crime and the creation of hiding places

RENEWABLE AND LOW/ZERO CARBON TECHNOLOGIES

56 Renewable and low carbon technology systems should not be used as a primary means of addressing energy efficiency. It is always more cost effective to conserve energy than to produce it. Consideration should be given towards incorporating renewable and/or low/zero carbon energy sources in schemes as a means of supplementing heating/cooling and lighting requirements.

Renewable technologies

57 ***Solar water heating*** - As well as the benefits to be gained from passive solar design, the sun can also be used to heat water in domestic, public and other building hot water systems. The main types of commercial systems, the flat-plate and the evacuated tube collectors both function in a similar way and are usually roof mounted on the southern pitch. Alternatively they can be mounted on the sides of buildings or on freestanding structures on the ground. A typical domestic system will require a 2-5 square metres surface area, facing between south east and south west, which should not be shaded by trees or other buildings.

58 ***Photovoltaic panels*** - These convert sun's light into electricity and can be roof and/or wall mounted/integrated or be free standing. They are well suited to use in large office as the energy supply is at a maximum during the period of maximum building operation, whereas generally domestic dwellings have a maximum demand during the period between 6pm and 10pm when the sun is low in the sky or set. Panels should be mounted on south facing facades and angled between 30-40° east-west and due south. They should only be used where they are completely un-shaded as they are particularly affected by overshadowing.

Whilst, planning permission is not normally required for the installation of solar panels or photovoltaic panels[8], it is advisable to obtain confirmation of this from the planning department prior to their installation. If the building is listed, listed building consent will be required.The following issues are important planning considerations for both solar water heating and photovoltaic panels:

- compatibility with existing building materials;
- on double pitched roofs panels should be located on the inside channel provided this can be done without compromising performance of the solar system;
- collectors/panels on listed buildings (if acceptable) should blend well with the existing traditional materials and may require the installation of more innovative solutions, such as PV roof tiles (as opposed to standard panels) that look like traditional roofing materials;
- the impact on public vantage points, and visually important landscapes (e.g. the Llŷn or Anglesey AONB, SNP) and townscapes within the Gwynedd LPA.

59 ***Wind Turbines*** - These can either be building mounted (micro scale) or free standing, grid connected or stand alone. However, an accurate assessment of wind speed is required if the system is to deliver the expected electricity supply. With the exception of micro-turbines, wind turbines need to be sited away from buildings to ensure that the airflow is as undisturbed as possible. In sensitive landscapes and conservation areas the visual impact of turbines will be an issue. Turbines attached to buildings can also cause damage through vibration.

[8] From 1 September 2009, Permitted Development Rights were extended to allow more domestic microgeneration equipment to be installed without planning permission, subject to specific criteria. WAG have published a leaflet for households explaining these changes – Domestic microgeneration permitted development: A guide for Householders.

60 ***Biomass*** - this term used to describe 'fuel' obtained from organic matter of recent origin such as waste products from animals (slurry and chicken droppings), plants (e.g. wood and miscanthus) and humans (municipal and industrial wastes). Clean solid biomass, such as wood, can be burnt efficiently in a suitable appliance to provide space and water heating at any scale from domestic upwards. The combustion of contaminated wastes is controlled under the Waste Incineration Directive, and is therefore usually only practical at a large scale. There is also a range of technologies for generating electricity from virtually any solid biomass, though again this is usually only practical at a reasonably large scale.

Domestic biomass heating systems are covered by permitted development rights on microgeneration. Larger heating systems and electricity generating projects are likely to require new buildings, a new flue and an increase in traffic due to fuel deliveries. Planning concerns are generally similar to any other commercial or industrial development of a similar scale.

Wet biomass, such as animal slurry, is not suitable for burning, but can be treated in an Anaerobic Digester to produce solid and liquid fertiliser and gas which can be burnt as a fuel. The gas is typically burnt in a Combined Heat and Power plant to provide heat for local buildings and electricity to sell to the grid. Small single farm systems may not require planning permission. Issues surrounding larger proposals might include:

- the need to screen for the need for an Environmental Statement;
- the visual impact of the structures and associated infrastructure;
- the potential of increased traffic movements and transport related emissions;
- to locate the plant as close to the sources of fuel as is practicable.
- measures to prevent unpleasant odours escaping from the facilities and having a detrimental impact on residential amenity - normally such plant will not be located in close proximity to residential areas.

Low carbon developments

61 ***Heat pumps -*** These systems extract heat from soil, rock, air or water using the same principle as a refrigeration. These systems are most efficient when providing heat at a low temperature, such as through underfloor heating or for a swimming pool. Sometimes the heat source pipes extract their heat directly from a lake, river or similar, in which case the system is known as a water source heat pump. Domestic ground and water source heat pump systems are permitted developments.

62 ***Air Source heat pumps -*** These require less space than ground source pumps as no underground pipes need to be installed. They derive their heat from ambient air or from exhaust air in a controlled ventilation system. Again they are most efficient when providing heat at a low temperature. Air source heat pumps are often used for cooling in summer as well as heating in winter.

63 ***Combined Heat and Power*** - This is a form of power generation (i.e. electric) whereby the heat produced during power generation is captured and used in local heating applications. It has greater economical and environmental benefits than conventional power generation systems being a more efficient process and so minimising energy loss and reducing costs.

There is a wide range of fuel sources available from biomass and fossil fuels to renewable sources. CHP can be used effectively in centralised power generation and to even greater effect in small-scale local generation such as district heating systems in mixed use developments and large buildings such as industrial units, leisure centres and hospitals. Prospective developers should consider the benefits of CHP in their proposals for new residential, commercial and industrial developments.

64 Planning considerations on such developments are similar to those outlined in paragraph 60 above.
More detailed and comprehensive information on how the various technologies work, their benefits and their suitability for domestic situations can be found on the Energy Saving Trust's website (www.energysavingtrust.org.uk/Generate-your-own-electricty).

FUTURE ADAPTABILITY OF BUILDINGS

65 The need to ensure that buildings are capeable of being adapted to changing circumstances over their lifetime is an important consideration. Building which are not designed to adapt to future climate changes and/or are not capeable of being easily adaptable to changing circumstances of occupants can have a significant impact on future energy demand either through their demolition and replacement, or through necessary adaptation works.

Adaptabilty to future climate change

66 Consideration should be given at the design stage towards managing and minimising the potential impact of possible future climate changes over the lifetime of the development. Possible effect of climate changes that should be considered are:

- Increased likelyhood of flooding - fluvial, flash and coastal
- Higher temperatures
- Increased demand for water but reduced supply
- Increased coastal erosion

67 Key adaptation measures for devlopers include:

- Minimise solar heat gain in summer
- Provide adequate and secure ventilation and/or cooling systems
- Minimise water demand
- Use of high thermal mass materials
- Install water efficient fixtures and fittings
- Provide features to absorb and store floodwater and attenaute run-off rates (i.e. SUDs)
- Ensure buildings are sited outside potential flood risk zones but where this is not possible, that they are designed to be resilient to future flood events

Flexible/adaptable buildings to changing occupier needs

68 Buildings should be designed for a long life, with ease of maintenance and adapatibility for changing needs. There are a number of issues that should, where appropriate, be included as part of the design process, including:

- Planning the layout of the building to allow for future changes in requirements e.g. extensions, sub-division, additional rooms (i.e. roof space), changes in use,

- Allowing space for future changes in working patterns e.g. working from home

- Having regard for the 'lifetime homes'[9] standard in designing new residential proposals which can ensure that the building can meet varying needs of different occupants in the same house or the changing needs over one family's lifetime.

APPLYING FOR PLANNING PERMISSION AND ASSESSING THE SUSTAINABILITY OF DEVELOPMENT PROPOSALS.

Pre-application

69 It is important that a sustainable design approach is adopted at the outset of the design stage of a project (even at the stage of selecting a site). Key to this will be the willingness of the developer to enter into early and meaningful discussions with appropriate officers of the Council at the pre-application stage. At the pre-application stage it will possible to discuss the key sustainable design principles of the proposed development. The context for these discussions will be provided by the relevant national (PPW, TANS etc) and local (Gwynedd UDP, SPGs) guidance. Therefore, it is expected that developers are fully conversant with the requirements of the national and local guidance before entering into discussions with the officers. The Council officers will aim to give developers a clear opinion whether their development proposal is in accordance with local and national planning policy and this guidance. The officers will also advise developers what information will be required to accompany the planning application in addition to the 'Design and Access Statement' (DAS).

Application Stage

70 In accordance with national planning policy the Council will require all DAS submitted by developers:

- to demonstrate how the proposed design and layout of their development has addressed sustainable issues raised in this guidance. See Appendix A for the checklist elements covered by this guidance to be included within the statement (as well as other aspects not covered by this guidance);

- if applicable, how they propose to meet the procedural requirements in Draft TAN 22

71 The level of detail to be included with a DAS will be proportionate to the scale, type and complexity of the development proposal. Appendix 1 of TAN 12 (Design) provides detailed guidance on the content of a DAS. In respect of energy and sustainability issues Appendix 1 of TAN 12 (Design) notes that a DAS should amongst other matters:

[9] The Lifetime Homes' standard (www.lifetimehomes.org.uk) identifies 16 features designed to make the homes more flexible and accessible.

- explain how the design of the development will meet or exceed sustainable building standards and how the design of the development has sought to reduce the carbon emissions associated with the development.
- address the need for flexibility of the development and how it may need to adapt to varying requirements of inclusiveness and sustainability over time or/and adapt for example to changing surroundings whether in use or in relation to climate change.
- A 'low or zero Carbon energy' feasibility study will be required to be submitted where such technologies are being incorporated into the development proposal. Further information regarding feasibility studies is given in Draft TAN 22.

72 In circumstances where a DAS is not statutory required to accompany planning applications e.g. housing extensions[10] (See Section A1 Appendix1 TAN 12) the Council will require illustrative material to be submitted at the planning application stage to demonstrate how the proposed design and layout of their development has addressed sustainable issues raised in this guidance. See Appendix A for the elements to be covered by the illustrative material, including, if relevant, the consideration that has been given to improving the energy efficiency of the existing building.

Planning conditions/negotiations

73 In respect of the use of planning conditions/negotiations the Council will be guided by section 7 (Planning Conditions and negotiations) of Draft TAN 22.

[10] Further advice is provided in the Energy Saving Trust leaflet Energy Efficient Domestic Extensions (CE122)

APPENDIX 1 – SUSTAINABLE CHECKLIST

Checklist		Has development design considered all of the following issues?
Land	Previously developed land	• Is the development site a 'previously developed site'? If yes, is it contaminated? Have you undertaken an appropriate site assessment?
	Re-use of existing buildings	• Are there any existing buildings on site? If yes, have you examined the possibility of incorporating them into your design proposals? • Have you undertaken a pre-demolition audit?
	Development density	• Have you made the best use of developable land? • Have you examined the possibility of increase in density and intensity?
	Efficient use of a site	• Does your proposal make the most efficient use of a site? • Have you designated all land within the iste with a function?
Transport and Movement	Encouraging sustainable transport	• How does your proposal minimise the need for car travel and promote other more sustainable modes of transport? • How does your proposal encourage sustainable transport and movement?
Energy demand	Maximise amount o 'free heat' from the Sun	• How does your proposal refelct the energy hierarchy? • Does it maximise the amount of 'free heat' that can be obtained from the Sun in terms of site layout, building design? • If the developemnt is non-residential, have you considered the potential imapct of overheating?
	Making the best use of the landscape and buildings as wind shelters	• How does your proposal propose to use the existing and proposed landscape features as shelter belts e.g. trees, hedgerows? • Have you given careful consideration to what types of tree species to plant? • Has your proposal considered the use of adjoing buildings as wind breakers? • Have you considered the impact of the wind on your development's layout
	Prevent heat loss from buildings	• Does your proposal contain appropriate levels of insulation? • Have you considered all the possible measures that could help create a well insulated building(s)?
	Ventilation	• How does your proposal address the need to provide adequate levels of controlled air ventilation?
	Natural Daylight	• How does your proposal aim to maximise natural daylight and minimise artifical lighting?
Energy efficiency	Using energy efficient appliances and products (lighting, appliances, heating)	• Does your proposal give priority to an energy efficency lighting scheme? • Does your proposal incorporate energy efficient appliances? • If the developemnt is non-residential, have you considered the potential imapct of electrical equipment on the wprking environment? • Does your proposal aim to optimise energy efficiency of its heating system?
Resource consumption	Reucing the use of resources (existing buidlings, materials, waste management, water conservations)	• Does you proposal address the issue of reducing materials used during the contruction process and to the use of sustainably sourced materials? • Does it the treatment of waste treatmment follow the principles of 'sustainable waste management? • How does the proposal propose to incorporate 'water conservation' principles and techniques?
The natural environment	Conserve and enhance the natural environment (SUDS, landscape,)	• How does your proposal address the issue of surface water disposal? • What forms of SUDS do you propose to use?
Renewable and lowz/ero carbon technology	Renewable (Solar hotwater, photvoltaic cells, wind turbines, biomass),	• If renewable and/or low/zero carbon technologies are to incorporated into the development proposal, have you considered all the relevant planning considerations? • Have you considered the need for a low/ zero carbon feasibility study?
Future adaptability builings	Adaptaion to future climate change	• How does your proposal propose to manage and minimise the impact of future climate change?
	Flexible adaptible buildings	• How does you proposal incorporate the the principles of flexibile and adaptible buildings?

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