

Dartmoor National Park Design Guide



Preface

The Dartmoor National Park Authority is the planning authority for the designated Dartmoor National Park area. In this role, it must prepare its Local Development Framework, which sets out the planning policies that the Authority will use in determining planning applications.

The principal document in the Dartmoor National Park Authority Local Development Framework is the Core Strategy, which was adopted in June 2008. The Authority is committed to preparing further documents to provide more detailed policies to aid the development management process. These documents are called Development Plan Documents (DPDs) and pass through a formal process on the way to adoption.

In addition to DPDs, planning authorities are able to produce Supplementary Planning Documents which provide more informal advice and guidance in specific policy areas. They are also given weight in the determination of planning applications.

The National Park Authority places great importance on encouraging a high standard of design in developments in the National Park and believes that a Supplementary Planning Document giving design advice is a suitable way of helping to achieve this. In this belief, the National Park Authority engaged Stride Treglown to produce this Design Guidance on its behalf.

Following widespread consultation on a draft version of the guide in early 2011, the National Park Authority adopted this design guide as a supplementary planning document in November 2011.

Dartmoor National Park Design Guide

Adopted Version - November 2011



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We will do our best to help.

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Introduction

In the 60 years since the creation of the first national parks in England and Wales, dramatic economic, social and indeed environmental changes have taken place. For example, living standards have improved, and there has been a multitude of technological advances, whilst in more recent years there has been growing concern that the way lives are being led in the modern world is leading to damaging climate change. Nonetheless, over this period the purposes of national park designation have remained the conservation and enhancement of the natural beauty, wildlife and cultural heritage of the designated areas and the promotion of opportunities for their understanding and enjoyment. However it has increasingly been recognised that in pursuing the purposes, National Park Authorities must also seek to foster the socio-economic well being of their local communities.

The need for balancing necessary change with conservation of a national asset is embodied in a Vision for the Dartmoor National Park 2027. This vision was originally inserted in the National Park Management Plan, the strategic plan for the National Park, which was published in December 2007.

It was slightly amended in the Authority's 2008 Core Strategy to give it a spatial context. The Core Strategy vision embodies the need for a sustainable future for Dartmoor - a high quality and distinctive landscape, much visited with a thriving local and working community. It is this vision that provides the context for this document. The vision is as follows:

The ancient Dartmoor landscape of deep valleys and rock-crested hills, long-established hill farms and the buried remains of Bronze Age settlements form a major component of the National Park's special qualities. From the blanket bogs and valley mires to the high moors, woodland and enclosed fields, Dartmoor National Park remains a unique and varied landscape, with habitats of international importance, an extraordinary range of wildlife and wide expanses of wildness. At the same time it is a place where people live, work and play, with consequent competing demands on resources. Farming and tourism need to be encouraged and balanced, both to manage the landscape and to enable it to be enjoyed. The conservation of the ancient fabric of the towns, villages and farmsteads remains a high priority, as does the protection of the moor from creeping urbanisation, such as light pollution and highway infrastructure. A modest degree of expansion is desirable in the larger settlements, to accommodate new employment and to provide housing for a thriving local population.

A responsible use of natural resources and a commitment to generating energy in sustainable ways must be fostered in order to minimise damage not only to Dartmoor but to the wider environment. Crucial to the future is the relationship between the local communities and the Park itself. Both the working economy and the National Park's cultural identity are vested in the local people. They provide the continuity, support and living heritage that make each place much more than a mere location on a map. This vision for Dartmoor National Park is therefore one of balance, in which both stability and change are beneficial to local people and visitors alike, and the special qualities of Dartmoor are preserved for future generations as well as for those who visit and live in the National Park.

Encouraging high quality, sympathetic and well informed design is vital to the achievement of the vision and its importance is reflected in both the goals of the Management Plan and the design and sustainability policies of the Core Strategy, the most relevant of which are included in Appendix III of this document. Essentially, this will include consideration of such issues as appropriate quality, choice of materials, accessibility and layout, all within the overall aim of conserving the quality and distinctiveness of the built environment and reinforcing local character. Additionally, design will also need to have regard to the increasing need for energy efficient development to meet the challenge of climate change. To achieve this in a manner that is appropriate in a protected landscape is a key challenge for this design guide.

However, the initial starting point for considering any design issue is an appreciation of Dartmoor itself and what makes it special. In taking that forward, the aim must be to create new and adapt existing buildings that contribute towards the distinctiveness of Dartmoor, building on, rather than diluting the sense of place and individuality.

Purpose of the Design Guide

As part of the Authority's Local Development Framework, the essential function of this document is to provide advice for those seeking planning permission from the National Park Authority for their proposals and in this context, it is intended for use by applicants and their agents and architects. However, it is important that the guide reaches a wider audience and it is also hoped that it will influence those who are planning smaller changes to their buildings, which do not need planning permission, by providing them with ideas and inspiration. While the individual impact of these works may be very small, their cumulative impact across the National Park is substantial. Finally it is hoped that it will encourage greater interest in the built environment from all those who live, work and visit the national park and inspire more enthusiasm for the maintenance and protection of its built environment.

It should be emphasised that the guide seeks to encourage innovative, high quality design, including contemporary solutions where appropriate. It is recognised that this may be particularly pertinent in meeting the challenging requirements of the government's energy efficiency agenda.

How to use this guide

Users of this guide are encouraged to read through the whole of the design guide to obtain a full understanding of design issues in the national park. However, the guide is designed so that it is also possible to look at parts of the guide that are most relevant to the particular type and scale of work that is proposed. It is divided into four parts.

Section 1 looks at the character of Dartmoor's landscape and its built environment and what makes it special. **Section 2** covers the broad issues of sustainability, how they affect design and how the sustainability agenda might be pursued in the National Park. Sustainability issues will be important factors in most types of development proposal. **Section 3** deals with specific considerations in relation to the most common types of development proposals that are submitted to the National Park Authority. It includes for example advice on farm development, domestic extensions and alterations to historic buildings. **Section 4** deals with the detailed elements of building design such as windows and doors, materials and the spaces between buildings. Good detailing, appropriate materials and a sympathetic treatment of the spaces between the buildings are vital and can make all the difference to the achievement of a successful and sympathetic end product.

In all proposals involving new buildings and alterations to existing buildings, it is important to consider design issues early in the process. Where planning permission is required then this should be at the pre-application stage and a flow diagram is included in Appendix I of this document to illustrate where this should take place and its relationship with the application process. As indicated previously, Appendix III of this document contains a list of the policies from the National Park Authority's Core Strategy that are most directly relevant to design issues. However, it should be emphasised that the principle of whether a development is acceptable is determined by reference to the full range of planning policies that currently apply. The full text of the Core Strategy and other relevant planning policies are available on the Dartmoor National Park Authority website at www.dartmoor-npa.gov.uk

1. Dartmoor's landscape and buildings

This section looks at what makes Dartmoor's landscape and buildings distinctive and special. It is relevant to all development proposals - the aim should be to reinforce Dartmoor's sense of place.

When considering the local distinctiveness of Dartmoor, reference should be made to the broad design related planning policies published in the National Park Authority's Core Strategy, including policies COR 4, COR 5 and COR 13 (see Appendix III). These describe how the scale and character of development should respond to context.

More detailed analysis is also available in Conservation Area Appraisals and the Dartmoor Landscape Character Assessment issued by the National Park Authority. These provide useful additional information on the context for design. Village design statements prepared by local communities are also a useful local resource.

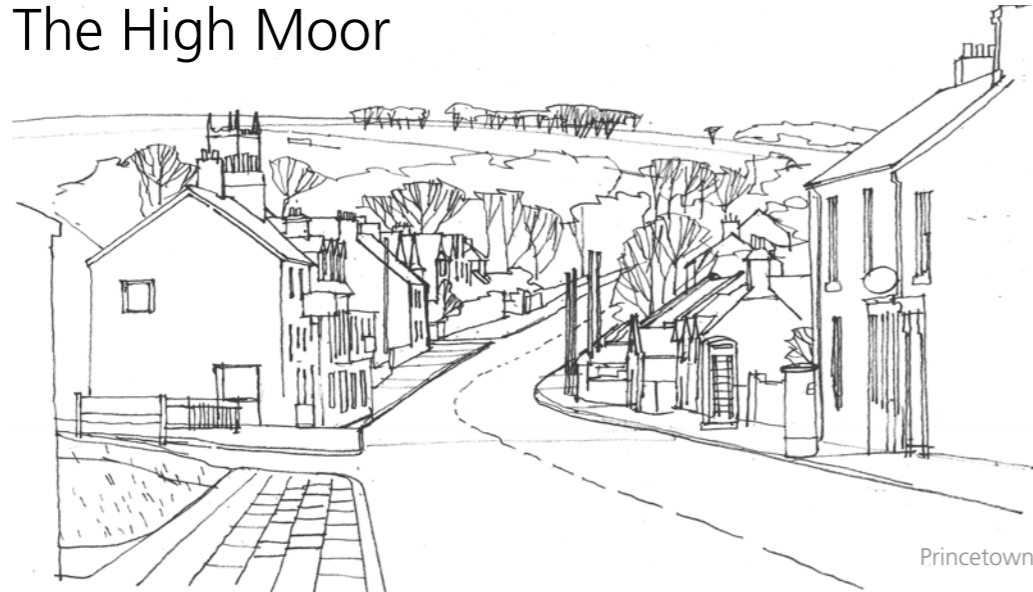
This guide identifies two distinct character areas:

The High Moor

The Moorland Fringe

Dartmoor's landscape and buildings

The High Moor



The High Moor is prized for its feeling of remoteness and uncluttered beauty. At its heart are the large unsettled plateaux of the north and south moors with broad ridges, expansive panoramic views and an overwhelming sense of remoteness and exposure. Below these uninhabited areas sits a gently rolling large scale moorland landscape with a strong sense of exposure and tranquillity and often far reaching views. It is a key aim of the National Park Authority to protect these special qualities. Development opportunities in this landscape will be limited, but because of its sensitivity, even small changes can be very noticeable and careful, sympathetic design is vital.

The High Moor was widely settled in prehistory when the climate was less harsh. Prehistoric boundary walls or reaves mark out large parts of the moor - even reaching up to the granite tors. These fields and their related settlements were abandoned in the first millennium BC but along with the ritual and ceremonial monuments - stone circles, stone rows, standing stones and burial mounds - they are still a prominent part of the landscape today.

During the later medieval period, with

an improvement in the climate, an effort was made to re-colonise the moor, but many farmsteads were subsequently abandoned. At the same time, tin mining became a major industry driving the prosperity and development of settlements on the moorland fringes like Chagford and Ashburton. They are linked to the High Moor by ancient roads and lanes.

Princetown is the only settlement of significant size on the High Moor. It began as a small agricultural settlement at the end of the 18th century and then later expanded when the prison was established. Elsewhere, small settlements have grown up on or close to the main roads that traverse the moor, often near river crossings.

The headwaters of the River Dart form a shallow basin within the central High Moor area - providing just enough shelter for a collection of isolated farmsteads. The fields close to the farms are bordered by dry stone walls. The land is generally cleared of the boulders that lie elsewhere on the open moor. Farmsteads usually consist of a farmhouse with a few related outbuildings often arranged in compact, tightly clustered groups. The whole impression is of simple



Opposite above
Industrial buildings associated with the tin mining industry at Powder Mills in the centre of the moor

Opposite below
The landscape of the High Moor - isolated farms with fields, cleared of moorstones stand out against the rough grassland of out-fields that merge with the open moor

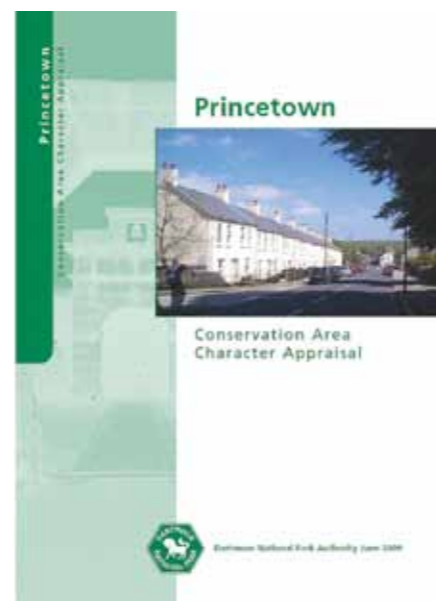
Opposite
Buildings of the High Moor - simple forms and uncluttered roofs

1. Challacombe
2. Merrivale
3. Granite wall near Postbridge
4. Houses at Zoar
5. Dunnabridge Pound - a typical farm on the High Moor, built to withstand the wind and weather - a tightly grouped collection of farm house and out buildings with a shelter belt of trees
6. Granite drystone wall near Peter Tavy

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5	6

forms without visual clutter. The buildings rarely break the skyline - instead they turn their back against the weather using natural hollows for protection as well as shelter belts of planted trees. These are simple, robust buildings built to withstand the elements.

The building material of the High Moor is granite. Large blocks of weathered stone, collected from the surface of the moor, are often directly incorporated in buildings. The farmstead buildings have stone walls - sometimes rendered to give additional weatherproofing. Roofs are slate and tend to be of shallower pitch than the steeper roofs of the moorland fringe - the eaves keep tight to the face of the building. Farmhouses have a strong horizontal emphasis with large chimneys at each gable end and windows are small. Barns and other farm buildings have few, mostly small openings and no chimneys of course and are generally without gutters.



Above
The National Park Authority's Conservation Area Appraisals give useful information on the character of historically significant areas and their special features

The landscape and buildings of the High Moor

- Granite is the universal building materials for buildings, field walls, and bridges.
- Farmsteads tend to be simple in form and set against a wide backdrop of open moor.
- Buildings are usually sited in natural folds and hollows in the landscape for shelter with a shelter belt of trees to the southwest.
- Buildings have granite stone walls, sometimes rendered for additional weatherproofing and slate roofs.
- Roofs are uncluttered with the eaves tight to the face of the building.
- Houses have a strong horizontal emphasis with large chimneys at each end.
- Barns and other farm buildings have few, mostly small, openings without chimneys and gutters.

Useful links and contacts

Download the character appraisal for the Princetown conservation area at: www.dartmoor-npa.gov.uk

Download 'A Landscape Character Assessment for Dartmoor National Park' at: www.dartmoor-npa.gov.uk



Dartmoor's landscape and buildings

The Moorland fringe



Chagford

At the edges of the High Moor, the land quickly descends into the steep wooded valleys of the moorland fringe. As the valleys level out, the landscape becomes an undulating mixture of farm, wood and river giving it a rich mosaic appearance. Occasional patches of moorland rise up to isolated tors but the dominant character is one of rich green pasture set against the darker greens of woodland. Where the High Moor is visible beyond the settlements, the brown and orange of the rough grass and bracken provides a striking contrast - especially in autumn and winter.

streams that flow off the moor gather together to form fast flowing rivers such as the East and West Dart, Tavy and Teign on which the larger settlements of Dartmoor have grown up. These rivers were once used to generate power for corn grinding and cloth making.

Farmsteads and hamlets in the valleys are linked by a web of sunken lanes which cross the rivers on elegant granite bridges. When compared with the High Moor, this landscape appears busy with human activity and movement.

Settlements and buildings in the moorland fringe increase in scale, size and complexity as the shelter of the lower valleys is reached. The typical, isolated farm of the High Moor gives way to sheltered hamlets containing two, three or four farms grouped together. This transition is less marked on the western fringes, which

The smallest fields are concentrated around the immediate fringe of the open moor at higher altitudes. As they reach the valley bottom, the fields become larger - bordered by stone faced, earth-filled, Devon banks that support large mature trees and thorn hedges. The numerous



Opposite above
Widecombe - on the fringes of the open moor

Opposite below
Chagford - a rich mixture of styles and ages of buildings

even at lower altitudes, are still so exposed to the harsh winter weather that they reproduce some of the robust forms of the High Moor.

The underlying geology is very varied and this is reflected in the building stones of the settlements. Granite, the universal stone of the High Moor and the area immediately adjacent to it, gives way to a mix of other stones at lower levels. To the west, around Lydford and Mary Tavy, buildings are constructed of slate and mud stone walls with slate roofs; in the south east around Buckfastleigh and Ashburton, limestone predominates; in the north and east cob and thatch are common. As a consequence, similar building types, forms and elements - like the Dartmoor porch – are translated slightly differently according to locality and the qualities of the local building materials.

The farmsteads and hamlets of the moorland fringe comprise mainly vernacular buildings. These tend to be unfussy, simple structures – reflecting slowly evolving and centuries old traditions. Dartmoor farmhouses tend to be low and long, built into the slope of the hill and detached from, but close to, the associated farm buildings. There are two traditional farmhouse types, each with a passage across the building dividing it into two parts. In the three room cross-passage house, the room at the lower end, on the opposite side of the passage to the living area was often used as a dairy or buttery, whilst in the longhouse, the lower end of the building was known as the shippon and housed livestock.

In vernacular buildings, the walls are invariably constructed from locally available stone and, where geological conditions dictated, of cob - a mixture of subsoil and straw. Their strong visual presence comes in part from their distinctive roofs – a consequence of a steep pitch being needed for good drainage and the roof covering type. Many historic buildings were probably originally thatched, but this has often been replaced with slate.

Windows tend to be small side-hung casements with deep reveals as protection against the weather and stone or wooden lintels. They frequently vary in size and position.

In places such as Chagford, Ashburton and Buckfastleigh, and in some of the other larger settlements, the character of the buildings changes. Towards their centres, the horizontal emphasis of the rural vernacular gives way to a more vertical and sometimes more ordered style. The density of development also increases towards the centre; terraces become more common and buildings jostle with each other for attention. It is in these settlements that most new development will take place and design proposals will need to respond to surroundings that display a great variety of scale, height and detailing, contributing to a rich visual picture.

Buildings in the centre of larger settlements are sometimes three storeys high, but rarely more, and often front directly onto the street. They aim to be well proportioned and frequently have decorative features such as window



Opposite above
In the centre of settlements the buildings have a greater variety of scale, height and detailing, making for a rich visual picture - Ashburton

Opposite below
The western fringe - stone walls with openings framed in granite - a plain and functional appearance softened by the quality and character of the stonework and the overall composition - Lydford

Opposite

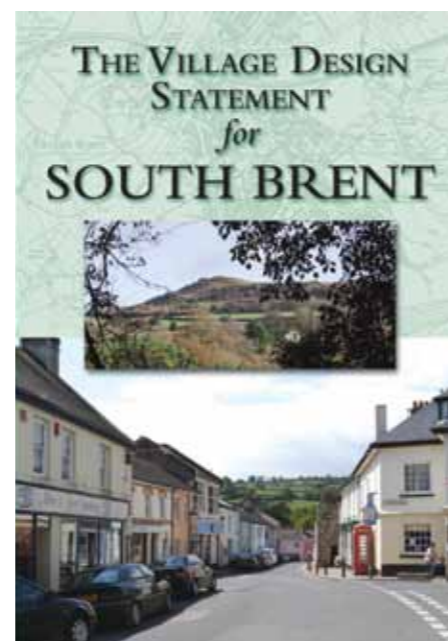
The moorland fringe

1. Cottage in Lydford
2. Higher Uppacott: classic Dartmoor longhouse with the farmer's accommodation on the upper slope and the animals accommodation on the down slope
3. Asymmetrical elevation of a vernacular building in Sticklepath
4. Contemporary house in Moretonhampstead
5. Georgian timber frame house with slate hung walls in Buckfastleigh
6. Buildings in Ashburton based on classical proportions and having a more 'ordered' style

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mouldings. There is a greater balance between solid and void with larger vertical sliding sash windows. Greater use is made of render and colour. Slate hanging and render on timber framing are also common.

Dartmoor National Park Authority publishes character appraisals for the conservation areas on Dartmoor. They give a background to the history and development of the settlements and pick out distinctive buildings and building details. Use these appraisals and, where available, village design statements prepared by the communities themselves to inform and inspire development proposals.



The landscape and buildings of moorland fringe

- The scale, size and variety of buildings increases as you leave the open moor and reach the shelter of the lower areas.
- The major building style in rural areas is vernacular – sheltered hamlets contain two, three or four farmsteads grouped together
- In the larger settlements, a more urban, ornate and ordered building style makes its appearance - especially in their centres.
- Within the larger settlements the buildings have a great variety of scale, height and detailing making for a rich visual picture.
- Common building forms and elements are translated slightly differently according to locality and the qualities of the local building materials.

Useful links and contacts

Download character appraisals for the conservation areas on Dartmoor at: www.dartmoor-npa.gov.uk

Download 'A Landscape Character Assessment for Dartmoor National Park' at: www.dartmoor-npa.gov.uk



2. Sustainability

This section looks at the broad issues of sustainability and how they affect development. Sustainable design and good design are mutually reinforcing. Good design is not just defined by how a building, space or place looks. It is also about whether it is responsive to context, adaptable, uses resources efficiently and delivers value over its whole life. All development will need to deliver well designed, sustainable buildings and high quality environments, providing the conditions for a flourishing economy, for the prudent use of natural resources and for social progress. Good design encourages sustainable living by helping to create buildings and spaces that fulfil environmental, social and economic needs.

Introduction

Embodied energy in buildings

Principles of passive design

Renewable energy sources

Contemporary design

Inclusive design and accessibility

Development and the historic environment

Biodiversity and nature conservation

How is sustainability measured?

Sustainability

Introduction

Sustainable development is about enabling all people to satisfy their basic needs without compromising the quality of life for future generations. This means:

- Living within the resources of the planet and reducing man-made greenhouse gas emissions.
- Safeguarding the local environment and retaining a sense of place by designing buildings that: respond to local context and traditions, meet the needs of people at all stages of their lives and promote well being, social cohesion and inclusion.

Climate change, brought about by increasing man-made greenhouse gas emissions is considered to be one of the greatest environmental challenges now facing us. Carbon dioxide is the most important of the greenhouse gases.

New and existing buildings account for about 40% of man-made carbon dioxide emissions. These emissions are attributable to both the energy used during the buildings construction and to the energy consumed once it is inhabited, such as through lighting, heating or cooling.

Sustainable, low carbon buildings are designed to produce significantly lower carbon dioxide emissions, thereby helping to mitigate climate change, with the ultimate ambition to achieve 'zero carbon' development while fostering more sustainable communities and ways of living.

The National Park Authority is committed to ensuring that new development will be constructed to high standards of design and energy efficiency. That ambition extends to encouraging energy efficiency in existing buildings. The National Park Management Plan advocates increased energy efficiency in the home, reduced travel and the reuse and recycling of materials as key areas in reducing carbon emissions. Moreover, the Authority's Core Strategy contains a policy in general support of small scale renewable energy schemes.

However, none of this must result in harm to the individuality and local design distinctiveness of the National Park and there will always need to be compromises to protect the special qualities of the built environment as well the other special qualities of the National Park. Inevitably therefore, there will sometimes be tensions and what some might see to be conflict in the advice that follows between the most energy efficient solution and keeping Dartmoor special. What is the acceptable balance will differ from place to place and from building to building.

With that in mind it is important to consider a range of strategies to increase energy efficiency and because there are thousands of existing buildings in the National Park, increasing the energy efficiency of the current stock is a fundamental starting point. Some of this can be done quite simply and it is hoped that this guidance provides some pointers. In addition to the guidance set out below, the Authority through its website contains further information particularly on micro-renewables.

The following are the key strategies in making buildings more sustainable but a rounded view of the most appropriate and effective solutions should be taken according to individual circumstances:

- Minimise the energy consumed in preparing the materials and construction of new building - the embodied energy of a development.
- Design buildings to minimise energy consumption during use with passive design strategies.
- Reduce energy consumption in existing buildings by adding insulation and upgrading the thermal performance of windows and doors.
- Use more energy efficient appliances.
- Generate energy locally using renewable (non fossil fuel) sources such as hydro and solar power.

Sustainability

Embodied energy in buildings

The embodied energy of a development is the energy used to extract, process and transport its building materials, and to construct the building. The energy used to construct a new building can dwarf the energy saved over its useful life. For this reason it is preferable to adapt existing buildings rather than demolish and replace wherever possible since, even when derelict, they represent a considerable store of embodied energy. Not only does this approach reduce the carbon footprint of a development when compared to a completely new building, but on Dartmoor it can also contribute to maintaining the unique character of the National Park.

Similarly, traditional building materials, which contribute so much to the quality of Dartmoor's buildings, tend to have low levels of embodied energy since they often involve minimal processing (for example stone, cob and timber) and are sourced locally. Their use is therefore sustainable in the truest sense.

Key strategies for reducing embodied energy should include:

- Using local and reclaimed materials wherever possible - this reduces the need to transport materials over long distances - does it make environmental sense, for instance, to import granite from China, or slates from Brazil when there are locally sourced supplies available?
- Checking the environmental impact of extracting of raw materials - is the timber sourced from a sustainable, managed forest so that for every tree felled another is planted?

- Considering the manufacturing processes of building materials – does the process use high levels of energy as in steelmaking, or lower levels of energy such as at timber sawmills – and how much pollution does it create?
- Considering methods of construction such as prefabricated timber panels that are erected quickly and create very energy efficient buildings.
- Considering the eventual demolition of the development. Design the building so that when it has reached the end of its useful life, its elements can be easily dismantled for reuse in another building.

Carbon Footprint

It is now widely accepted that Greenhouse gas emissions caused by humans are having a significant impact on our climate. The most important greenhouse gas is carbon dioxide (CO₂). Almost all human activities cause CO₂ emissions – for example generating electricity from fossil fuel power stations; burning gas for heating; driving a car; and using energy for the production, transport and disposal of building products. The total level of greenhouse gas emissions caused directly and indirectly by an individual, organisation or product is commonly called their carbon footprint.

Sustainability

Principles of passive design

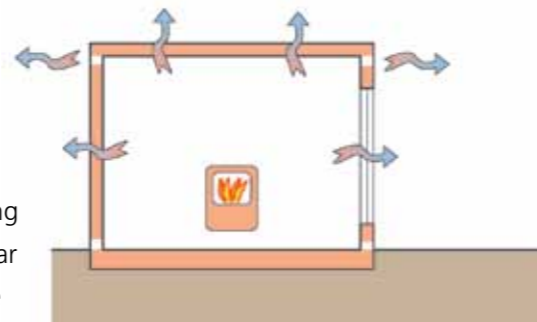
To be effective, passive (non-energy using) strategies need to be incorporated at the earliest stage of the project as they can have a fundamental impact on the siting, design and layout of a new building. Passive design maximises the capture and use of freely available solar energy to reduce energy demand for heating, cooling and lighting, whilst avoiding excessive solar gain. Many of these principles can also be applied to existing buildings.

Insulation and draught proofing

A cost-effective way to reduce energy consumption is to maximise the amount of insulation in the building. Managed ventilation will be required to combat the increased potential for dry rot and also (on Dartmoor) to combat any build up of harmful radon gas but this can provide additional opportunities for heat exchange or recovery. This is a far cheaper and more effective strategy than adding expensive renewable energy technologies, especially in existing buildings. Full insulation in an average dwelling can reduce heat loss by 65%.

Single glazed windows in buildings are a major cause of energy loss, so consider replacement with new double or triple glazed timber units. Where historic windows are to be retained, consider other measures such as draught proofing secondary glazing, internal shutters and heavy curtains. Simple maintenance and refurbishment also helps thermal performance, for example by repairing poorly fitting windows and doors. Upgrading poor roof and cavity wall insulation also makes a substantial

Large amounts of energy are lost through gaps in the building fabric and through single glazed windows



Poorly insulated building

Heat is lost through the building fabric resulting in high energy consumption, high heating bills and an uncomfortable environment

Gaps in the building fabric are filled, windows need to be double or triple glazed



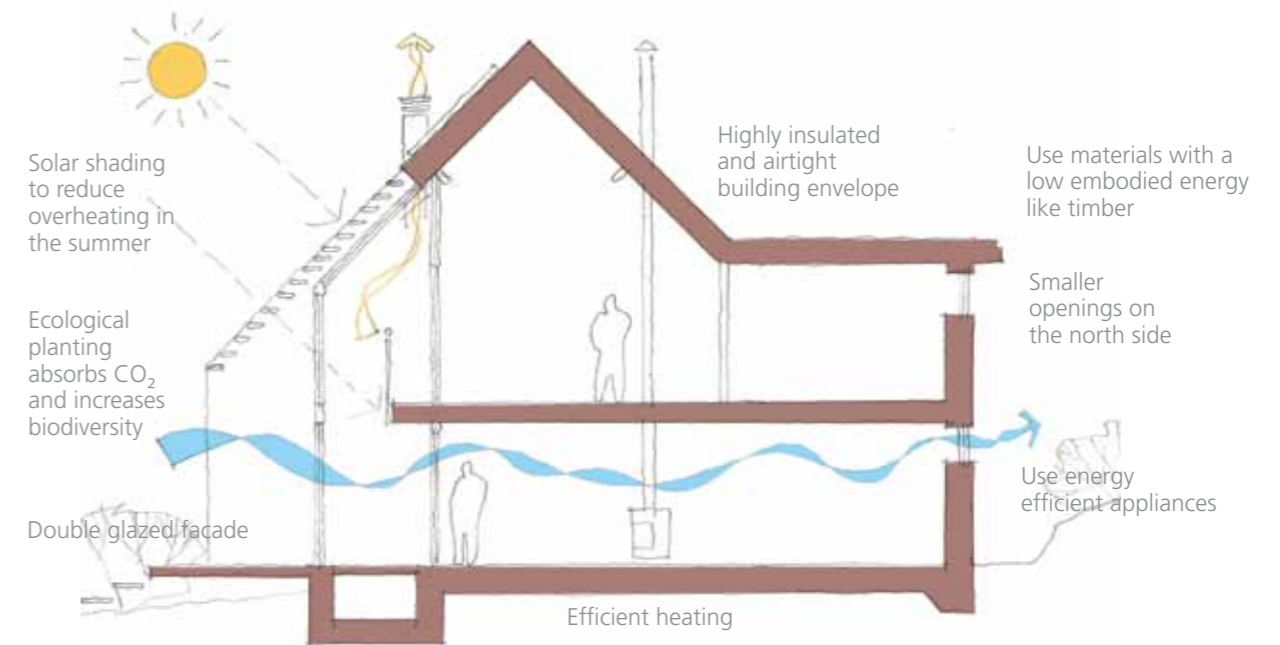
Well insulated building

Heat is retained within the building resulting in lower energy consumption, lower heating costs and a more comfortable environment

contribution to achieving thermal efficiency.

Siting and passive solar gain

The site layout should maximise the potential for solar gain, with buildings orientated to within 30° of due south. Gain can be maximised by locating the main living and working spaces to the south elevation with larger windows where they can benefit from direct sunlight.

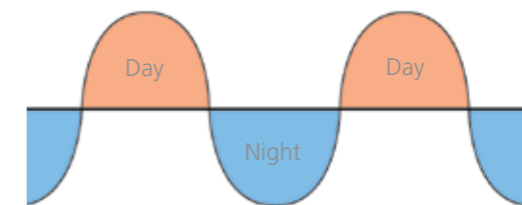


The principles of passive solar design

Service rooms, with smaller windows are then placed on the North elevation to minimise loss. Traditionally on Dartmoor, belts of trees are planted to the southwest to provide shelter from prevailing winds and this is also a useful strategy to combat cold northerly and easterly winds. Planting can also be used to provide shading in the summer months.

In existing buildings that have limited opportunities for increasing insulation (solid stone walls for instance), attaching an unheated space such as a greenhouse, conservatory or garage to an outside wall could be considered. This will reduce heat loss by providing a thermal buffer space.

South facing glazed conservatories are particularly effective in the winter when the heat of the winter sun is captured in the thermal mass of the building, which is then radiated out to help reduce winter heating costs and even out internal temperature fluctuations. However conservatories suffer



Internal temperature fluctuations in a building with little thermal mass

In a poorly insulated building with little thermal mass the internal temperature closely follows the wide fluctuations in external temperature



Internal temperature fluctuations in a building with thermal mass

In a well insulated building, with plenty of thermal mass, fluctuations are evened out resulting in a more comfortable internal environment reducing the need for artificial heating and cooling

significant heat loss and should only be used as living space as and when it is warm enough to do so without artificial heating. Care must be taken to ensure that the cold air from the conservatory is not allowed to circulate into the main house.

Thermal mass

Buildings that have internal thermal mass (dense materials like brick, cob, concrete block and stone) are able to absorb, store

and then slowly release heat from the fabric of the building. This creates a more comfortable internal environment by evening out temperature fluctuations between day and night and thereby reducing total energy demand.

In the summer, thermal mass has a cooling effect and in the winter, it has a warming effect. To work in winter, the thermal mass needs to be directly exposed to winter sunlight from south facing

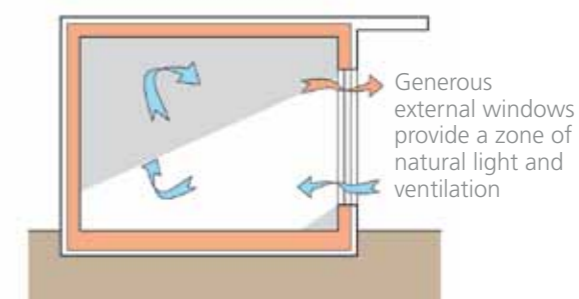
windows. The thermal mass is warmed passively by the sun during the day. Heat stored in the mass is then released back into the interior during the night.

The 'thermal store' effect can be enhanced by artificial means, for instance, by placing pipes within the thermal mass, that connect to a ground source heat pump to exploit the thermal mass of the earth. As the ground is at an almost constant temperature throughout the year, it can be used to heat or cool the building.

Thermal mass needs to be exposed within the building to function well, so covering a solid stone floor with carpet or timber and walls with plasterboard will negate the advantages of thermal mass.

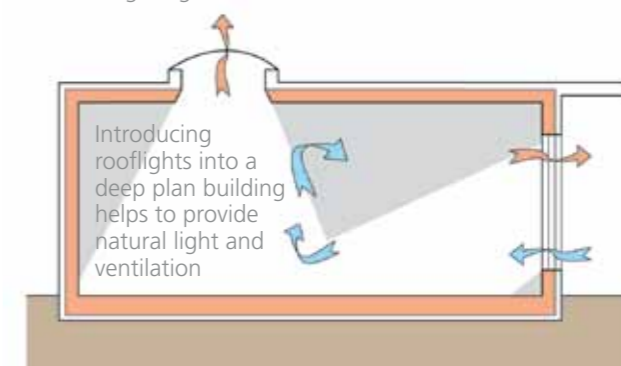
Building form

Square, deep plan buildings are potentially more energy efficient with a low ratio of external wall area (where heat is mainly lost) to internal volume. This advantage has to be balanced against the need to achieve acceptable levels of natural ventilation and daylight in the centre of the building. Rooflights can help, but in a multi-storey building the effect will be limited to the upper floor. It is usually preferable to sacrifice some of the thermal advantages of a deep plan for shallower spaces - about a maximum of 6m wide - where natural light is able to penetrate the room and opening windows can create natural air circulation currents.



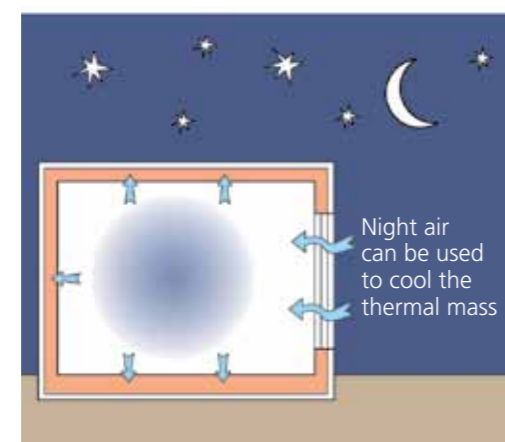
Building form - shallow plan

Shallow plan building forms (less than about 6m wide) can be naturally ventilated and have enough natural daylight to reduce the need for artificial lighting

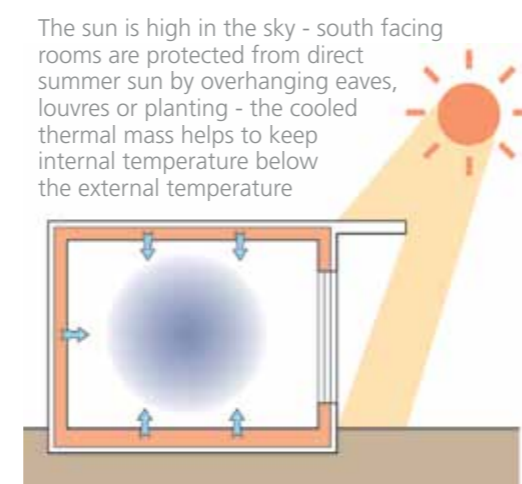


Building form - deep plan

Deep plan building forms are inherently more difficult to light and ventilate naturally

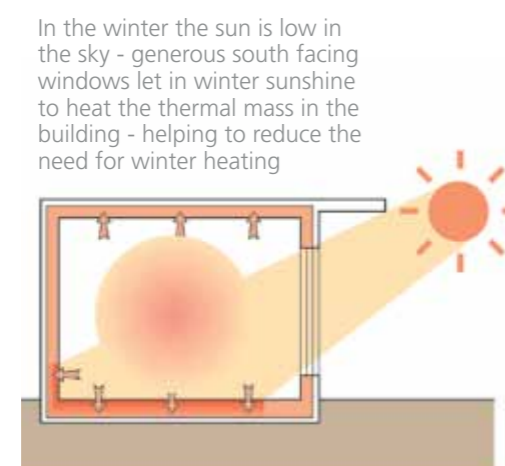


Thermal mass - summer night



Thermal mass - summer day

Summer



Thermal mass and passive solar gain on a winter day



Thermal mass - winter night

Winter



Many Georgian and Victorian buildings have larger windows serving the main living and working spaces so they are flooded with daylight - this strategy will help reduce the need for electric lighting

Rainwater harvesting and water recycling

A great deal of energy is used in purifying and transporting water to homes and businesses and this results in significant greenhouse gas emissions, so minimising water consumption is the main goal. At each level of the Code for Sustainable Homes, minimum standards of water efficiency are required (see the section on ‘How is sustainability measured?’ on page 46 of this guide). This can then be supplemented by harvesting rainwater and recycling ‘grey’ water from washing machines and baths to flush toilets. Recycled water will require filtration equipment and a large storage tank - usually sited underground. To reduce

water consumption, bathroom and kitchen fixtures and fittings should be specified/ upgraded to include:

- Spray taps.
- Low flow rate showers (less than 9 litres/min).
- Low volume toilet cisterns.
- Dishwashers and washing machines which use water efficiently.

Adaptation - responding to climate change and “future proofing”

Not only do we need to reduce the environmental impact and energy use of new development but also to ensure that it is designed to meet the challenges of the changing climate. The location and

Plant native trees to act as shelter and to increase biodiversity on the site

Position larger windows on the south facing elevations and relate them to main living spaces

Orientate the building to make the most of freely available light and energy from the sun

Passive design strategies

Out buildings are good places to unobtrusively site solar PV panels and other renewable energy technologies

Redundant buildings represent a substantial source of embodied energy - bring them back into use as workshops and home offices for sustainable living and working

Unheated spaces such as conservatories and garages can be attached to the outside of heated rooms to act as thermal buffers helping to reducing heating needs and costs



Sustainability - key design principles

Remember that sustainable design addresses a broad range of factors, not just energy consumption and carbon footprint. A holistic approach that ensures that the development is functional and attractive as well as environmentally sustainable throughout its life must be considered from the outset.

Energy

- Reuse and adapt buildings to save embodied energy.
- Incorporate high levels of insulation in both existing and new buildings.
- Design to use passive solar gain to maximise natural light and solar energy opportunities.
- Utilise thermal mass effectively and consider omitting central heating.
- Reduce energy demand, fit energy efficient condensing boilers, lighting and specify high efficiency rated (A and above) electrical appliances.
- Consider energy use during construction, use local labour and suppliers where possible.
- Use renewable sources of energy – biomass, solar and micro-hydro opportunities are more suited to Dartmoor.

Water

- Reduce water consumption and utilise rain and grey water.
- Minimise surface water run off with a sustainable drainage system (SUDS) including permeable paving.
- Consider using reed beds for treatment of foul waste.

Materials

- Specify and use recycled building materials where possible.
- Use construction materials that can be recycled, are biodegradable and non-polluting.
- Use timber from a sustainable source and source materials locally.

Transport

- Prioritise and encourage opportunities for use of sustainable means of transport such as walking, cycling and public transport in the site design.
- Provide secure, sheltered bike storage and create cycle and footpath links to surrounding areas.
- Maximise accessibility to public transport and reduce car parking where possible.
- Design to support working from home - include study/workshop space.

Waste recycling

- Incorporate facilities for sorting and storing waste at source to achieve high levels of recycling and composting.
- Allow sufficient external storage space for waste and recycling bins.
- Incorporate measures to minimise the amount of packaging and waste generated during construction.

Accessibility and inclusion

- Design new buildings to meet the needs of all users making the development welcoming and accessible to all.
- Improve accessibility to existing buildings where possible.
- Design to encourage social interaction with attractive public and shared community spaces.
- Facilitate access to community facilities such as community buildings, shops, pubs and places of worship.

Future proofing

- Design the building so that it can be adapted to changing needs. For housing, consider designing homes to the Lifetime Homes Standard, ensuring they will be more adaptable as peoples’ lives change.
- Design to withstand and adapt to the potential impacts of future climate change, such as hotter summers, wetter winters and an increase in extreme weather events.

design of new buildings should minimise vulnerability to climate change and design decisions now should not constrain future options to adapt and respond.

It is expected that there will be hotter dryer summers and warmer wetter winters with an increase in extreme weather events, such as storms. Consideration will need to be given as to how development should respond to such challenges and to design accordingly.

Consider the following:

- Is the location at risk from flood, erosion, subsidence, instability, storm, drought, pollution? If so, can the development be located elsewhere?
- Has the design of the building taken into account the potential impact of climate change? (eg flooding, subsidence, driven rain, wind exposure, solar gain and UV exposure).
- How long is the building likely to last and how appropriate will the design be over that time - Is it compatible with anticipated changes and increased risk?
- Has the impact of climate change been considered in the selection of materials and fittings? (eg: slates, fixings, render, hard surfacing, drainage, roofing systems etc)
- What are the implications for the environment, for the economy and for the community of protecting a development from such risk? (eg is flood protection cost effective? Will it destroy valuable habitats? Will it induce flooding elsewhere?)

Opposite above
The Haytor Centre embraces a number of sustainable building approaches including an air source heat pump, rainwater harvesting, sheeps' wool insulation and locally sourced timber

Opposite above
Encouraging sustainable transport - bicycle racks at the National Park Authority offices in Bovey Tracey

Useful links and contacts

The Building Research Establishment (www.bre.co.uk) provides expert, impartial research, knowledge and advice.

The Green Building Bible (www.greenbuildingbible.co.uk) contains a comprehensive and practical introduction to sustainable building.

Other useful contacts are: the Energy Saving Trust at: www.energysavingtrust.org.uk

the Centre for Sustainable Energy at www.cse.org.uk and the Devon Sustainable Building Initiative at: www.sustainablebuild.org

The Green Building Forum at www.greenbuildingforum.co.uk contains advice and opinion on topical issues relating to sustainable building.

Some of the above sites contain information about grants but the availability of grant aid is constantly changing and up to date information can be obtained from the Department of Energy and Climate Change at: www.decc.gov.uk



Sustainability

Renewable energy sources

Integrating renewable energy technology in a sensitive setting such as Dartmoor sets particular design challenges. The impact of installations on the natural and built environment must be carefully addressed.

Biomass

Biomass fuel sources are varied, some are purpose grown such as miscanthus and others arise from a wide range of organic waste sources. On Dartmoor, small-scale, domestic biomass use normally takes the form of wood pellets, wood chips or wood logs. Small stand-alone stoves can provide heating for domestic rooms and can be fitted with a back boiler to provide water heating. Larger, whole house or community schemes are also becoming more popular and offer opportunities for combined heat and power. Early consideration must be given to allowing adequate space and access for fuel delivery and storage in the design process.

Producing energy from biomass has both environmental and economic advantages. It is a carbon neutral process as the CO₂ released when energy is generated is balanced by that absorbed during the fuel's growth. Waste wood and low grade timber may be locally available from forestry activities and wood fuel networks are developing.

Hydro-electric generation

Streams and rivers on Dartmoor have been used for centuries to generate power. Micro hydro schemes have potential on Dartmoor because of the high rainfall and topography with numerous small, powerful streams and leats.

Hydro-power works by using falling



water to drive a turbine. The amount of energy produced depends on how far the water is falling - the head – and the flow. It generates a steady, reliable supply of electricity compared to wind or photovoltaic installations. It particularly complements photovoltaic installations because river flow, and power generation, is greatest in the winter when solar energy is at its lowest. Carefully designed micro hydro systems take only a small amount of water from a river or stream and return it a short distance downstream – reducing their environmental impact. One way to identify possible sites for small hydro projects is to look for old water mill sites – some existing structures may already be in place, helping to reduce build costs and there will be an obvious, established precedent. Planning permission and consents from the Environment Agency will be needed and an Environmental Impact Assessment may also be required. The Authority has a protocol to deal with such proposals and it invites all potential applicants to look at the advice on its web site before submitting a formal application.

Solar hot water panels

These panels absorb energy from the sun to heat water for baths and showers, supplementing a conventional water



heater. The panels are relatively heavy as they contain circulating water, so the roof needs to be strong enough to take their weight. Extra internal space may also be needed for a larger twin coil or an additional water storage cylinder. There are two types of panel available, the efficient evacuated tube or the flat plate panel. Both are low maintenance once installed. For either system, it is important that safety devices are fitted to prevent overheating.

A typical domestic installation will need about four square metres of panels facing southeast to southwest. The panels should not be installed on listed buildings or on street front facing roof slopes on non listed buildings in conservation areas. Prominent roof slopes facing roads on other buildings should also be avoided if possible. The dimensions of the panels and their colour should be carefully considered to integrate as much as possible with the roofscape to minimise visual impact and the panel should sit as close to the plane of the roof as possible.

Solar photovoltaic panels

Solar photovoltaic panels absorb energy from the sun to generate electricity. A PV array needs to be fitted on an unshaded south facing roof at a tilt of 30 degrees to work most effectively in south west England. Orientation from east through to west will still harness the power of the sun albeit with a longer financial payback.

The most common are panels fixed to the roof slope; others can be attached, less obtrusively, to glass on conservatories to provide shading as well as electricity. Unlike solar thermal panels, which need to be located near to the water storage cylinder, photovoltaic panels can easily be located on an outbuilding or at ground level. For the amount of energy they generate, they are usually considered to be an expensive option but they are generally low maintenance as there are few moving parts to go wrong. Solar slates are now available which mimic natural slate and may provide a low impact option in an area like Dartmoor where the most common natural roof covering is slate. While the

Dartmoor's streams and rivers have great potential as a source of renewable energy - this is Horrabridge

visual considerations and restrictions on solar photovoltaic arrays are similar to those for solar water panels, photovoltaic panels sit closer to the plane of the roof and as the technology improves, particularly with regard to solar slates, they may become even more widely acceptable and potentially suitable for use even on listed buildings.

Wind generation

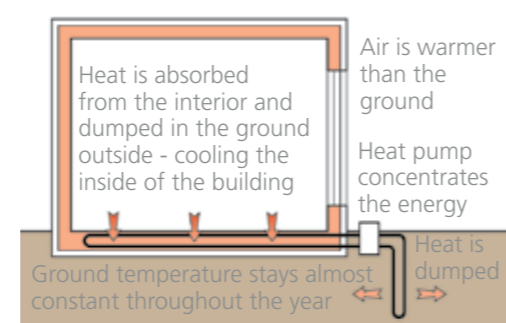
Wind turbines can be a cost effective and sustainable way of generating energy but performance is very site specific and specialist consultation is likely to be required. The output from a turbine depends on its size and location. They are dependent not only the speed of the wind available but also on its consistency and direction and the effects of turbulence because of proximity to other structures or topography. More successful installations tend to be in exposed areas where they can take advantage of higher wind speeds from a wide variety of directions. The major issues in the National Park will be their visual intrusion in the landscape, the noise they generate in operation and the impact they have on wildlife, so sensitive siting will be an important consideration. Typically, a domestic system will need to generate 3 to 6 kilowatts which requires a large stand alone turbine; smaller capacity turbines tend not to be sufficiently efficient to be viable. Situations where this form of renewable energy source is acceptable on Dartmoor may therefore be limited.

Ground and air source heat pumps

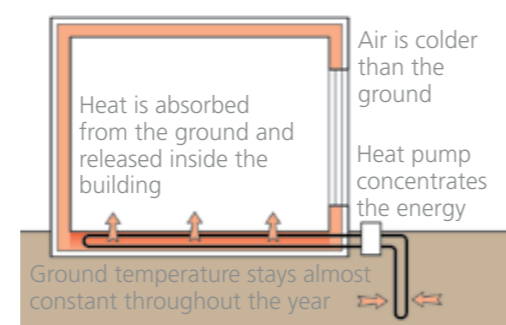
This is a well established technology used in fridges and air conditioning units. It is



Solar slates incorporated on a natural slate roof



Ground source heat pump - summer



Ground source heat pump - winter

not strictly a renewable source as it requires an input of electrical energy but uses it in a very efficient way. Linking the pump to a renewable energy source, such as photovoltaic cells, would make the process even more sustainable. For ground source heat pumps, every unit of electricity used to power the pump, needs to produce around 3 units of heat to achieve any carbon saving. The pump transfers heat

from the ground into a building usually via low temperature underfloor heating but cannot be used with radiators. Lengths of pipe are buried in the ground, either in a borehole (at least 10 to 15 metres deep) or in a horizontal trench over a considerable area - often 75 to 100 square metres. Care must be taken to ensure that there is no detrimental impact to biodiversity or archaeological features when laying the pipes. The pipe is filled with a mixture of water and antifreeze, which then absorbs heat from the ground. The heat pump transfers the heat to a hot water tank which then feeds the heating system. The process can be reversed in the summer to aid cooling and dump unwanted heat in the ground.

Air source heat pumps are less efficient but work in a similar way to ground source heat pumps by absorbing heat from the outside air. This is then used to warm water (for radiators or underfloor heating) or to warm the air in the building. A unit can be fitted to an outside wall or placed on the ground – it will need plenty of space to ensure a good flow of air. As air source heat pumps generate less heat than traditional boilers, it is important that the building is well insulated.

Combined heat and power

A combined heat and power installation simultaneously generates heat and power - recovering the heat that would otherwise be lost to the atmosphere. It is important to be able to match both heat and power outputs with demand to work efficiently, often more difficult to achieve in the summer. This technology works well for larger developments where a

central plant serves a number of buildings although systems for individual houses are now available and the technology can be accommodated in most existing buildings.

Renewable energy

- Remember reducing energy consumption is the top priority - maximise the amount of insulation in the building and prevent drafts.
 - Wood stoves are a good renewable energy strategy for Dartmoor.
 - Consider the use of micro hydroelectric power. Look for sites where old mills used to work.
 - If ground conditions permit, consider ground source heat pumps. Photovoltaic and solar thermal panels can often be sited on the roof without the need for planning permission (but restrictions apply on listed buildings and in conservation areas).
- Planning policy information is available from the Planning Portal - navigate to 'Greener Homes' www.planningportal.gov.uk
- The National Park Authority website at www.dartmoor-npa.gov.uk contains useful information on the circumstances when permission is need for the installation of renewables.
- Advice for individuals and organisations on energy efficiency, renewable energy, sustainable transport and sustainable building is available from Energy Action Devon (incorporating the Devon Association for Renewable Energy) at: www.energyactiondevon.org.uk
- British Hydropower Association publish 'A Guide to Mini-hydro Developments' www.british-hydro.co.uk

Useful links and contacts

The Centre for Alternative Technology and The Energy Saving Trust have free information sheets including information on installation costs. www.cat.org.uk

The availability of grant aid for the installation of renewable technologies is subject to regular change and for up to date information visit the website of the Department for Energy and Climate Change at: www.decc.gov.uk

Sustainability

Contemporary design

The role of contemporary design on Dartmoor should be to bring together the distinctiveness of Dartmoor with the sustainability issues outlined in this section. Preserving and enhancing the quality and character of Dartmoor needs sensitive and imaginative design. The principles outlined here - the importance of context, of thinking about how the building will sit in the landscape and how it responds to its neighbours - will apply equally whether the style is based on direct historic references or is contemporary in its use of materials and details.

The key is to analyse and understand the surroundings and to respond sensitively and positively to them. Indeed, the National Park Authority recognises that, with the increasing challenges of meeting environmental performance targets and the evolution of new building technologies to support the sustainability agenda, there is a place for innovation, new materials and for exemplar contemporary design on Dartmoor. For example, although no historic precedent survives in the National Park area, the use of planted roofs in certain contexts could contribute to meeting environmental objectives (biodiversity, rainwater attenuation, thermal and acoustic insulation) and could also reduce the visual impact of a new building – especially if it can be viewed from above.

As well as considering the characteristics of landscape, settlement pattern and individual buildings close to the proposed development, there may be other features, perhaps less directly derived from built forms that could influence a design solution. The important thing is to

make sure that the design response derived from these influences reinforces Dartmoor's sense of place.

A topographical feature, perhaps on or close to the site, could inspire an altogether more contemporary organic built form rather than a traditional, rectilinear building. It would not be appropriate to adopt this approach on a widespread basis, but if handled carefully in a particular setting it could generate a modern building closely related to its context and sensitive to its surroundings.

The indigenous building materials of Dartmoor all create surface patterns and textures that give a subtle visual richness and local distinctiveness that could inspire contemporary design solutions. For example, cob and rammed earth walling has a highly textured irregular surface that could be juxtaposed with crisp minimalist detailing to great effect in the right location in a contemporary building.

A design solution that takes its cue from traditional materials used in an innovative way can generate interesting contemporary design without being strident or intrusive. Locally sourced timber and granite are obvious materials; thatch used to roof modern buildings or re-used natural stone to form external walls are further examples of opportunities for modern design with local reference. Lightweight glazed structures can address sustainability issues and can complement even listed structures.



Contemporary design

- Contemporary design should draw on the distinctiveness of Dartmoor's landscape and buildings and reinforce Dartmoor's sense of place.
- The design should fully integrate with the issues of sustainability outlined in this section.
- A design solution that takes its cue from traditional materials used in an innovative way can generate interesting contemporary design without being strident or intrusive.
- Creating a clear visual contrast between historic fabric and new building is a well established and appropriate response.
- Contemporary design needs to sit comfortably and complement the existing building and landscape.

Useful links and contacts

The Commission for Architecture and the Built Environment (CABE) publishes guidance on good contemporary design and has downloadable publications and case studies of outstanding buildings and spaces. www.cabe.org.uk

A topographical feature, perhaps on or close to the site could inspire an altogether more contemporary organic built form than traditional, rectilinear massing

Sustainability

Inclusive design and accessibility

Inclusive design is more wide ranging than simply adding ramps to buildings - it covers the whole way a building or service is provided and designed. It has particular implications for those buildings where services are provided to the general public - schools, libraries, visitor attractions - which have an obligation to provide a fully accessible environment.

The aim is to design buildings, streets and public spaces which allow equal, independent and dignified access for all, regardless of their age, gender or disability. This means eliminating physical barriers by providing level or ramped access, but also includes less obvious requirements for people with mobility, sensory or learning difficulties - such as hearing loops and designing memorable and distinctive spaces to help wayfinding. The average age of the population is rising fast and in the future, more and more people will benefit from a fully accessible environment.

Lifetime Homes

The Lifetime Homes Standard is intended to make new homes as easy to use as possible and for as many people as possible. The intention is that a new building will be flexible enough, and have space enough, to be fully accessible throughout peoples' lives - for young families with push chairs and for older people with a temporary or permanent physical impairment and needing to use a wheelchair. The home should be designed so that it is adaptable enough to change as the needs of its occupants change over time. The Standard is already being implemented in parts of the UK and the

Government but the timetable for it to be mandatory for all housing by 2013 now seems to be slipping. Any building that wishes to achieve a rating of 6 stars under the Code for Sustainable Homes will need to fulfil the Lifetime Homes Standard.

Access to historic buildings

In historic buildings, the desire to provide an accessible environment needs to be balanced against the need to conserve the building. The aim here should be to improve access wherever it is practically possible without damaging the special character of the building.

Design and Access Statements

For larger developments and developments that incorporate an existing building, an Access Audit should be carried out. This will establish the extent of existing accessibility and recommend actions needed to address any shortcomings. The report should form part of the Design and Access Statement that must accompany an application for planning permission. Following a successful planning application, a building regulations application will have to be submitted. Part M of the Building Regulations covers access for disabled people. Meeting Part M is an important requirement of any successful building regulations application. It will have a fundamental effect on the layout and appearance of a development so it is always wise to at least consider this topic during the early stages of a design, before a detailed planning application is submitted.



Church House at South Tawton - historic buildings have a duty to make changes as long as the changes do not damage the intrinsic value of the building, here a ramp has been unobtrusively added

Accessibility

- Show how access issues have been addressed through a Design and Access Statement. These are required for all but the most minor planning applications.
- Consider whether the building is flexible - so different people can use the building safely, easily and with dignity regardless of their age, gender, mobility, ethnicity or circumstances.
- Design memorable and distinctive spaces to aid wayfinding.
- Look at the design of new housing in the context of the 'Lifetime Homes' standard.

Useful links and contacts

CABE publishes 'The principles of inclusive design - they include you' - and advice on the preparation of design and access statements to accompany planning applications. Download at its website: www.cabe.org.uk

English Heritage publishes 'Easy access to historic buildings.' Download at: www.english-heritage.org.uk

Information on Lifetime Homes is available at: www.lifetimehomes.org.uk

Part M of the Building Regulations can be downloaded at the Planning Portal. www.planningportal.gov.uk

Sustainability

Development and the historic environment

Dartmoor's rich historic environment comprises landscapes, sites, buildings, above and below ground structures and artefacts. These heritage assets have, to a greater or lesser extent, some capacity to absorb change, but the way in which this is achieved must be carefully managed.

People have been present on Dartmoor for 8,000 years, producing an archaeological heritage virtually unsurpassed in the country. This is reflected in the high number of scheduled monuments – 1,208 (6% of the national total) – which are protected by law. Equally, the distinctive historic building heritage forms an important part of the historic environment resource: the earliest building still in occupation on Dartmoor dates back to the thirteenth century. There are 2,564 buildings within the National Park that are listed by central government as being of special architectural and/or historic importance and these are also legally protected.

Together, some 17,500 heritage assets (archaeological sites and historic buildings and structures) are recorded on the Dartmoor Historic Environment Record and there are, in addition, over 20 designated conservation areas in National Park settlements whose origins typically date back to the medieval period.

Buried archaeological remains might be expected almost anywhere within the National Park and could be damaged where ground disturbance occurs during development. In some cases, it will be necessary to establish the likelihood and significance of potential archaeological features through investigation before

a planning application is determined. The investigation can take the form of a desk-based assessment (studying documents and maps for example), and/ or on-site evaluation, comprising survey or excavation.

A historic building develops over time and it is valuable to understand what is important about the building by carrying out a historic building assessment and statement of significance before drawing up proposals to alter or extend it. Understanding the origins and development of a historic building can shape how it will be treated in the future: this is known as 'informed conservation'.

Investigating and understanding the nature of a building can include documentary research and analytical survey of the fabric and plan form and setting; occasionally, physical intervention (such as the removal of small areas of plaster or disturbance of floors) can benefit interpretation.

An assessment or evaluation is likely to be required if:

- There is an entry on the Dartmoor Historic Environment Record on or near to a proposed development site.
- There are indications of structures etc. on historic maps of the site (such as 19th century tithe maps).
- The development is taking place within a conservation area.
- Proposals to alter or extend a historic building or structure are likely to alter its plan form or affect historic fabric.
- Historic floor levels within a building are likely to be disturbed.

It is important to remember that heritage assets may not only be affected by physical change, but by development which will affect their setting, so it will be necessary to consider what effect a proposal may have on a nearby historic building, structure or archaeological site. Where a heritage asset is likely to be affected by proposed development, the design and access statement will need to include an assessment of significance.

The outcome of an assessment or evaluation will help the Authority to determine whether to grant or refuse consent to an application. If minded to grant, it may place conditions on the consent requiring further recording through a watching brief or further excavation or analytical survey.



Development and the historic environment

- The Dartmoor Historic Environment Record is held by the Dartmoor National Park Authority and can be consulted through the Authority's Conservation Directorate.
- Pre-application discussions with the National Park Authority will help establish whether there is a need for an assessment of the significance of a heritage asset and if so, how this might be undertaken.
- Environment Planning Practice Guide (2010).
- English Heritage: Understanding Historic Buildings: A Guide to Good Recording Practice (2006).
- English Heritage: Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment (2009).
- Dartmoor National Park Authority: Listed Buildings on Dartmoor (2008).

Useful publications

- English Heritage: Informed Conservation (2001).
- English Heritage: PPS 5 Planning and the Historic Environment and the accompanying Historic

Useful links

www.english-heritage.org.uk

The Institute For Archaeologists
www.archaeologists.net

Sustainability

Biodiversity and nature conservation

The term biodiversity describes the whole scope and variety of life on earth, from microscopic organisms to giant redwood trees and their habitats. Biodiversity is of fundamental importance to the health of the earth and vital to many basic human activities such as providing fresh water, fertile soil, clean air, pollination of crops and recycling of waste. The National Park Authority aims to maintain and increase biodiversity on Dartmoor. To achieve this, particular steps need to be taken at the design stages of a project:

Development and biodiversity

A proposal should, where possible, make a positive contribution to the natural environment including a net gain in biodiversity. The National Park Authority has a legal obligation to take account of protected species (those most at risk) when considering planning applications. New developments should look for opportunities to incorporate ecological habitats within the development which could help improve the biodiversity of the area. This includes individual animal and plant species as well as their habitat and shelter. Existing features such as trees, hedgerows and ponds should be retained and expanded wherever possible and incorporated into the design.

Bats, owls, swallows, swifts, house martins and other creatures are protected by law and while their presence on a site will not necessarily mean that development cannot take place, it may affect the time of year it can happen. New development should encourage wildlife; features for bats and birds can easily be added to a

new building; hedgerows, Devon banks and native trees can be planted to form boundaries and to provide valuable habitat corridors for wildlife.

Is an ecological survey needed?

Dartmoor National Park Authority ecologists screen planning applications and will request professional wildlife surveys in cases where protected species are likely to be present. Ecological surveys can only be undertaken at certain times of the year so they have potential to delay consideration of planning applications and the start of construction. For this reason, a survey should be considered at the earliest opportunity - preferably prior to submitting a planning application.

For small domestic developments such as extensions and conversions, a check will have to be made to see whether protected species like bats and birds are present. Occasionally that will be obvious from the presence of droppings, but it may take the trained eye and experience of a specialist ecologist and a 'Targeted Species Survey' to make sure.

In larger developments that involve the removal of habitat such as trees and hedges and on greenfield sites, a professional ecological survey is likely to be needed. The more environmentally sensitive the location, the more likely it is that the effects of development will be significant and that a specialist survey will be required.

Ecological surveys

Where an ecological survey is needed, it must be done by a qualified ecologist.



It is best carried out in spring and summer when animals are out of hibernation and when most plants are in growth - but beware as some species have a very limited period when their presence (or absence) can be established. It may be necessary to wait many months for another opportunity to survey them. The survey will generally follow a standard format:

- A desk study of existing ecological records - is the development part of, or near to, an area protected by law such as a Site of Special Scientific Interest?
- A 'walkover survey' looking for signs of legally protected species and other notable species.
- Production of a simple habitat map.
- Specialist species surveys if required.
- The ecological consultants then present a report, which will include an impact assessment, avoidance and mitigation proposals as well as wildlife enhancement measures.

National Park Authority Officers can provide contact details of suitably qualified ecologists.

Trees

The National Park Authority has specific powers to protect significant trees in the National Park by making a Tree Preservation Order (TPO). Protection for significant trees is often sought when granting (or refusing) planning permission. All types of trees can be protected - not just native species - and they can be identified individually in the TPO, or in groups. A survey of trees and hedges at planning application stage will be expected and measures to protect them during construction will generally have to be provided as a condition of the planning permission. It is recommended that proposed works follow the recommendations in BS5837 which provides advice on 'Trees in Relation to Construction'.

Trees are an important part of what makes a conservation area special and they have protection even if they are not covered by a TPO. Anyone proposing to cut down or carry out work on a tree in a conservation area must give the National Park Authority six weeks prior notice.

This is called a 'Section 211 Notice' and is downloadable from the Authority's website.

1	2
	3

Above
Enhancing biodiversity through design
1. Wall features to encourage barn owls and small birds
2. Support for a house martin nest
3. Timber cladding allowing access for bats

Bats and breeding birds

All species of bats are protected. Bats do not cause damage to buildings and do not present a risk to human health. They often roost unnoticed in small crevices and cavities - entering through small gaps under barge, eaves and soffit boards. They prefer buildings close to watercourses and woodland, returning to the same place every year. This makes them vulnerable to even small scale renovation work which can unwittingly block their entry and exit points.

Droppings usually provide the best evidence of occupation. Any development that involves building or timber treatment work within the roof or loft space could

affect bats. In all cases where bat occupation is suspected, a survey must be commissioned. New development should include bat friendly features such as bat bricks, boxes and roost tubes.

All birds are protected during the nesting season from damage and destruction to an occupied nest. Barn owls are a so-called 'Schedule 1' species, which means that they have even more protection because they are so rare and it is illegal to disturb them whilst they are nesting. Development proposals should seek to maintain and enhance nesting opportunities for birds and for barn owls in particular.

Wildlife and ecology

- At the start of a project, find out what types of habitat and species are present on the site - if necessary, commission a wildlife survey.
- Assess the likely impact of any development on biodiversity.
- Retain existing features like trees and hedgerows wherever possible.
- Take opportunities to improve the habitat and support wildlife in the development.
- All applications are screened by the Authority's ecologists. If protected species are considered likely to be present, a specialist survey will be required before an application can be determined.

Useful links and contacts

Natural England has leaflets to download on protected species and mitigation measures for individual species. www.naturalengland.org.uk

Devon Wildlife Trust www.devonwildlifetrust.org

The Bat Conservation Trust provides information on and links to manufacturers of bat bricks and tubes. www.bats.org.uk

The Barn Owl Trust and English Nature publish a booklet called 'Barn Owls on Site - a guide for developers and planners'. Download at: www.barnowltrust.org.uk

Further information on planning and wildlife is available on the Dartmoor National Park Authority web pages at: www.dartmoor-npa.gov.uk

Table 1 - types of ecological survey commonly required for different types of development

Type of development	Type of Survey				
	Extended Phase 1 Habitat Survey	Bats	Breeding Birds	Reptiles	Other protected species (Otter, Dormouse, Badger)
All major developments that include areas of semi natural habitat - including brown field sites	✓	✓	✓	✓	✓
Any development within or adjacent to any statutory and non-statutory designated sites and areas (SPA/SAC/SSSI/ LNR/ CWS and Biodiversity Network)	✓	✓	✓	✓	✓
Existing buildings set within farmland, mature gardens, particularly those with large complex roof structures, gable ends, slate roofs, and/or weather boarding etc		✓			
Any development affecting existing mines, tunnels, bridges, and similar underground ducts and structures		✓			
Any development affecting old and veteran trees and/or trees with obvious holes, cracks & cavities		✓	✓		
Any development of sites where protected species are known to be present	✓	✓	✓	✓	✓
Any development involving lighting of churches/listed buildings or flood lighting of green space within or adjacent to any statutory and non-statutory designated sites and areas.		✓			

Table 2 - timing and seasonal constraints associated with different ecological survey types

Type of Survey	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Extended Phase 1 Habitat Survey	Survey methods can be used at any time of year but surveys are more effective in the spring and summer											
Bats	Survey of tree and building roosts				Inspection of building roosts Activity surveys & emergence counts					Survey of tree and building roosts		
Badgers	Survey methods can be used at any time of year but surveys are more effective in the spring and summer											
Birds	Winter bird surveys	Breeding and migrant bird surveys			Breeding bird surveys			Breeding and Migrant bird surveys			Winter bird surveys	
		No tree, hedgerow or scrub removal during bird breeding bird season										
Reptiles	No survey			Reptile surveys						No survey		

Sustainability

How is sustainability measured?

Achieving a highly sustainable development means incorporating, and thinking about, sustainability right from the inception of the project. Sustainable technologies are much less effective if they are added in or 'bolted on' at a late stage. The main tools for measuring the sustainability of new buildings are the Code for Sustainable Homes (CSH) and the Building Research Establishment Environmental Assessment Model (BREEAM).

Code for Sustainable Homes

The Code for Sustainable Homes is a way to rate and certify the environmental performance of new homes. The Code uses a 1 to 6 star rating system. A 6 star home will have achieved the highest sustainability rating and will be zero carbon. For social housing, which will probably make up the majority of new houses on Dartmoor, minimum standards are prescribed and it is expected that the required standards for all homes will increase as the Government ultimately works towards making all new homes more energy efficient. An assessment can only be carried out by an independent assessor who will conduct an initial Design Stage Assessment based on energy efficiency, water efficiency, surface water management, site waste management, household waste management, building materials and Lifetime Homes (6 star homes only). A final assessment is then carried out once construction is complete.

BREEAM

BREEAM (Building Research Establishment Environmental Assessment Method) is used

to assess the environmental performance of new and existing non-domestic buildings. It is not compulsory, but many funders and future owners will expect an assessment to have been carried out. A retrospective assessment once the design has been fixed, or after the building has been completed, is unlikely to score well and this can adversely affect the value of the development. Credits are awarded according to environmental performance in key categories such as pollution, ecology, energy efficiency and waste management - some of which are very wide ranging in their implications for the design. The credits are added together to produce a single overall score. The building is then rated on a scale of pass, good, very good, excellent or outstanding. Input from a qualified assessor is needed at the earliest stages in the design – certainly well before a planning application is submitted. The assessment process can be very technical and often requires the input of specialists such as ecologists, and engineers.

The formal certification process, at least for BREEAM, is aimed at larger developments but the principles that underpin the assessments are also applicable to smaller developments. The National Park Authority is keen to see that the sustainability considerations are considered fully in all development and applicants and agents are encouraged to consider BREEAM and CSH principles in developing their proposals.

Information on the Code for Sustainable Homes and BREEAM can be accessed at www.breeam.org

3. Specific types of development

This section deals with specific design considerations in relation to the most common types of development proposals that are submitted to the National Park Authority. It includes, for example, advice on new agricultural development, domestic extensions and alterations to historic buildings.

Converting traditional farm buildings

New agricultural development

Equestrian development

Alterations to historic buildings

Domestic extensions, conservatories and outbuildings

New housing development

New commercial, industrial and community development

Converting traditional farm buildings



Successful conversions respect and reflect the building's past life. Retain the character of the hard landscaping - don't be tempted to 'tidy up' or replace too much

Some old farm buildings have become redundant as farming practice has changed. Even though they may not be specifically protected, most traditional farm buildings are heritage assets. Their setting is often an essential part of the building's character. An assessment of their significance will be required as part of the Design and Access Statement accompanying a planning application. A new agricultural use is most likely to be in sympathy with the building's character. If this is not viable, then look for an alternative business or farm diversification function - such as conversion to a workshop or farm office.

Design guidance

- Successful conversions respect and reflect the building's original functions and maintain the agricultural character and historic elements on the outside and inside.
- Be realistic in what can be achieved. The layout of the existing building will impose limits on what is achievable.
- Most traditional farm buildings are simple, functional structures built from local materials with small window openings generally and minimal decoration.
- Work within the existing envelope - extensions are not usually acceptable.
- It may not be possible to convert some types of farm buildings such as shippens and linhays. A list of building types that are usually not suitable for conversion is included in Appendix IV.
- Resist the temptation to add domestic details - avoid the addition of elements such as barge boards, fascias, rainwater goods, porches and conservatories. Adding these elements damages the original character of the building.
- Making new window openings in walls is not usually acceptable - new windows in existing openings should be set well back and have strong simple framing.
- Avoid adding chimneys to buildings that have had none in the past - a discreet matt black metal flue coming through the roof is normally acceptable.



- Dormer windows look out of place but rooflights are a good way to bring light into the interior and reduce the need for electric lighting - position them

flush to the plane of the roof and try to site them on the least visible roof slope.

A sensitive conversion of a former farm building; new windows and doors are simple and strong in character

Converting farm buildings

- Non domestic use is preferable as an alternative use for redundant farm buildings.
- Understand the existing building and its history; work with it to get a good design and be realistic in what can be achieved - an imaginative contemporary approach can be the most successful.
- Seek professional advice from architects and talk to planning officers at an early stage.
- Resist the temptation to add domestic details to a building constructed for agriculture. For example, window frames should be robustly detailed with large lights; barge boards and fascias should be avoided. The infilling of large openings with reduced areas of glazing requires particularly careful handling.
- Think about the treatment of internal surfaces. Wherever possible, retain the building's character and original features inside as well as outside.
- Farm buildings are often home to bats, barn owls and other protected species - undertake a survey of what is there - the design should take them into account and should make a contribution to local biodiversity.
- Avoid domesticating the surroundings of the building with gardens etc to retain its setting.

Useful links and contacts

English Heritage publish 'The Conversion of Traditional Farm Buildings: A guide to good practice' - download at www.english-heritage.org.uk

New agricultural development

Modern farming practices do not always fit well with traditional, small scale, farm buildings and inevitably there is a pressure to construct larger modern farm buildings. However, with a little thought, they can often be accommodated within the existing farmsteads without overwhelming the traditional buildings.

New buildings should be well designed, of good quality and functional. They need to be thoughtfully sited in the landscape - the accumulation of 'visual clutter' and out-of-scale buildings would have a very damaging effect on the Dartmoor landscape. The visual impact of a poorly situated building cannot easily be reduced but often a minor repositioning or realignment can considerably improve proposals.

Sometimes a site elsewhere on the farm might be preferable if this can be achieved without imposing undue difficulties in construction or operation. If for example, the farmstead comprises buildings that are listed of historic interest, the introduction of a new building in the group might not be desirable. The aim should not be to hide a building, but rather to soften a hard outline, break up a prominent silhouette, and help 'anchor' a new building to the surrounding landscape. Tree planting and new hedgebanks can help to break up the hard outline of a building and help to blend it into the landscape. However, new planting should not be used to hide a badly sited or designed building and can even draw attention to it. Modern materials can work well on a new farm building but careful use of appropriate materials and suitable colours will help to

reduce its impact.

The National Park Authority is occasionally contacted with regard to the need for new tracks or access roads. Such development can have a major impact on the landscape. That impact can be mitigated by following the advice below.

Design guidance

New agricultural buildings

- Wherever possible reuse, adapt and extend existing redundant farm buildings rather than build new ones as they represent a substantial store of embodied energy.
- Development should aim to fit into, and be sympathetic to, existing farmsteads and the landscape - avoid visually intrusive new buildings that are too dominant or overbearing and do not respect the scale of surrounding buildings.
- Dual pitched roofs are usually preferred, although monopitch can be acceptable particularly for smaller buildings or lean to extensions.
- Larger monopitch roofs can often be broken up into several small pitches without compromising the use of the building and the outline of a new building can be improved by breaks in the roof line to follow changes in ground level.
- On sloping sites, it can help to set the building into the slope.
- Trees and folds in the landscape can provide opportunities for sensitive, unobtrusive siting - but even here, prominent views from footpaths, roads or high points will be an important consideration.



- Additional tree planting and external works will help to assimilate new structures into the landscape and can enhance new buildings and add new wildlife habitats.
- Modern materials can work well on a new farm building and are a practical response to modern farming requirements. However, where feasible, the use of traditional materials and methods of construction is encouraged and this is particularly important in the vicinity of a listed building.
- Reflective and light coloured sheet materials should be avoided for roofs as they tend to stand out when viewed from a distance.
- A dark roof colour with lighter walls is the preferred solution as this reduces the apparent scale of larger buildings.
- Avoid metal roofs with metal sides of a similar colour as this can produce a large monolithic appearance.
- Use round fibre cement or profiled metal roof sheeting - anthracite or merlin grey is most appropriate.
- Vertically fixed locally sourced timber is the preferred material for walls - preferably Forestry Stewardship Council (FSC) certified. Choose a durable timber which requires minimal treatment and maintenance such as Western Red Cedar or Douglas Fir.
- The apparent bulk of a building can be reduced by combining a dark coloured roof with vertical, close boarded timber walls and a stone or rendered blockwork plinth.

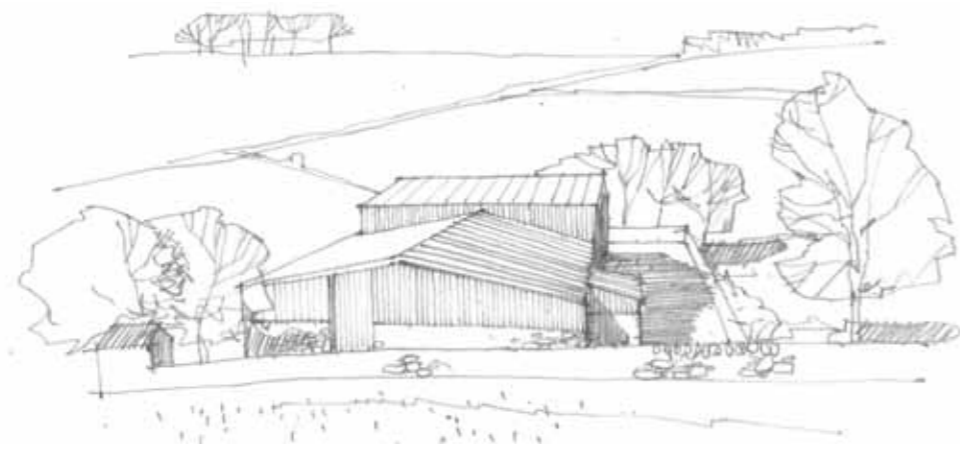
Dual pitched roofs can break up the scale of agricultural buildings



A single large span roof can be overbearing



Breaking the roof and minor repositioning behind existing buildings or trees can help to reduce the visual impact even in prominent views



Even quite large agricultural buildings can be accommodated in the landscape by careful positioning, setting them into the slope and using natural features and trees to screen the buildings

Roads and tracks

- Wherever possible, new farm roads and tracks should follow the contours of the land and existing field boundaries. Care should be taken to avoid the removal of traditional Devon boundaries.
- Darker coloured road surfaces using natural materials or surface dressing reflecting the colour of the local soil or stone will generally be less intrusive than light coloured materials. Black bitumen should be avoided.
- The use of recycled aggregate is acceptable provided it does not introduce alien colour. The use of concrete should be avoided unless additives are used to tone down the light colour.
- Consider using surfaced tyre track widths with grass down the middle instead of using hard surfacing along the entire width of the track particularly in circumstances where only light usage is envisaged. Wherever possible tracks should follow contours and natural features such as hedgerow lines rather than strike out across open fields or against contours.

New agricultural development

- Consider how the development will appear when seen from important viewpoints and how it will impact on the existing settlement and landscape.
- Try to incorporate a new building into the existing farmstead – match the size and orientation of existing buildings and consider the reuse or adaptation of redundant buildings
- Make use of surrounding trees, hedges and other landscape features to help integrate the building.
- Consider planting a shelter belt of native trees to protect the development and to provide valuable habitat for other plants and animals.
- Avoid pale or shiny roof materials.
- Check for the presence of protected wildlife or habitat and ensure that existing hedgerows and trees are not damaged.
- For new roads and tracks, follow the contours of the land & existing field boundaries using colours that reflect the colour of the local soil or stone.

Useful links and contacts

The Department of Communities and Local Government publishes 'A Farmer's Guide to the Planning System' www.communities.gov.uk

Equestrian development

In recent years, numbers of planning applications for equestrian development has increased substantially and the National Park Authority has become increasingly concerned about the cumulative effect of collections of isolated stable blocks, field shelters (permanent and temporary) and structures and works connected with jumps and schooling. The Authority is keen to minimise the impact of new equestrian development.

Grazing horses does not require planning permission but the following will usually require a planning consent:

- The construction of new buildings or changing the use of existing agricultural buildings.
- The construction of field shelters unless they are temporary, moveable structures.
- The construction of permanent jumps and cross country courses.
- New gateways or access points onto highways.
- Floodlighting associated with winter/ night time exercise areas.
- Arenas, manèges and other permanent schooling areas.
- New areas of hardstanding/surfacing.

Design guidance

The points made in the section on 'new agricultural buildings' will also apply to the choice of colours and materials for equestrian buildings. In addition consider the following:

- Field shelters, horse boxes and jumps can be very visible in the landscape - proposals should seek to reduce the visual impact of these structures by

using existing features to help shield them from view.

- New buildings, arenas and sand schools should generally be sited within, or adjacent to, existing buildings.
- Avoid exposed skyline locations and minimise the need for earthworks so that the development integrates with the surrounding landscape.
- Retain existing vegetation and habitat with ecological value – new native planting can help to integrate buildings with their surroundings and choose materials that blend with the surrounding landscape.
- If possible, avoid sub-division of fields and where you have to, mirror the contours or lines of the existing field boundaries and use low visibility materials and muted colours.
- Site muckheaps carefully to avoid run-off polluting groundwater and subsequently watercourses.
- Avoid light pollution by keeping external lighting to a minimum for working and security purposes. Minimise light spillage from those lights that are necessary by angling lighting to the ground and using night friendly lamps.
- Plan cross country courses to avoid areas that are known to be archaeologically, historically or ecologically sensitive.



Simple pitched roof timber stable building set against a woodland backdrop

Equestrian development

- Site within, or adjacent to, existing settlements and buildings.
- Use the existing landform to avoid exposed skyline locations.
- Retain existing vegetation and habitat with ecological value - new native planting can help to integrate buildings with their surroundings.
- Buildings structures and other works associated with equestrian development may be very visible in the landscape - try to minimise the impact by careful siting and shielding.
- Cross country courses will need permission - mitigate the effect by using existing features as much as possible.
- Outdoor arenas and sand schools should be generally hidden from view by existing vegetation and landform and located close to existing buildings.
- Consider the effect of traffic access and car parking.
- Avoid sub-division of fields where possible and if it is necessary, follow local landscape patterns and materials.

Useful links and contacts

Further advice can be found in the South West Protected Landscapes Forum publication 'Horses, the landscape and you' at: www.southwestlandscapes.org.uk/commissionedworks/asp

Alterations to historic buildings

The distinctive quality of Dartmoor owes much to its historic buildings. Many historic buildings are given special protection by law. They are listed for their architectural or historic interest according to three categories; Grade I, Grade II* and Grade II. Grade I and Grade II* buildings are of national significance. The owner of a listed building has a legal responsibility to maintain both the building and its character.

Alterations to both the interior and exterior of any listed building which affect its historic character and/or appearance will require listed building consent and also in some cases, planning permission. Listing covers all aspects of the building, both inside and out, including plan form, fixtures and fittings. Other buildings and structures closely associated with or located within the curtilage of a listed building often enjoy the same status as the listed building itself.

It is important to note that other historic buildings may not be listed but depending on their significance may be local heritage assets and deserve the same level of care when considering an alteration, extension or other changes that affect their setting. There is no precise definition of what constitutes a historic building but for the purposes of this guide, a general rule of thumb would be that it encompasses all buildings built prior to 1919. However it would also be true to say that there are some later 20th century buildings of a quality and significance that would make them equal to or of greater architectural or historic interest than many pre 1919 buildings so the definition must be treated with a little caution. However it

is hoped that it gives some assistance in interpreting the guidance in this document. If further advice is required then National Park Authority officers can provide this. It is anticipated that at some stage in the future it will be possible to enter all 'historic buildings' in the Dartmoor Historic Environment Record.

Design guidance

- With historic buildings, the first principle is to repair and overhaul rather than replace building elements such as windows and doors. 'Off-the-shelf' timber windows and doors may not be suitable for historic buildings where elements are needed to match existing windows or fit into existing openings.
- Remember that the thermal properties of historic buildings can and should only be improved without the removal of historic fabric.
- When considering alterations and extensions, an analysis of the origin, function and development of the building should be undertaken to inform the proposals.
- The form and significance of a historic building imposes limits on what is achievable and compromises are often necessary. An assessment of significance will be needed as part of the Design and Access statement which accompanies a planning application.
- Some types of building may not be suitable for the changes proposed. For example, Appendix IV contains a list of building types where conversion



is generally considered inappropriate because of their special historic, architectural, landscape or constructional characteristics or because of their value in a local setting.

- Using traditional methods and materials, but in a modern contemporary way with careful attention to detail, can help to blend

the old with the new.

- Alternative roofing materials such as copper or lead can be successful - particularly on contemporary extensions to historic buildings.
- A listed building application may need to be very detailed and the help of suitably qualified, experienced and imaginative professionals is desirable.

Sympathetic conversion of former farm buildings at Cornwood for studio and workshop use

Alterations to historic buildings

- Understand the existing building and its history and work with it
- The National Park Authority offers professional advice on all aspects of historic buildings and has close links to conservation bodies such as English Heritage.
- Alterations to both the interior and exterior of listed buildings will usually require Listed Building Consent.
- Employ skilled crafts people when carrying out repairs. If possible use local contractors and specialists with traditional skills.
- Historic buildings are often home to bats, barn owls and other

protected species - undertake a survey of what is there - the design should take them into account and make a contribution to biodiversity.

Useful links and contacts

English Heritage publishes advice for those managing or owning an older building on 'Energy Efficiency and Historic Buildings' and other useful booklets - download at: www.english-heritage.org.uk
The National Park Authority's listed buildings leaflet can be downloaded at: www.dartmoor-npa.gov.uk

Domestic extensions, outbuildings and conservatories

A well designed extension can enhance the character, appearance and value of a building. The key to a successful approach is to look for existing good examples and clues to work with - remember, on Dartmoor, the distinctive style is for simple, uncluttered and robust forms. The adding of a conservatory is a common way of extending a property and can have a role to play in reducing energy use by utilising passive solar gain to help heat a building in winter. Adding an outbuilding or making use of an existing outbuilding may be another strategy that can be considered, for example where additional workspace is needed. They may also be good buildings to install photovoltaics and other renewable technologies.

Domestic extensions Design guidance

- Scale is the major issue with all extensions to existing properties – new extensions should not overwhelm the original building - a small original building has less opportunity for extending.
- Buildings that have been extended previously can reach a point where further extensions dominate the original dwelling to the point of being inappropriate to the site and the building.
- On a large plot with a small original building, consider the opportunity to build a detached outbuilding instead.



- Extensions offer an opportunity to use good contemporary design. It may be possible to add a well designed extension in a modern style as long as it is in harmony with the existing building.
- Ensure that the extension does not compromise the privacy of neighbours by building too close to their property or by overlooking them.

- Materials used in exterior work should be in sympathy with those of the exterior of the existing house - consider using appropriate local reclaimed materials.

Small rear extension in Moretonhampstead with sash windows, slate roof and ridge detailing reflecting the features of the parent building

Outbuildings

Design guidance

- The safe starting point is for the materials and roof pitch of an outbuilding to match those of the parent building. However, particularly where matching materials are not available there is scope for an alternative approach using good contemporary design and materials.
- Outbuildings are a good opportunity to use appropriate local reclaimed materials thereby reducing the carbon footprint of the development.
- Generally outbuildings should have pitched roofs and doors should be vertical timber boards.
- Consider the incorporation of bat bricks and tiles, swift boxes etc in extensions to encourage wildlife.



Peter Tavy



Opposite above
Store at Lydford

Opposite below
Conversion of outbuilding to artist's studio near Chagford



Conservatories

Design guidance

- A large glazed conservatory will usually look out of place on the main elevation of an existing building.
- Glazed conservatories can help improve the thermal performance of a building through passive solar gain but they need to be unheated and thermally separate from the main building - there should be a door or window that can be closed to isolate the conservatory from the main building because although they can gain heat quickly in direct sun, they can also lose heat rapidly at night.
- Conservatories have potential as locations to site solar photovoltaic and solar thermal panels, being less prominent than the roof of the main building.
- Conservatories standing in the rear garden of a property need to avoid being intrusively conspicuous to neighbours.
- An alternative approach might be to build a 'garden room' extension or outbuilding with an insulated roof which will offer all year round use - as the roof would then have a slate, sheet metal or thatched roof, it will also be easier to integrate with the existing building and the surrounding area.
- Timber is preferred as a material because it is inherently more sustainable than uPVC.



Conservatory on the rear of a building



Conservatory/greenhouse on the gable



Garden room extension to a listed building at Dunsford

Domestic extensions, outbuildings and conservatories

- Scale is the major issue - do not overwhelm the original building.
- Identify and work with the best features of the existing building and site - the aim should be to enhance the building without altering its fundamental character.
- Extensions/conservatories can help to improve the thermal performance of the building.
- Ensure that the building does not compromise the privacy of neighbours by building too close or overlooking their property.
- Outbuildings are often home to bats, barn owls and other protected species - undertake a

survey of what is there - the design should take them into account and make a contribution to biodiversity.

Useful links and contacts

The 'interactive house' on the planning portal has current advice on what sizes and types of development need planning permission and what is considered permitted development.

Listed buildings do not have permitted development rights for extensions.

www.planningportal.gov.uk

New housing development

The National Park Authority encourages good design in new housing proposals and schemes that incorporate well thought out approaches to the issue of sustainability. Innovative design, which reflects local distinctiveness, is encouraged. This could include energy conservation and efficiency measures and incorporate passive and renewable energy technologies. Traditional skills can also be used to support modern sustainable building initiatives, for example, cob, rammed earth, straw bale and timber frame construction.

Design guidance

Context and layout principles

- The National Park Authority has published a series of conservation area character appraisals that describe how individual settlements developed, their distinctive characteristics, significant local buildings, building types and materials. In short, they provide a good basis for the exploration of local context even for the most modern and contemporary of buildings. Additionally, the Building for Life criteria, developed by CABI with the Home Builders Federation, provide a national standard for well designed homes and neighbourhoods and are also worth considering before detailed design work is commenced.
- An explanation of how a proposal relates to the distinctive qualities of the site will be needed for the planning application.
- The principles of sustainability outlined in Section 2, for instance by orientating the building to make the most of passive solar gain, should be incorporated.
- Dartmoor's sense of place should be reinforced by reflecting the local building tradition - for instance in rural areas and smaller settlements the local vernacular is one of rugged simplicity, avoiding decoration or anything unrelated to the function of the building.
- Dispersed, low density cul-de-sac development should be avoided. It does not reflect the historic layout of Dartmoor's towns and villages and is an inefficient use of scarce building land.
- Encourage pedestrian use and movement by creating footpaths across the site to link with surrounding areas
- When considering development within existing settlements, take full account of the relationship with existing surrounding buildings, important views and open spaces. The urban fabric of most larger settlements is of relatively continuous buildings built tight to the back of the pavement, reinforcing the line of the street.
- The shape of the land, layout of other buildings, positions of trees and hedges should all be used to tie the development to the site.



In the main settlements the urban grain is for buildings reinforcing the line of the street



Neighbourliness

Consideration should always be given to existing properties that are adjacent to new development, especially the impact on existing properties though the loss of privacy or daylight.

- These can be addressed through the location and layout of the building within the plot and through the design of the internal layout and location of the main habitable rooms.
- Privacy can be maintained by retaining an appropriate distance between main habitable rooms of facing properties - usually 21m of separation.
- The layout of the development within the plot can maintain privacy through the arrangement and definition of public and private exterior space and the careful arrangement of windows on an elevation.
- The location of a new building or extension could cause shading to an adjacent property. A neighbourly design minimises the impact of this.

Landscaping

- Grass with native wildflowers is a common surfacing material for public spaces within moorland settlements.
- Hedgebanks can be used for boundaries using hawthorn and hazel.
- Street furniture (such as seating, bollards, lighting and signs) should reflect the character of the settlement. For example, simple timber benches in rural villages are likely to be suitable, whereas in the larger settlements something more formal is appropriate.
- Electricity and telephone cables should be underground.
- The external setting is also important and provides clues as to what is likely to be the most appropriate treatment for a particular site, For example, are properties accessed directly off the street or through gates? Are other properties bordered by hedges, granite stone walls or railings?

Contemporary houses in Dunsford take their cue from the vernacular tradition on Dartmoor. They address the street and pavement creating social spaces, the detailing of the railings reflects the rural site

Landscaped areas, which are in the public realm, need future maintenance, so care and thought should be given to how this can be achieved, perhaps through a management company. Boundary features are vitally important to the way a new scheme fits into its surroundings. Avoid close boarded fencing particularly where it is visible to the street. Similarly high walls onto the street can be forbidding and unwelcoming.

Lifetime Homes

The Lifetime Homes Standard is intended to make new homes as easy to use as possible for as many people as possible. The aim is to make homes adaptable and fully accessible throughout peoples' lives - for young families with push chairs and for older people with a temporary or permanent physical impairment particularly those reliant on wheelchairs. Design guidance is available on the Lifetime Homes website. The Authority will in future use the Lifetime Homes marking system to assess development proposals.

Secured by Design

Secured by Design is an initiative to encourage design that reduces the opportunity for crime and helps to create a safe and secure environment. Detailed guidance is available on the Secured by Design website and includes measures such as:

- Designing out secluded access points and routes especially at the rear of buildings.
- Encouraging a sense of shared ownership with communal spaces located so that they can be observed and supervised from adjacent properties.
- Avoiding the creation of narrow dark corridors and footpaths which could be perceived as threatening.

- Positioning planting and choice of species should not create places to hide.
- Maintaining good visibility across the site and external lighting designed so that dark areas in communal spaces are minimised.

Building elements and materials

Dartmoor National Park Authority does not support the use of:

- False chimneys that have no function.
- Boxed eaves and verges.
- Inappropriate use of exposed quoins at the corners of buildings and around openings.
- Drip beading on render, or bellcasting of render above windows or doors.
- Square section guttering and
- Clipped slates

but encourages:

- Recessed windows.
- Strong window sills.
- Clipped eaves and
- Metal rainwater goods.

Gap and infill sites

Within settlements, development plots will often involve infilling between existing buildings. Consider the importance of undeveloped open space to the character and appearance of the area. A requirement of granting planning permission will be that the loss of the open space would not detract from the grain and character of the surrounding area. Such undeveloped open spaces between buildings may be considered important in their own right and it should not be assumed that permission will be readily granted. After considering this issue, then look at the buildings surrounding the site and analyse their appearance for clues on how to proceed.

- Are buildings terraced or detached?
- If detached, how wide are the buildings and is there a common width of the gap between them?
- Do the buildings sit on the back edge of the pavement or are they set back from it?
- What is the minimum and maximum height and the number of storeys?
- What is the roof pitch - is it steep or shallow and what are the minimum and maximum ridge heights of the roof?
- Do the buildings have parapets or eaves? How are they detailed?
- What are the proportions of the windows?
- What is the range of colours and materials used?



Local character

- Reinforce a sense of place in Dartmoor's towns and villages by understanding and respecting the existing built heritage.

New development in Moretonhampstead reflecting traditional characteristics of Dartmoor buildings - simple porches and canopies, side-hung casement windows, strong sills and slate roofs

New housing development

- Reinforce a sense of place in Dartmoor's towns and villages by respecting the existing built heritage.
- Respect the unique views and landscapes in the National Park
- Encourage the use of alternative means of transport to the private car.
- Ensure safe and inclusive access (Lifetime Homes Standard and Secured by Design).
- Promote energy efficiency in new development and use appropriate renewable energy strategies.
- Incorporate green infrastructure using existing features of ecological interest such as streams, hedgebanks, trees, wildflower meadows as well as bat and bird features.

Useful links and contacts

The 'interactive house' on the planning portal has up-to-date advice on planning guidance and planning policy.
www.planningportal.gov.uk

Information on Lifetime Homes is available at:
www.lifetimehomes.org.uk

Information on Secured by Design is available at:
www.securedbydesign.com

Conservation area appraisals are available from the Dartmoor National Park Authority website at:
www.dartmoor-npa.gov.uk

New commercial, industrial and community development

New commercial, industrial and community developments of appropriate scale and in appropriate locations are welcome. They increase the variety of local services and facilities and provide local employment. Most new development of this nature will be expected to take place within or adjacent to existing settlements. The National Park Authority welcomes innovative design solutions, and the commercial and education sectors have been at the forefront of sustainable design.

Design guidance

- On Dartmoor, designing a building of appropriate scale is probably the most important factor in making sure the development is not alien or intrusive.
- In the past, commercial and industrial buildings were usually constructed from standard factory-made products but alternative treatments such as locally sourced, naturally durable timber boarding and rammed earth construction could provide a more sustainable approach.
- Adequate access to the highway and on-site parking will be important matters when an application is considered - it will be necessary to demonstrate that there is enough room on the site for all the traffic generated by the development.
- Parking and turning space will need to comply with County Highway standards.
- Large areas of car parking are never attractive - break them up into smaller areas.
- The most practical roofing materials for many commercial and industrial buildings are likely to be profiled sheet either of fibre-cement or colour coated metal - dark colours with matt surfaces are preferred since the shallow pitches typical of large span roofs tend to be more reflective. As a general rule, the roof should be darker than the walls.
- On Dartmoor, there is an attractive tradition of using corrugated metal profiles, particularly but not exclusively on agricultural buildings. This is a pleasing part of Dartmoor's built heritage and the corrugated profile is a good alternative to the square or box section profiles more commonly used now on the roofs of most industrial buildings.
- Wherever possible, provision should be made to avoid the need for external storage of materials and waste. However, where this is not possible the external storage should be in contained areas or bins with appropriate screening.
- The materials for boundary and landscaping should be of high quality and in sympathy with the character of the area - wherever possible, they should be sourced locally. Materials which are not indigenous to the area should be used with great care to ensure they fit with the local colours.



Commercial, industrial and community development

- Proposals should be of appropriate design and scale and have sound environmental credentials.
- Developments should generally be located within or adjacent to existing settlements.
- The local roads should be capable of serving the proposed development adequately and safely.
- The impact of materials used, parking and boundary treatments should be considered at the initial stages of design.

Useful links and contacts

Advice on buildings and planning permission, plus advice and support for business is available from the Government at: www.businesslink.gov.uk

Information on grants for the installation of sustainable technologies is available from the Carbon Trust at: www.carbontrust.co.uk

Tavy Business Centre near Tavistock. The factory units are heated with ground source heat pumps using 75m deep boreholes to exploit the natural heat of the earth. The smaller workshops use a clean-burning biomass boiler feed by locally sourced wood pellets. These measures will cut carbon dioxide emissions by an estimated 50%.

4. Building elements and materials

This section describes the design and detailing of individual building elements and is intended to be consulted as needed on specific developments. It contains advice on the following:

- External walls
- Roofs
- Rainwater goods, rooflights, dormers and chimneys
- Windows
- Porches and canopies
- Doors
- Shop fronts, signs and satellite dishes

This section also considers the treatment of open spaces between buildings and gives general advice on site analysis and layout, boundary walls, gates and landscaping, and finally car parking and access, drainage, public space and lighting.

Sustainability issues to consider:

- Use local recycled materials wherever possible (slate, timber and stone are the most commonly recycled materials); this can provide a significant reduction in the embodied energy of the project.
- Separate and re-use waste where it can be usefully sold or used elsewhere including windows, timber, slates, bathroom suites and kitchens.
- Incorporate construction waste into a new development - consider the use of crushed demolition material in the hardcore for the building's foundations.
- Arrange with material suppliers to reduce the volume of packaging material or return it to them.
- Use sustainably managed sources wherever possible – for example, use accredited timber from responsibly managed forests.

Building elements and materials

External walls

Stone

Most local building stones are no longer quarried in the National Park but mudstone and limestone for example are still available from local working quarries. Additionally small quantities of local granite are available from the spoil heaps of a local quarry and recycled Dartmoor granite may be able to be accessed for small developments. Use local sources where practical and relevant to the traditions of the locality. Where stone is used, lay it on its natural bed with uncut faces exposed and coursed. Token panels of stone and inappropriate use of exposed stone quoins on a building rarely look good on new rendered buildings and are not favoured. The mortar joints on stone walls have a great impact on appearance - so for both new build and repair work:

- Prepare of a couple of sample areas using traditional mortar mixes with different sands to ensure a good colour match.
- Allow the mortar to dry out for two days to reveal its true colour.
- Finish joints flush or just behind the stone face. Then, after the initial set, stipple the surface to reveal the coarse aggregate.
- Avoid the use of wide joints or raised ‘ribbon’ pointing which tends to dominate the stone.

Cob, rammed earth and straw bales
Cob walls are formed from local subsoil mixed with water and straw. They are traditionally raised in ‘lifts’ without using shuttering. This is labour-intensive and lengthy as each lift has to slowly cure and gain strength over a number of weeks before the next layer is added. However, pre-formed cob blocks are available and can be used as an alternative. Rammed earth is another take on this process – it uses temporary shuttering and mechanical compactors to speed up construction. Straw bales are a renewable

resource and can be used for external walls or insulation or both.

- The local availability underpinning the use of cob, rammed earth and straw bales make them very sustainable materials.
- One of the great attractions of cob and rammed earth is its ability to mould into curved shapes providing opportunities for innovative contemporary design. Wall faces can be left in their natural raw state or finished with lime render and/ or wash.

Concrete block and render

Concrete blocks have a relatively high environmental impact through the effect of quarrying and CO2 emissions in their manufacture, but more sustainable types of block are available that use recycled waste as aggregate. High density concrete blocks are a good form of thermal mass and so are ideal for passive solar applications - see Section 2 of this guide for further information on this. Render is the most common external finish.

A smooth or roughcast render on blockwork is suitable although natural stone-lime based renders and mortars are preferable. Avoid the use of bellcasts over windows and doors and the use of drip beading on large areas of rendered walls.

Slate hanging and timber cladding
Slate and timber cladding are particularly appropriate for buildings of timber frame and prefabricated timber panel construction, and are potentially very sustainable forms of new construction.

- A British natural riven slate is preferred.
- Traditionally, the slates are laid on a mortar bed.
- Slate cladding has been successfully used on contemporary buildings using new and reclaimed natural slates.
- Durable, locally sourced timber is a particularly sustainable cladding material.



Opposite
1. Wall built from local limestone at Buckfast
2. Slate hung wall in Ashburton
3. Curved wall with coloured render (Chagford)
4. The rich texture of a lime washed, cob and stone wall
5. Timber cladding - an inherently sustainable material
6. 'Granite Walling' the style of the pointing allows the texture of the stone to be shown to the full



Building elements and materials

Roofs



Boxed eaves and verges are not part of the Dartmoor tradition



Verge and eaves should be plain and simple, tight to face of the walls

- Opposite**
- 1. Repairing a thatch roof
 - 2. Copper sheet roof
 - 3. Slate used to protect the verge of a historic building
 - 4. Slate roof laid to diminishing courses with inset glass rooflights
 - 5. Natural slate with riven (natural) finish
 - 6. Zinc sheet roof and rainwater downpipe
 - 7. Weathered corrugated metal roof

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Slate roofs

The traditional roof on Dartmoor is pitched with a gable end and replication of this style is usually the most appropriate form. The most common traditional roof covering on Dartmoor is natural slate.

Traditionally, slates came from south and west Devon but are no longer available. Light grey slate from Cornwall and Wales is an acceptable alternative, so use these sources if practical. Natural slate with a good riven finish and riven edge is preferred to modern artificial slate/tiles which have a uniform and uninteresting finish. Nailing is the more traditional means of fixing slates. Clips should be avoided.

- Imported slates can be at odds with the colour and texture of traditional roofs - officers can recommend suitable types that match the existing. Imported slates are a less sustainable alternative to good quality, locally sourced second hand slates which can usually be found in sufficient quantities for a small extension.
- Ridge tiles on slate roofs should be of clay. If half-round tiles are used they should match the roofing material in colour and texture.
- Eaves details should be plain and simple with a thin fascia board flush to the wall. Projecting boxed eaves with wide soffit boards should be avoided.
- Verges should preferably be finished without boards - slates can be used as an alternative (see photo 3).
- Special 'bat slates' are available to give bats access to roosting sites in the roof.

Thatch roofs

Thatch is the warmest of the traditional roofing materials on Dartmoor and is well suited to granite, cob and contemporary rammed earth construction. Thatch needs regular maintenance on the most exposed areas such as the ridge but this rarely

involves replacing the whole roof - usually the top layer is removed down to good thatch and then this is covered with new material. On thatch roofs, rainwater is thrown directly off the roof. Gutters and down pipes are rarely used. Roof pitches are typically 45 to 50 degrees. Combed wheat reed thatch and a plain ridge are the local traditions, giving a neat, simple and rounded appearance to the roof.

- Metal sheet roofs**
- There is a tradition of using corrugated iron sheets on Dartmoor buildings - especially in the countryside where the rusty orange roofs on farm buildings are a prominent part of the landscape. Other sheet roofing materials such as steel, zinc, copper or lead can be successful, particularly on contemporary extensions to historic buildings.
- Plastic coated metal of an appropriate colour (anthracite or merlin grey) is acceptable on industrial and commercial buildings. The impact of light coloured roofs when viewed from higher ground should be carefully considered. Generally a darker roof will help to anchor the building in the landscape.
 - A corrugated profile is preferred but square or box section profiles can also be acceptable.
 - Pale coloured or shiny finishes should be avoided as they reflect sunlight and make the building stand out.

Green roofs

Green or 'living' roofs are attractive, help to insulate the building and create a habitat for wildlife (see the photo in the section on contemporary design). They can also contribute to a sustainable drainage scheme by increasing rainwater evaporation and thereby reducing water run-off.



Building elements and materials

Rainwater goods, rooflights, dormers and chimneys

- Opposite

1. Swept dormer window - a common feature on Dartmoor buildings - dormers allow habitable spaces to be formed in roof spaces and help to reduce the scale of the building

2. Large granite chimney - a characteristic detail on Dartmoor

3. Traditionally, gutters are supported on wall mounted brackets rather than attached to a timber fascia board

4. Granite chimney with lower section of the stack now exposed following removal of thatch

5. Rooflights bring natural light into a building and reduce the need for electric lighting

6. Rooflights should sit as close to the plane of the roof as possible - consider 'conservation rooflights' in conservation areas and on historic buildings

7. Eyebrow dormers - another way to reduce the scale of a building and utilise roof space

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Rainwater Goods

Slate roofed agricultural outbuildings and thatch roofs do not generally have gutters - the rain is allowed to fall directly to the ground. On traditional domestic buildings, gutters and downpipes are typically cast iron, half round or ogee shape and fixed directly to the wall by straps or decorative spiked brackets. Square section gutters are not a traditional profile. Polyester powder coated aluminium rainwater goods have a similar appearance to cast iron. Modern fascia boards to support gutters are unnecessary, and detract from the appearance of a building. Dark coloured gutters and downpipes are generally less obtrusive. Alternatively, downpipes can be painted the same colour as rendered walls. UPVC rainwater goods are not recommended because of their poor appearance, their tendency to fracture and concerns over their sustainability. On contemporary buildings, consider the use of zinc gutters and downpipes. Zinc is recyclable and compared with other metals is relatively sustainable; its typical life span can exceed 100 years.

Rooflights

Rooflights can be an unobtrusive way of bringing daylight into a building helping to reduce the demand for electric lighting (which can account for 25% of a building's energy consumption). Care needs to be taken that the appearance of the roof is not compromised - this can happen if the rooflights are too numerous, too large or too prominent on an elevation. Historic

and listed buildings should only have small traditional style conservation rooflights' that sit very close to or flush with the plane of the roof. Rooflights provide greater levels of daylight when compared to windows in external walls.

Dormers

Dormer windows are common on Dartmoor especially on cottages where the head height of rooms is low and a sloping ceiling prevents windows being placed in the walls below the eaves. Dormers should be no wider than a double side hung casement with simple swept or gabled roofs. When used in loft conversions they should relate to the size and position of existing windows. Large, flat roof box dormers should be avoided.

Chimneys and flues

Traditional chimneys on rural Dartmoor are often substantial structures and add greatly to the interest of the roofscape. Chimneys can be used on contemporary buildings as a convenient location for boiler flues or for ventilation intakes and extracts. Large chimney breasts within a building can act as a 'heat store' providing an element of thermal mass. False chimneys without a function should be avoided. In building conversions where there is no existing chimney, new metal flues that penetrate the roof should be a matt colour rather than bright stainless steel and, if possible, they should penetrate the least publicly visible slope of the roof.



Building elements and materials

Windows

Opposite

1. The earliest window openings were completely open or had simple wooden shutters
2. Granite mullions and leaded lights in 17th century building
3. The rural vernacular on Dartmoor - side hung casements
4. Modern, double glazed side hung casement inserted in an existing granite wall
5. Vertical sliding sash window - more common in the larger settlements
6. Ornate vertical sliding sash window for a principal room
7. Georgian windows were large enough to allow plenty of natural light into the principal rooms before the invention of electric light - a strategy that can be used today to reduce dependance on electric lighting
8. Modern timber windows on a contemporary building in Liverton

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In most Dartmoor buildings, windows are modest in size when compared to the total area of wall. This is particularly obvious on rural buildings where windows are often small and set well back from the face of the wall to protect them from the harshness of the weather. Recess windows by at least 100 mm where possible and use good strong visible cills as a feature. Typically, windows in rural areas are painted side hung casements (photo 3). Modern double glazed examples are available (photo 4). In towns large vertical sliding sash windows are more common (photos 5, 6 and 7). Wherever possible avoid large picture windows, fanlight or top hung opening windows. Glazing bars details and the proportions of windows are important. Look around the area and see what the older buildings have in terms of window proportions and glazing bars as a guide.

Materials

Dartmoor National Park Authority does not encourage the use of uPVC for windows or doors. UPVC is made from oil and its manufacture is an energy intensive process resulting in high embodied energy. In addition, unlike timber windows, those made out of uPVC are difficult to repair and recycle once they have failed. Timber from sustainable sources is therefore the preferred material. The timber should generally be painted though in some circumstances, for example on a former agricultural building, staining is acceptable. Advice on timber windows is available from the wooden windows trade organisation at www.woodwindowalliance.com

Historic buildings

Wherever possible the priority is to repair and overhaul rather than replace existing windows, particularly in conservation areas and on listed buildings. In these cases, the advantages of improving the thermal performance of existing windows need to be balanced against the impact on the appearance of the building and the possible issues of dry rot and radon build up. There are a number of simple strategies that will help to improve the thermal performance of the building but with minimal impact:

- Fit draught proofing strips.
- Add secondary glazing on the inside of the existing window.
- Fit internal shutters - a traditional detail in many historic buildings.
- Fit heavy curtains - this will reduce drafts and have an appreciable effect on thermal performance.
- Replacing windows and doors in older properties can easily go wrong if the glazing, proportions and panel patterns of the original windows and doors are changed. Where windows need to be replaced, good quality timber framed double glazed units for both side hung and vertical sliding sash windows are available and should be used.
- Care should be taken to ensure that the metal divider strips inside the double glazed unit do not show.
- Every effort should be made to match the window design with the age of the building, well proportioned and with glass panes and glazing bars of identical size and shape.
- Avoid prominent trickle vents. Locate them on the frame as unobtrusively as possible or ventilate by an alternative means.
- Consider reuse of the casements and/or glazing in a new frame - old glass with its imperfections is an important part of the character of an old building.
- English Heritage has further guidance and information on its website (www.english-heritage.org.uk).

Contemporary buildings

Sustainable buildings need to pay close attention to the size and positioning of windows so that enough natural daylight is brought into the building to reduce the need for electric lighting. This approach reflects window design in Georgian and Victorian buildings where, before the invention of electric light, rooms used during the day had larger windows. Window and door design will be obviously different to more traditional building forms and designers should avoid a mix of contemporary and traditional in the same building which can give rise to a confused identity for the new building.



Building elements and materials

Porches and canopies

Porches

Some of the oldest and most prominent buildings in the National Park such as the Three Crowns in Chagford (photo 3), have large two storey stone porches though the vast majority of porches are more modest. Domestic porches provide shelter from the worst of the weather and are a very welcoming feature. The most successful examples complement the main building and help protect the main door, reducing heat loss. They also provide useful space for such things as bicycles and utility meters.

Look around for good examples in the immediate area for design inspiration. The porch should not be too dominant in relation to the overall façade - the rule of thumb is that the porch should not be more than about 2m deep and a maximum of about one third of the width of the main elevation but the appropriate dimensions will vary according to the size of the elevation of the building on which the porch is located.

The porch roof should not project any higher than the underside of the first floor window sills and follow the pitch of the main roof where possible. On Dartmoor it is usual for the porch door to be opposite the main door rather than on the side.

There is much scope here for a modern, contemporary response - particularly as unheated, south facing porches can help capture heat from the winter sun and act as a buffer space reducing the need for heating.

Canopies

The canopy is more often found on buildings in the countryside and in small rural settlements than in towns. As usual, the success of this sort of building element is in the detail - Victorian canopies and porches are exceptionally well crafted elements (photo 7).

Porch roof should not project above the eills of first floor windows

Maximum of about 2m deep

Maximum of about one third of the width of the main elevation

Rules of thumb for porch design

Opposite

1. South Zeal
2. Chagford
3. Two storey Dartmoor porch (Three Crowns at Chagford)
4. Porch on contemporary house at Moretonhampstead
5. Rural canopy at Lustleigh Turn
6. Lustleigh
7. Lustleigh
8. Belstone
9. Victorian canopy in South Tawton

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Building elements and materials

Doors

Historic buildings

Doors are one of the most important features of a building. Retain and repair an original door if at all possible and when replacing modern or inappropriate doors, reclaimed timber doors are recommended. In historic buildings the style of the door should suit the period of the house. Aluminium, uPVC, stained softwood and tropical hardwood are not encouraged and are not appropriate in conservation areas. Fan lights may be appropriate over the door but look out of place in the door itself. Older doors are often wider than modern versions - do not modify an existing frame and opening to fit an 'off the peg' modern door.

Types of door and door fittings

In rural areas and in former industrial or agricultural buildings, timber framed, ledged and braced or boarded doors are usually the most suitable - simple, well proportioned and robust. Panelled doors are suitable in Georgian and Victorian buildings. When replacing inferior modern doors look for suitable original examples from adjacent buildings for reference. Avoid plastic or chrome numerals, letter boxes and knockers - solid brass or black iron are more appropriate. Solid brass numerals, knockers, letter plates and knobs are appropriate on 18th and 19th century houses.

Black japanned thumb latches are suitable on small rural cottages. Pressed steel doors are strong and most appropriate for outbuildings, large sheds and temporary structures where additional security is important.

Finishes for doors

The doors and windows of traditional farmstead buildings are best finished in a colour which complements the predominant colour of surrounding walls. Alternatively, untreated timber of a durable type such as oak can be left to weather to a natural silver grey. Paint is the traditional finish for domestic doors. They tend to look best in deep rich colours. Taking a paint scrape from an existing door or window will often reveal the original colour scheme.

Contemporary Buildings

As with the design of windows, the proportions, materials and finish of doors in new buildings are important. If designing a new building in an existing settlement, look for successful examples from surrounding buildings for reference. The detailed design of the door, its frame and ironmongery, should reflect the overall character of the building as well as its surroundings. It is the first part of the building that people encounter and it should therefore be carefully considered; a bespoke design is often preferable to an 'off-the-peg' solution.

Opposite

1. Rural garden door
2. Simple robust rural door with thumb latch ironmongery
3. Contemporary door in existing granite building
4. Modern garage doors at Moretonhampstead
5. Door on contemporary house
- 6,7,8. Panelled doors typical of Georgian and Victorian houses

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Building elements and materials

Shopfronts, signs and satellite dishes

Well designed, high quality signs and shopfronts can make a significant contribution to the character and local distinctiveness of the Dartmoor National Park, particularly within its towns and villages.

Shopfronts

It is important to maintain the local character and the proportions of traditional shopfronts. Good repair and maintenance of an existing shopfront is often preferable and more cost effective than the installation of a new one. New shopfronts should respect the street scene - this is usually best achieved by the use of a simple, traditional design with vertical emphasis, constructed in painted wood or occasionally painted metal. An individual facade should not be heavy or have an overbearing appearance in the street. Where, for security reasons, blinds or shutters are required on a new shopfront, they should be incorporated into the design at the outset, rather than being applied as an afterthought. An internal open grill type shutter will almost always be the preferred option. Solid shutters must be avoided as they give rise to a dead appearance to the shop front outside trading hours. Fascias should not extend above the bottom of the first floor window sills nor obscure architectural detail such as friezes or cornices. Stall risers and pilasters should follow the best examples to be found in the town centre. Modern undivided plates of glass should be avoided. The use of large areas of coloured plastic films fixed to the window glass is not appropriate, being garish and over-dominant in the street scene. Traditional flat type canopies should be used rather than for example plastic serrated alternatives. Blind boxes should be incorporated into the design of the shop front wherever possible. Many older shops in the town or village centres may be protected by virtue of being a listed buildings. If that is the case, advice should be sought prior to any works taking place. Unlisted buildings may still require planning permission for works to shopfronts and advice should be sought from the National Park Authority before carrying out such works.

Signs

The sign should be as small as is functional for the purpose. Breaking up a sign into smaller units can help it fit the proportions of the building. Timber or other natural materials are preferred. Clear, handpainted letters in a light colour on a dark background should be used.

Signs do not need special illumination if the light from windows and street lights is adequate. Where some illumination is essential, then a well designed form of external lighting may be acceptable. Lighting should be the very minimum necessary utilising energy efficient bulbs, should be static and should not result in dazzle or glare. It should be carefully angled, or baffles should be utilised to minimise light pollution. Internally illuminated shop fascias and other similar signs which require the use of coloured plastic detract from the appearance of towns and villages in the National Park and should be avoided. Swan neck lighting units should be avoided. Lighting fittings should be discreet rather than be a feature themselves.

Satellite dishes

Careful positioning is needed on buildings, particularly in conservation areas, and it is preferable to avoid mounting equipment on a listed building altogether (any installation here will require listed building consent). Wherever possible, equipment should be installed in inconspicuous locations and not on front elevations or highly visible roof slopes. Consider alternative positions, such as in the garden or on an outbuilding. Satellite dishes on commercial properties usually require planning permission as do dishes on the front elevation facing the highway on domestic properties. Further advice on the need for planning permission for satellite dishes can be found on the National Park Authority web site.

Select a colour for the antenna which does not stand out against the mounting surface. Use a mesh or a transparent antenna and use the smallest size possible. If the antenna is no longer needed, then it should be removed as soon as possible. Consider sharing an antenna with neighbours.

Opposite

Examples of shops and signs on Dartmoor

1. Discreet gallows sign at Chagford
- 2, 3, 4 Traditional shopfronts in Chagford and Ashburton
- 5 Simple timber fascia board with light coloured letters on a dark background
6. Modern sign in Buckfast

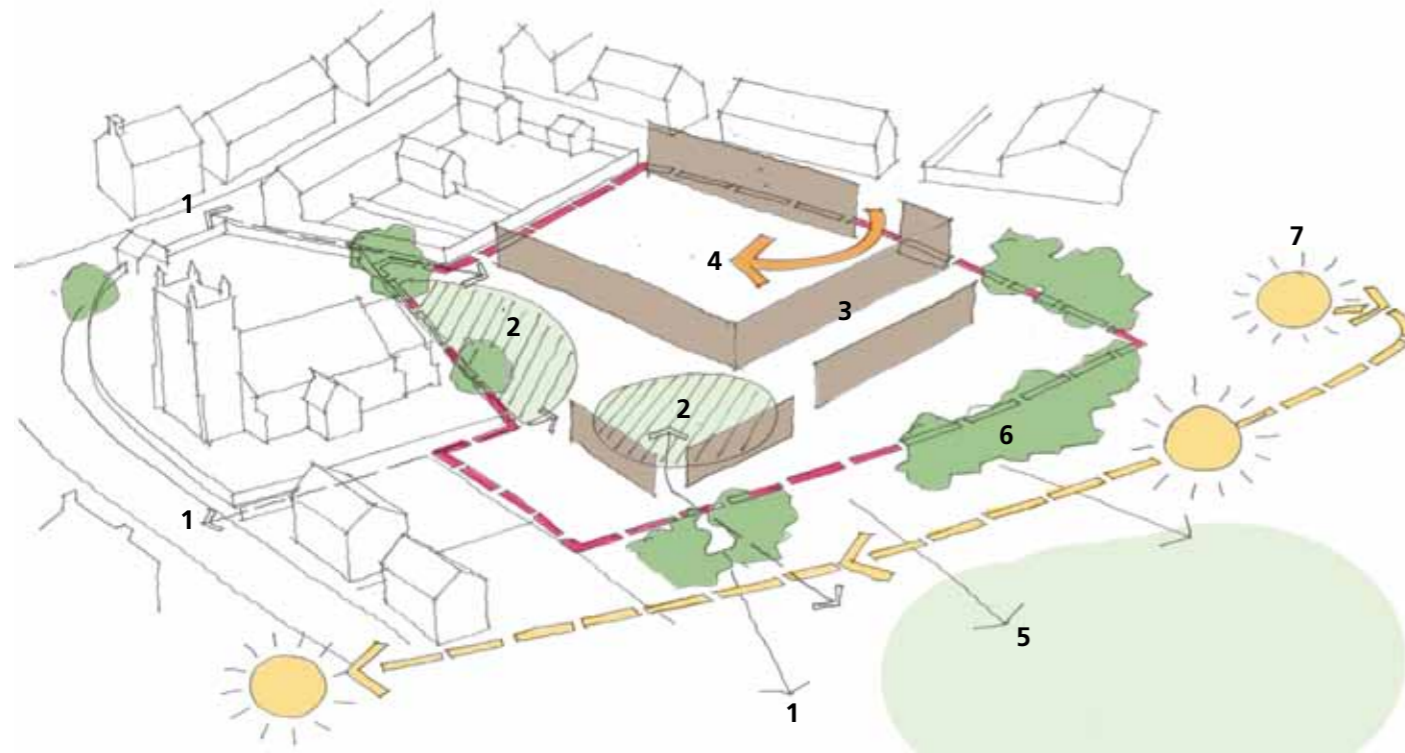
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Building elements and materials

Spaces between buildings -

Site analysis and layout principles



1. Make pedestrian links to nearby thoroughfares and spaces
2. Look for potential for new public open spaces
3. Set out building lines to create a legible street layout
4. Make courtyards for discreet communal parking and private gardens
5. Maintain visual links to adjacent green space
6. Retain existing vegetation where possible
7. Consider orientation and sun path

Site analysis and layout

Whatever the size of development, the layout and grouping of buildings and the spaces created between them must reflect the locally distinctive characteristics of the site and its surroundings. In settlements, buildings should be grouped together to form a sense of enclosure and strongly defined places that match and reinforce the 'grain' of immediately adjacent areas. Opportunities to link a new development to its surroundings should also be taken. These can include framing views to landmark buildings or natural features, providing well lit and attractively laid out pedestrian routes to connect with existing thoroughfares and creating set-backs in new building lines to respond to significant neighbouring buildings.

The orientation of buildings on plots should also be considered. Wherever

possible, the layout should maximise daylight, passive solar gain and sunlight to gardens. Plotting the sun paths at different times of the year will help determine the optimum orientation. Integrating the landscape design to make sure that plants do not grow to block out sunlight as they mature should also be considered. The layout should also take into account prevailing weather conditions.

The nature of spaces will be directly affected by the ratio of building height to the distance between their frontages – as a general guide, a street is typically of the ratio 1:1 to 1:2.5 height to width, and a public square 1:4. The immediate context of a development site will offer clues to the appropriate proportions of its external spaces.



Layout principles for infill sites

1. Design for a high proportion of properties with a southerly aspect
2. Conservatories/sun spaces face south, not on main facade
3. Delineate pedestrian routes by locally sourced high quality hard landscape materials
4. Surface parking court with porous paving (sustainable urban drainage system SUDS)
5. Ensure car parking area is overlooked by adjacent housing
6. Set up well defined building lines for the development to reinforce the urban grain of the surrounding area
7. Respect special landmark buildings. Here the new buildings are set back from the church, creating attractive public open space

Design guidance

- Design buildings to front onto the street or other public space and avoid blank facades facing public areas.
- Set up a definite building line with a coherent frontage and only introduce building set-backs and projections to achieve a specific effect.
- Lay out streets and pedestrian links to align with landmark buildings or special views, off-setting axes if necessary, to help way finding, add visual interest and connect the development to its surroundings.
- Minimise the impact of cars on townscape quality by keeping communal parking areas small, attractively detailed and efficiently laid out. Avoid putting parking in the front curtilage of properties.

- Communal residential parking areas should be as close as possible to and overlooked by the housing they serve.
- Where appropriate, design shared surfaces and use hard landscape materials – locally sourced wherever possible – to minimise the visual impact of vehicular traffic and create a pleasant pedestrian friendly environment.

Building elements and materials

Spaces between buildings -

Boundaries, walls, gates and landscaping

The choice of boundary treatments - walls, hedges and gates - and the quality of landscaping offers important opportunities to reinforce the local Dartmoor character of a development and to integrate it with its surroundings.

Local context

The context of the site - the surrounding buildings, streetscape and land form – will suggest the kind of detailing appropriate for boundaries, hard surfaces and landscaping. Dartmoor National Park Authority publishes Conservation Area Character Appraisals which highlight distinctive details for many individual Dartmoor settlements.

Boundaries - walls and hedges

Existing traditional boundaries should be retained wherever possible - this helps to maintain the character of an area and 'knits' new development into an existing settlement. New boundaries should reflect the location - rural or urban. In rural areas on the moorland fringe, Devon banks are the most common boundary type - earth banks faced each side with stone. On the High Moor, drystone granite walls are the most common boundary type. Hedging and trees can provide shelter from prevailing winds as well as softening or screening the visual impact of the development. Hedges planted with native species such as hazel and hawthorn encourage a wide variety of wildlife and increase biodiversity. Timber post and rail fences are cheaper to erect than stone

walls and are often appropriate without achieving the same visual effect and sense of permanence. However large areas of close boarded timber fencing are not attractive and should be avoided. Gates should reflect the style of the boundary - generally farm style timber gates in the countryside and metal gates in the main settlements are appropriate. In urban areas mortared walls using the stone of the locality and metal railings are the main boundary types.

External landscaping

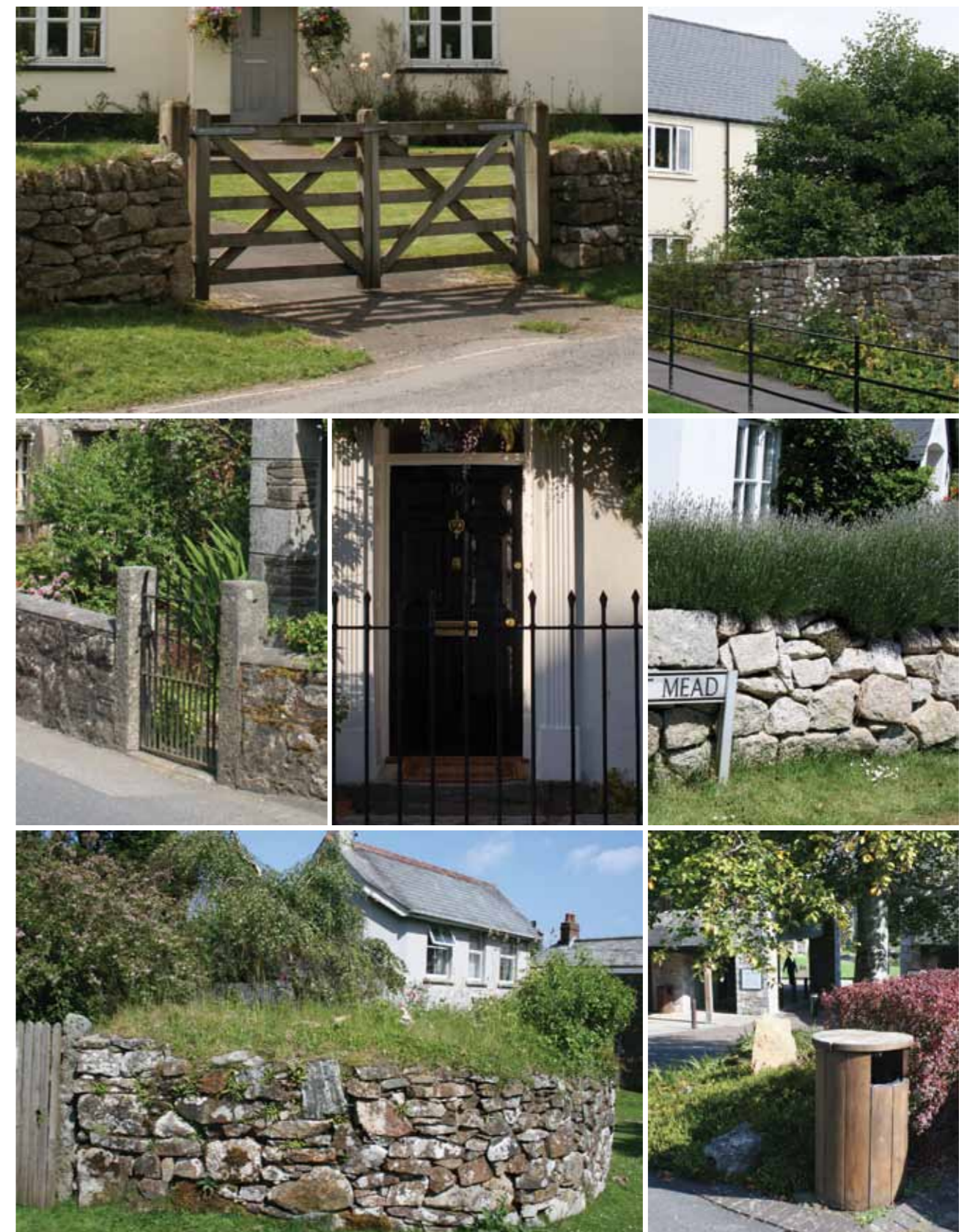
The treatment of the external landscape can often pull a development together and help it appear established in its surroundings. The choice of surface materials, boundary treatments and planting can provide the vital finishing touches to a scheme. Influences should be used from the existing surrounding landscape treatment where possible.

Granite has historically been a local resource, extensively used in walling as kerb stones and to form gateposts and street bollards. If possible, these features should be reproduced in new developments using salvaged recycled granite. As an alternative, timber also features highly in the provision of street furniture with large timbers used as bollards and for benches. Hedgebanks in varying forms are common in the landscape of Dartmoor's fringe, with some consisting of banks with grass on top and others with hedgerows, typically of mixed thorn.

Opposite

1. Wide 'rural style' gate with new Devon bank boundary walls and soft roadside verge (Widcombe)
2. Stone wall providing privacy to new houses in Moretonhampstead with a strip of verge allowed to 'go wild'
3. Low stone wall and gate in Lydford
4. 'Urban style' railings (Buckfastleigh)
5. Planted stone wall in Dunsford
6. Devon bank in Belstone
7. Sensitive landscaping and carefully chosen street furniture can substantially enhance a development

1		2
3	4	5
6		7



Building elements and materials

Spaces between buildings - Car parking and access, drainage, public space and lighting

Car parking and access

The careful management of car parking is critical to the quality of the external space. Every effort should be made to reduce the dominance of the car in the design of new developments in the National Park. Minimise the impact of cars on townscape quality by keeping communal parking areas small, attractively detailed and efficiently laid out. Avoid putting parking in the front curtilage of properties. Communal residential parking areas should be as close as possible to and overlooked by the housing they serve, with landscape planting used to define spaces and reduce visual impact. Parking is less intrusive if located to the rear of a development.

Lay out street and pedestrian links to align with landmark buildings or special views offsetting axes if necessary to help wayfinding, add visual interest and connect the development to its surroundings. Within housing developments, consider the use of shared surface areas where pedestrians and cars share the same surface creating a safer environment.

Try not to over-design road junctions. Large bell mouths to junctions with large expanses of tarmacadam are inappropriate. Design with tight kerb radii to help slow traffic but without compromising safety. Manual for Streets (2), published by central government (www.dft.gov.uk), provides useful advice for highway design that is sensitive to its location. Devon County Council's 'Highway Management in Devon's Protected Landscapes' provides more locally specific guidance and can be

accessed on the National Park Authority's website at www.dartmoor-npa.gov.uk

Drainage

Appropriate drainage, so that an existing flooding problem is not made worse, is an important consideration for many developments. Moreover, with the expectation that extreme rainfall events will increase in the future, it is important that new development does not increase the likelihood of a flooding problem emerging in years to come. The spaces between buildings have an important role to play in mitigation of the risk.

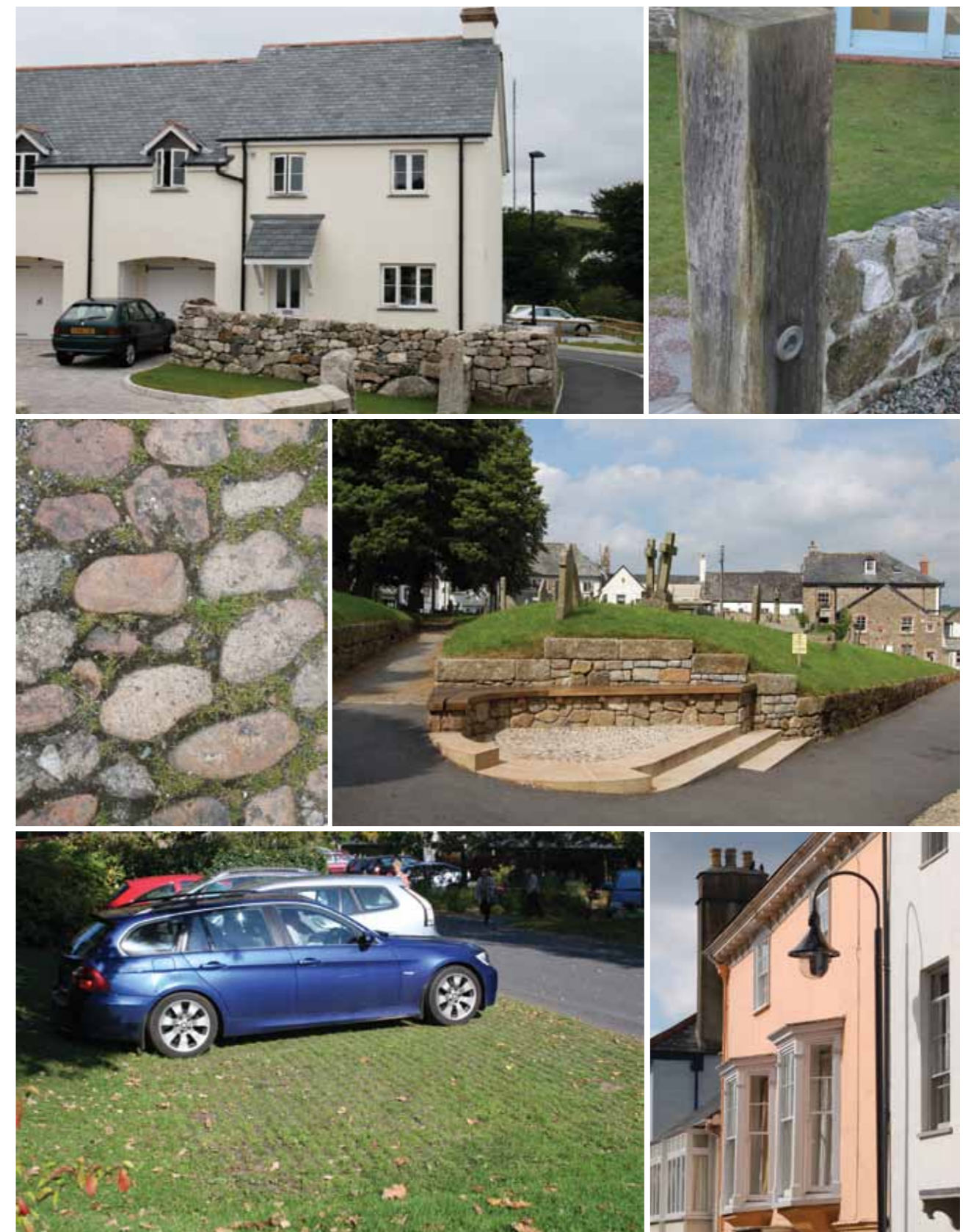
Traditionally in build up areas, surface water was removed as quickly as possible into local watercourses. As the intensity of rainfall increases in the future with global warming, discharging surface water increases the likelihood of flooding and of pollution as rainwater overwhelms foul sewers. The emphasis is now on holding the rainwater and releasing it slowly so that the existing drains can continue to cope. Quite apart from the impact of global warming, this may also be necessary and cost effective where sewers are nearing capacity.

Sustainable Urban Drainage Systems (SUDS) aim to moderate the discharge of large amounts of surface water during periods of intense rain so that drains and sewers are not overwhelmed and also to ensure that discharge water is as free of pollutants as possible. This is achieved by laying permeable surfaces rather than paving slabs and tarmac - water can sink

Opposite

1. Permeable paving and car parking in Princetown
2. Timber bollard and discreet lighting at Cornwood
3. Traditional permeable surface
4. Public seating area in Chagford reflecting local materials
5. Permeable surface on the Abbey car park at Buckfast
6. Sympathetic street lighting in Ashburton

1	2
3	4
5	6



into the ground which acts as a store. Alternatively, or in addition, attenuation tanks can be installed as part of the drainage scheme. These are containers where water is held at peak rainfall and then slowly released.

On new housing developments in the future, the use of SUDs will be mandatory and there will be a need for a separate certificate from a drainage body.

Public space and lighting

At focal points in the development, consider the opportunity to create new public spaces. Large new developments should include at least one focal public space that is designed to a high quality. Public spaces should follow the guidance in Secured by Design to create safe communal spaces ([www. securedbydesign.com](http://www.securedbydesign.com)).

Where the opportunity exists, high quality public art should be included in the design of this space.

Lighting is often at the heart of public space and the nature of street lamps is an important feature of the street scene. High quality lanterns are important as an enhancement to the local environment and black painted standards are preferred. The National Park Authority is committed to maintaining the tranquillity of Dartmoor and its dark skies are a very important component of that tranquillity. Therefore new lighting should also be directional so that light pollution is minimised. This consideration applies throughout Dartmoor but particularly in the more rural parts of the National Park. Floodlighting and security lighting can be particularly intrusive and the need for it should be carefully

considered in any proposals so that the extent and quality of the dark night skies on Dartmoor is not diminished and a valuable special quality of the National Park is not damaged.

Appendices

Appendix I

The planning application process

Appendix II

Useful links and contacts

Appendix III

Links to adopted planning policy

Appendix IV

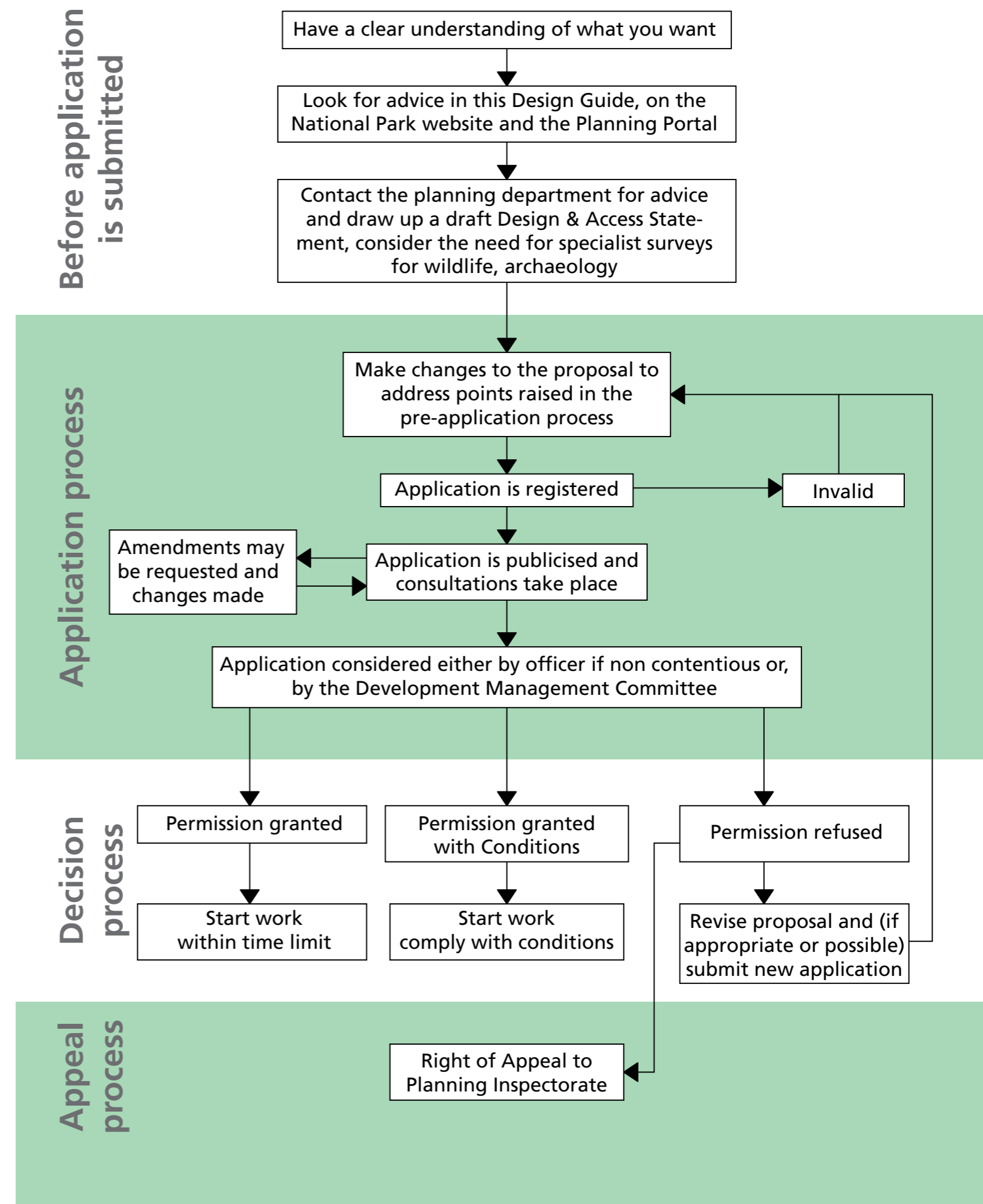
List of buildings likely to be unsuitable for conversion

Appendix V

List of trees and shrubs for consideration in planting schemes

Appendix I

The planning application process



Appendix II

Useful links and contacts

The text of the design guide contains numerous references to organisations and their web sites where further information can be obtained. The list below identifies a number of the key contacts but the reader is encouraged to look at the sections of the guide relevant to a type of development or a particular design detail for further ideas. The list in this appendix concentrates on the websites of public bodies but it is also in particular worth looking at the web sites of trade organisations such as the Wood Window Alliance for ideas and inspiration.

Code for Sustainable Homes and BREEAM

These are the main tools for assessing the sustainability of new buildings. More details are available on the BREEAM web site. www.breeam.org

Commission for Architecture and the Built Environment (CABE)

The CABE website is a source for guidance on good design and has a good downloadable guide to compiling a Design and Access Statement. The website also contains details on CABE's 'Building for Life' criteria which list a set of principles and a scoring system for assessing good sustainable design. The National Park Authority uses Building for Life for assessing more major proposals. It is useful for prospective applicants to consider the Building for Life principles before submitting an application. www.cabe.org.uk

Dartmoor National Park Authority

The National Park Authority website contains the relevant planning policies currently applicable within the national park including a downloadable version of the design guide. It also contains other relevant documents which provide a greater appreciation of what makes Dartmoor special, such as the Landscape Character Assessment of Dartmoor and appraisals of designated conservation areas. The web site also has links to other design advice produced by others such as the South West Protected Landscapes Forum document, 'Horses, the landscape and you' for advice on equestrian development in protected areas as well as its own leaflets on, for example, historic buildings and ecology. www.dartmoor-npa.gov.uk

Department of Communities and Local Government

This is the department of central government that is responsible for planning matters. It provides the latest guidance from government on planning policy and the building regulations. It also provides information on the environmental performance of buildings and the Code for Sustainable Homes. www.communities.gov.uk

Department for Transport

As the name suggests, this is the department of central government responsible for transport matters. Its publication, Manual for Streets (2), is available on its website and provides useful information on sensitive highway design. www.dft.gov.uk

English Heritage

English Heritage is the government's lead advisory body for the historic environment. It publishes wide-ranging guidance on the conservation of historic buildings to assist those working in the care and management of the historic environment make informed decisions. www.english-heritage.org.uk

Environment Agency

The Environment Agency is a public body responsible to central government. Its principal aims are to protect and improve the environment. Its web site contains maps of areas subject to flooding and details of how to implement sustainable urban drainage schemes. www.environment-agency.gov.uk

Green Building Bible

The Green Building Bible is a comprehensive and practical introduction to sustainable building. www.greenbuildingbible.co.uk

Lifetime Homes

The Lifetime Homes standard is a set of 16 design criteria for building accessible and adaptable homes. www.lifetimehomes.org.uk

Natural England

Natural England is a public body responsible to central government. Its main purposes are to pursue the protection and improvement of England's natural environment and to encourage people to enjoy and get involved with their natural surroundings. Included on its website is advice on protected species. www.naturalengland.org.uk

Planning Portal

This is a government website providing a gateway to planning information throughout the UK. It is full of useful guidance and tips on planning matters and includes an interactive house which gives guidance for householders thinking of carrying out alterations to their properties. Planning applications can also be submitted through the portal. www.planningportal.gov.uk

Secured by Design

This is the official UK flagship initiative supporting the principles of 'designing out crime'. It focuses on crime prevention at the design, layout and construction stages of homes and commercial premises and promotes the use of security standards for a wide range of applications and products. Further information is available on the 'Secured by Design' website. www.securedbydesign.com

Appendix III

Links to adopted planning policy

The Local Development Framework (LDF)

The National Park Authority's Local Development Framework (LDF) is the suite of documents which contain local planning policies and against which the National Park Authority will determine planning applications. The principal document in any LDF is the Core Strategy. This document provides a vision for the future of the planning authority's area. It also sets out broad planning policies and identifies any areas for large scale development needed to achieve the aims and objectives that follow on from the vision. The National Park Authority's Core Strategy was adopted in 2008. The policies in the Core Strategy that are most relevant to design issues are listed below and are supplemented by the design advice in this guide.

At the time of going to press with the Design Guide, the Authority is preparing a document that will provide more detailed planning policies and allocate areas of land for specific uses to meet the requirements of the Core Strategy. It will sit beneath the Core Strategy and above the Design Guide. Up to date information on progress on this document, and indeed any changes to local planning policy, can be found by accessing the Authority's website at www.dartmoor-npa.gov.uk and going to the forward planning pages.

Relevant Core Strategy policies

Policy COR 4

Development proposals will be expected to conform to the following design principles:

- Demonstrating a scale and layout appropriate to the site and its surroundings, conserving or enhancing the quality and distinctiveness of the built environment and local landscape character;
- Using external materials appropriate to the local environment;
- Making the best sustainable use of the site, including the re-use and refurbishment of existing buildings;
- Providing an attractive, functional, accessible, and energy and water efficient development;
- Creating places that deter crime.

Policy COR5

The character, appearance, historic plan forms, settlement patterns, integrity, local distinctiveness and cultural associations that contribute to the special qualities and settings of the historic built environment and historic parks and gardens should be conserved and enhanced.

Policy COR6

Development will not have an adverse impact on the integrity or setting of a Scheduled Ancient Monument or other sites or remains considered to be of national archaeological importance. Locally important archaeological sites will also be protected.

Policy COR 8

Development should ensure that natural resources are used in efficient and sustainable ways. This will include the following aims:

- Achieving the highest practicable energy efficiency by addressing such factors as location, orientation, layout, design and high standards of insulation;
- Realising the potential for the generation of on-site renewable energy, unless impracticable because of technical or environmental reasons. Major development will be expected to provide on-site renewable energy generation equipment to off-set at least 20% of the predicted carbon emissions of the development;
- Incorporating sustainable drainage and water conservation systems;
- Having no adverse effects on drainage patterns or flood storage capacity;
- Minimising waste and facilitating recycling;
- Providing opportunities for the beneficial management of strategic nature areas and other habitats and species to promote adaptation to climate change and to sustain their contribution to the mitigation of climate change.

Policy COR10

Small-scale renewable energy schemes will be considered favourably, subject to there being no over-riding environmental and amenity considerations. Large scale renewable energy schemes which would

compromise the objectives of National Park designation will not be supported. Where there are other renewable energy schemes in operation in the area, the cumulative effect of additional development will be an important factor to be taken into consideration.

Policy COR11

The Authority will seek to sustain Dartmoor as a place that continues to offer a sense of tranquillity to residents, those who work in the National Park and those who visit it.

Policy COR13

Development proposals should, by virtue of their location and physical features, meet the highest standards of accessibility and design.

Appendix IV

List of buildings likely to be unsuitable for conversion

There are certain buildings which because of their special historical, architectural, landscape or constructional characteristics, or because of their value within a local setting, are unlikely to be suitable for conversion. They include:

- Long house shippens;
- Listed lincays;
- Farm buildings providing an essential agricultural setting for a Grade I or II* listed farmhouse;
- Farm groups of particular significance such as the best examples of estate architecture, or buildings constructed for specialist activities and functions;
- Agricultural buildings within groups of farmsteads of particular merit or historic associations;
- Farm buildings with particularly good interiors or with internal features, furniture or machinery of historic interest which cannot be retained in the conversion scheme;
- Medieval and late-medieval farm buildings;
- Minor buildings which are unlikely to be converted separately but where their use and retention unmodified should be carefully considered in any scheme, forexample: ash houses, kennels, dovecotes, pigsties, roundhouses, farm offices, fowl houses, granaries, ice houses;
- Cart sheds;
- Industrial or other non-agricultural buildings which are considered to

be of outstanding historic significance, or which have internal features, or furniture or machinery of historic interest which cannot be retained in the conversion scheme or which make an outstanding contribution to the character of a settlement, particularly within a Conservation Area.

Development through conversion can result in the converted building acquiring a set of permitted development rights. It is important to maintain control over future changes to buildings where the permission was given to help sustain the character and appearance or historic features of the building. It is equally important to maintain control over the setting of the building, especially where it contributes to the architectural or historical character of the locality.

Appendix V

List of trees and shrubs for consideration in planting schemes

The schedule overleaf of trees and shrubs and ground cover plants indicates a selection of species for a range of landscaping functions, together with details of their size and main characteristics. The species and varieties

shown should not be regarded as suitable for all sites, nor as a finite list as others may be appropriate. Selection from the schedule should be made with care, having particular regard for adjacent landscaping and the requirements of individual sites.

Botanical Name	Common Name	Evergreen	Growth Rate	Mature Height (m)				Shape	Hedges	Shelterbelts	Tolerance			Comments	
				< 0.3	0.3-1	1-3	3-10				> 10	Exposure	Shade		Wet Sites
TREES															
Acer pseudo platanus	Sycamore		F				*	R		*	*	*		Casts dense shade and of low wildlife value.	
Acer campestre	Field Maple		M			*	*	R	*			*		Grows best on fertile soils.	
Aesculus hippocastanum	Horse Chestnut		F				*	S						Attractive blossoms and fruit. Not suitable near roads.	
Alnus glutinosa	Alder		M				*	R				*	*	Attractive catkins and cones. Can check river bank erosion.	
Betula pendula	Silver Birch		F			*	*	R			*			Attractive bark. Casts light shade.	
Betula pubescens	Hairy Birch		F			*	*	R			*		*	As above but more tolerant of wet and cold.	
Carpinus betulus	Hornbeam		S				*	S	*			*		As a hedge, retains leaves in winter. Casts deep shade.	
Castanea sativa	Sweet Chestnut		M				*	S						Edible fruit.	
Fagus sylvatica	Beech		S				*	S	*	*	*	*		Prefers well drained soils. Casts deep shade. Upright varieties available.	
Fraxinus excelsior	Ash		F				*	R				*	*	Prefers wet and/or fertile soils.	
Ilex aquifolium	Holly	*	S			*	*	R	*		*	*		Attractive berries. Winter browsing for farm stock.	
Larix decidua	European Larch		F				*	U		*				Suitable in mixtures and as a nurse tree.	
Malus spp.	Crab Apple		M			*		R	*		*			Spring blossom. Edible fruit.	
Pinus sylvestris	Scot's Pine	*	F				*	U		*	*			Prefers light soils.	
Prunus avium	Wild Cherry: Gean		M				*	R						Attractive blossom. Prefers light fertile soils. Suckers freely.	
Prunus padus	Bird Cherry		F			*						*	*	Attractive blossom. Suckers freely.	
Quercus petraea	Sessile Oak		S				*	R			*			Will grow on thin, poor, upland soils.	
Quercus robur	Pedunculate Oak		S				*	S						Prefers lowland sites.	
Salix caprea	Goat Sallow		F			*		R				*	*	Produces decorative catkins in spring.	
Salix alba	White Willow		F				*	R				*		Silver-grey foliage.	
Sorbus aria	Whitebeam		M				*	R				*		Attractive foliage and berries. Prefers fertile soils.	
Sorbus aucuparia	Rowan		M			*		R		*	*			Brightly-coloured berries.	
Taxus baccata	Yew	*	S			*		S	*			*		Foliage can be toxic to farm stock. Upright varieties available.	
Tilia cordata	Small-leaved Lime		M				*	S				*		Prefers well-drained soils. A good substitute for Elm.	
Ulmus glabra	Wych Elm		M				*	S			*	*	*	Prefers moist rich soils. Susceptible to Dutch Elm Disease.	
Ulmus procera	English Elm		M			*		R	*			*	*	Suckers vigorously. Tends to shed large branches so not suitable near roads. Susceptible to Dutch Elm Disease.	

Botanical Name	Common Name	Evergreen	Growth Rate	Mature Height (m)				Shape	Hedges	Shelterbelts	Tolerance			Comments	
				< 0.3	0.3-1	1-3	3-10				> 10	Exposure	Shade		Wet Sites
SHRUBS															
Cornus sanguinea	Dogwood	M		*				*			*			Attractive flowers and winter twigs. Prefers fertile soils.	
Corylus avellana	Hazel	M		*	*			*			*			Edible nuts.	
Crataegus monogyna	Hawthorn	M					*	*	*	*	*			Spring blossom and attractive berries. Spiny.	
Euonymus europaeus	Spindle	M				*		*			*			Prefers fertile soils. Attractive berries.	
Lonicera periclymenum	Honeysuckle	M						*			*			Active climber. Scented flowers.	
Prunus spinosa	Blackthorn	M		*				*			*	*		Suckers freely. Edible' fruit and attractive blossom. Spiny.	
Rosa canina	Dog Rose	F		*				*						Attractive flowers and fruits. Spiny.	
Cytisus scoparius	Broom	F		*							*			Prefers well drained soils.	
Ulex europaeus	Gorse	*	S		*						*			Provides winter browsing for farm stock. Attractive flowers.	
Viburnum lantana	Wayfaring Tree	M		*				*						Attractive foliage, flowers and berries. Prefers well drained, fertile soils.	
Viburnum opulus	Guelder Rose	M		*				*			*	*		Attractive flowers and fruit.	



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