3.8 How to Protect Neighbouring Properties

Noise

Noise can be a source of significant aggravation for residents, particularly at night. Issues associated with noise are particularly prevalent in locations close to external sources of noise such as railway lines and busy roads.

Reference should be made to PPG24, which provides specific advice on proposals for new residential development in close proximity to an existing noise source.

Design to prevent noise disturbance

Noise disturbance can be reduced through careful design. The following techniques can be used:

- Orientate buildings so that habitable rooms and sitting out areas do not face noise sources.
- Introduce design features such as enclosed porches, recessed balconies and acoustic lobbies.
- Construct barriers such as garages or walls between noise sources and dwellings.
- Locate noisy external activities such as play areas close enough to the properties they serve to be safe and usable but far enough way to avoid noise disturbance.

389 Sunken amenity space provides buffer from road noise

390 Recessed balcony provides protection from noise

391 Acoustic fencing provides protection from road noise

3.9 How to Deliver Sustainable Development

Housing makes a significant contribution to CO2 emissions in the UK. The construction industry also utilises substantial volumes of non-renewable resources and generates pollution and waste. The need for sustainable approaches to building design is therefore fundamental if the challenges associated with climate change, resource depletion and pollution are to be addressed.

Traditionally, sustainable technologies such as wind turbines and solar panels have been retro-fitted to existing buildings, often to the detriment of the building design. This section looks at how sustainable design and construction can improve the environmental integrity of housing, without compromising design quality. The council will encourage developers to follow the principles in the energy hierarchy set out in paragraph 1.4 of the Technical Appendix to the Sustainable Design and Construction SPD.

The following section sets out how the sustainable technologies illustrated in Images 392 and 393 can be incorporated into new residential developments without compromising their design.

1. Domestic wind turbine
2. Thermal chimney
3. Semi-transparent, photovoltaic roofing
4. Solar water heating
5. High thermal mass stone
6. Sun room
7. Triple glazed windows with low E-coating
8. Water Butt
9. Green roof
10. Wing wall
11. Trombe wall
12. Ground source heat pump
13. Indigenous tree planting
14. Locally sourced slate
15. Bird box
16. Cycle storage
17. Permeable surfacing
18. Waste storage area

392 Sustainable building rear elevation

393 Sustainable building front elevation

3.9 How to Deliver Sustainable Development

Site Layout & Orientation

The most successful approach to sustainable design is to integrate sustainability at the earliest stage in the design process. The site layout and the orientation of buildings relative to the sun and the prevailing wind direction can have a direct impact on the demand for heating in winter and cooling requirements in the summer.

Orientate buildings to the south

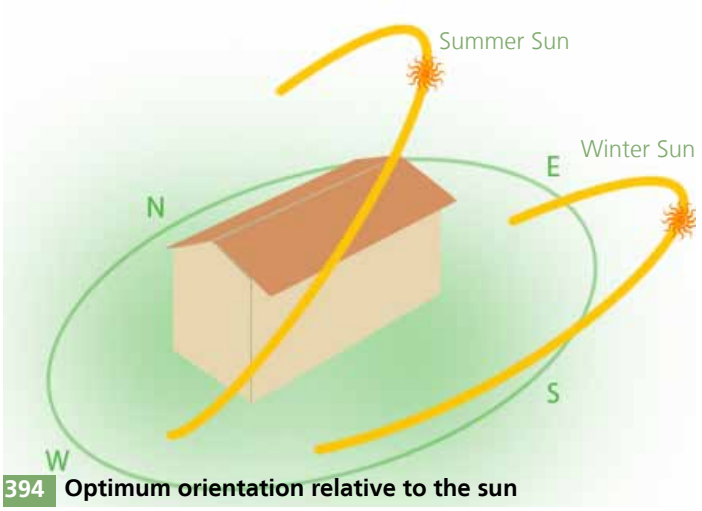
In general, orientating houses within 30 degrees of south and maximising glazing on the southerly aspect will capture solar heat throughout the year. The optimum orientation for individual sites will vary depending on site specific factors such as vegetation, topography and existing buildings that may overshadow the proposed development during the day. Care must be taken to ensure that this approach does not result in a monotonous, linear development. An appropriate design solution may be to integrate a broad range of building styles into the streetscene and to vary eave heights and ridge heights.

Design to reduce wind

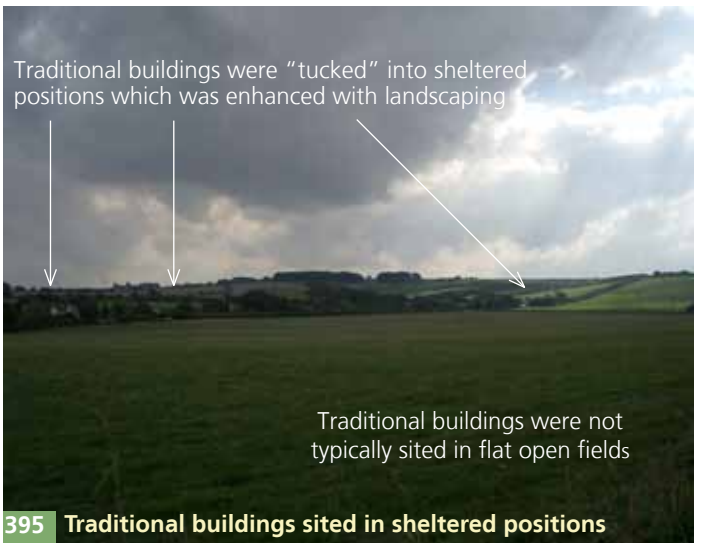
High winds greatly increase heat loss from buildings and can increase maintenance requirements. Long linear streets can cause wind channelling, which can increase wind speeds. Curved streets and roads, courtyards and mews can help prevent wind disturbance. The traditional alignment of many villages and streets in the Vale follows this curved street layout, which provides a high degree of natural shelter and also produces a harmonious built form.

Introduce natural shelter

The topography of the site can be used to provide natural shelter from wind and therefore prevent heat loss in winter. Integrating buildings around the existing topography can also help to soften the appearance of a new development.



394 **Optimum orientation relative to the sun**



395 **Traditional buildings sited in sheltered positions**


396 **In open areas shelter is often provided by landscaping**

Landscaping should be designed as an integral part of any development, not just to improve its appearance but to provide summer shade. In summer, breezes channelled by topography and landscaping can be used to provide natural cooling. Native planting should be used where possible.

3.9 How to Deliver Sustainable Development

Building Design & Layout

The design of a building can have a significant impact on its energy requirements. Traditional buildings were often designed to take account of the local climate, incorporating thick stone walls and small windows to ensure minimal heat loss in winter. These traditional approaches coupled with modern techniques can produce a highly efficient building that is appropriate to the local context.

Maximise daylight and sunlight

Orientating houses within 30 degrees of south and incorporating large windows on the southern elevations can maximize sunlight and daylight penetration. Features such as sunrooms and trombe walls (image 399) can be incorporated to maximise the benefits of solar gain. Where these features are integrated, it should be part of a comprehensive design strategy that does not detract from the building design or character of the area.

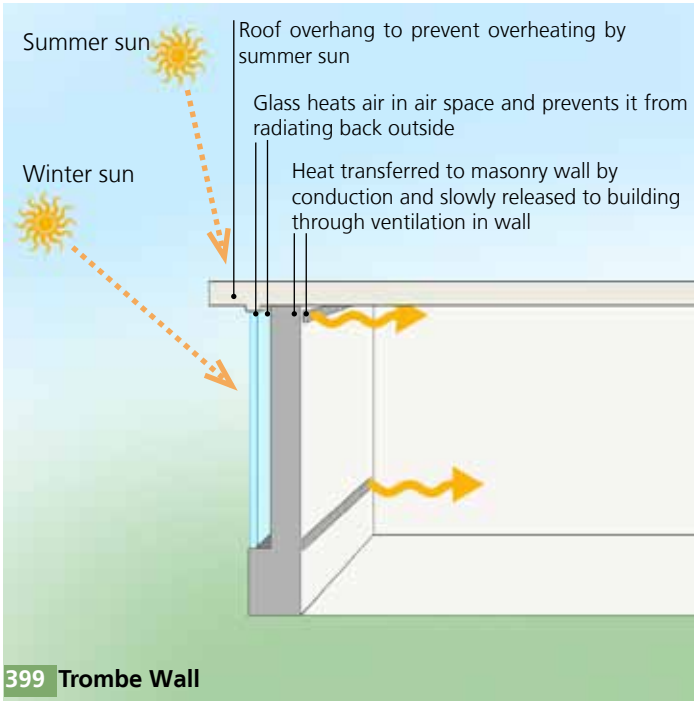
North facing walls should incorporate minimal glazed areas to prevent unnecessary heat loss in winter. Many traditional Vale buildings had small cottage style windows, which can be successfully accommodated using this technique. Windows on western and eastern facing elevations can provide warmth and lighting, but are vulnerable to overheating in summer if not shaded with blinds, shutters and/or appropriate depth eaves. Again care should be taken to ensure that such details are appropriate to individual buildings and their context.

Focus habitable rooms on southern side of buildings

Frequently used living rooms should be located on the southern side of the building, while non-habitable rooms such as bathrooms, utility rooms and circulation space should be located on the northern side of the building.

397 Southern elevation of building with large glazed area

398 Northern elevation of building with minimal glazing



399 Trombe Wall

3.9 How to Deliver Sustainable Development

Reduce exposure of buildings to the environment

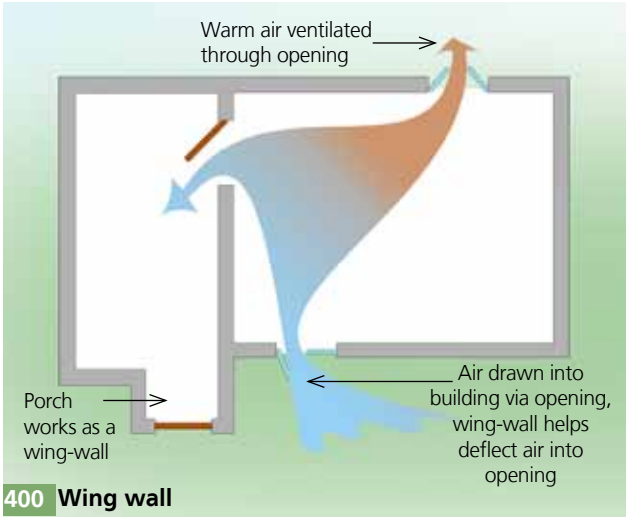
A compact floorplan can reduce the amount of external wall exposed to the environment. Buildings can also be set into the ground for protection.

During summer months shade created by trees can reduce air temperature adjacent to buildings and grass and shrubs can provide evaporative cooling. Channels created by trees and planting can funnel cooling summer breezes into a property. Deciduous trees provide shade in summer without compromising solar heat and light in winter.

Green roofs offer a wide range of sustainability benefits, including reducing storm water runoff, increased sound proofing, filtering water and increasing biodiversity. They also provide a radiant barrier to prevent rooms becoming hotter than the outdoor air temperature in summer. A green roof can be integrated into the design of a new extension, retrofitted to an existing flat roof or planned into individual units on a larger scheme.

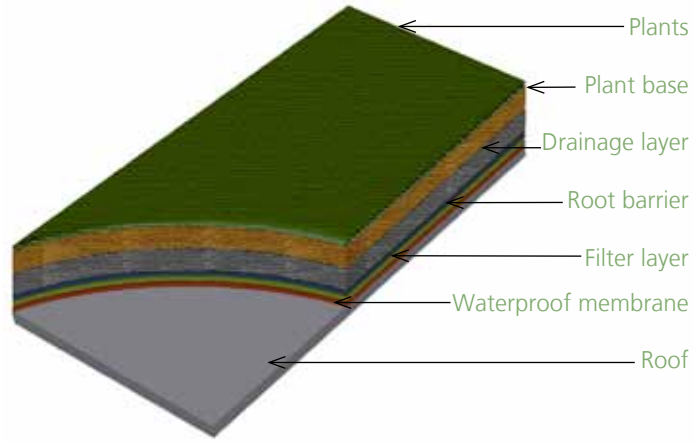
Take advantage of natural ventilation

Natural cooling in summer can be provided by incorporating features such as opening windows, cross ventilation, thermal chimneys and wing-walls (see images 400 and 404). These features can add interest to buildings if designed as part of the overall design concept but can appear incongruous if designed as "add-on" features.



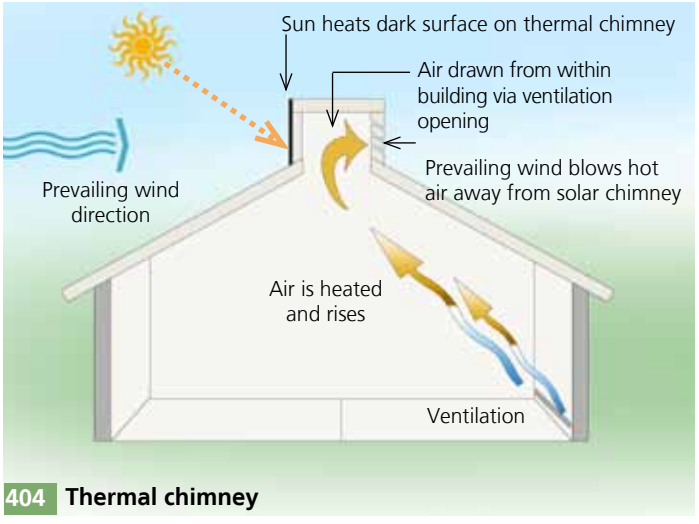
400 Wing wall

401 Deciduous trees provide shade in summer



402 Green roof composition

403 Green roof, Blackdown Horticultural Consultants



404 Thermal chimney

Materials & Construction

The choice and source of materials can have a significant bearing on the amount of energy used to construct and operate buildings.

Source materials locally

Wherever practical locally sourced materials should be used as this significantly reduces the distance products travel and therefore increases the sustainability credentials of a building.

Consider the environmental impact of materials

Materials such as plastic and aluminium require large amounts of energy to produce, have polluting manufacturing processes and consume non-renewable resources.

In contrast renewable materials, such as sustainably harvested timber require less energy and are less polluting. Examples of other sustainable building materials include sheep wool insulation, rammed earth, clay, non-toxic and low-VOC glues and paints and bamboo. All these materials can be successfully used in the construction of new dwellings without compromising their design or having an adverse impact on the surroundings

Use recycled materials

Recycling materials avoids manufacturing and production energy and costs. Materials such as brick, timber, slate, stone and metal can be reclaimed locally. Using locally sourced recycled materials is not only more sustainable but can help to ensure that a development is successfully integrated into its context.

Evaluate the thermal mass of materials

Using high thermal mass materials can significantly reduce heat loss in winter. Traditional Vale buildings were frequently constructed using materials such as brick and stone, which store heat and release it slowly. Modern materials such as concrete and rammed earth also have a high thermal mass, but their use for buildings must be justified as part of a comprehensive design concept, particularly in sensitive historic areas.

405 Materials found in the Vale

3.9 How to Deliver Sustainable Development

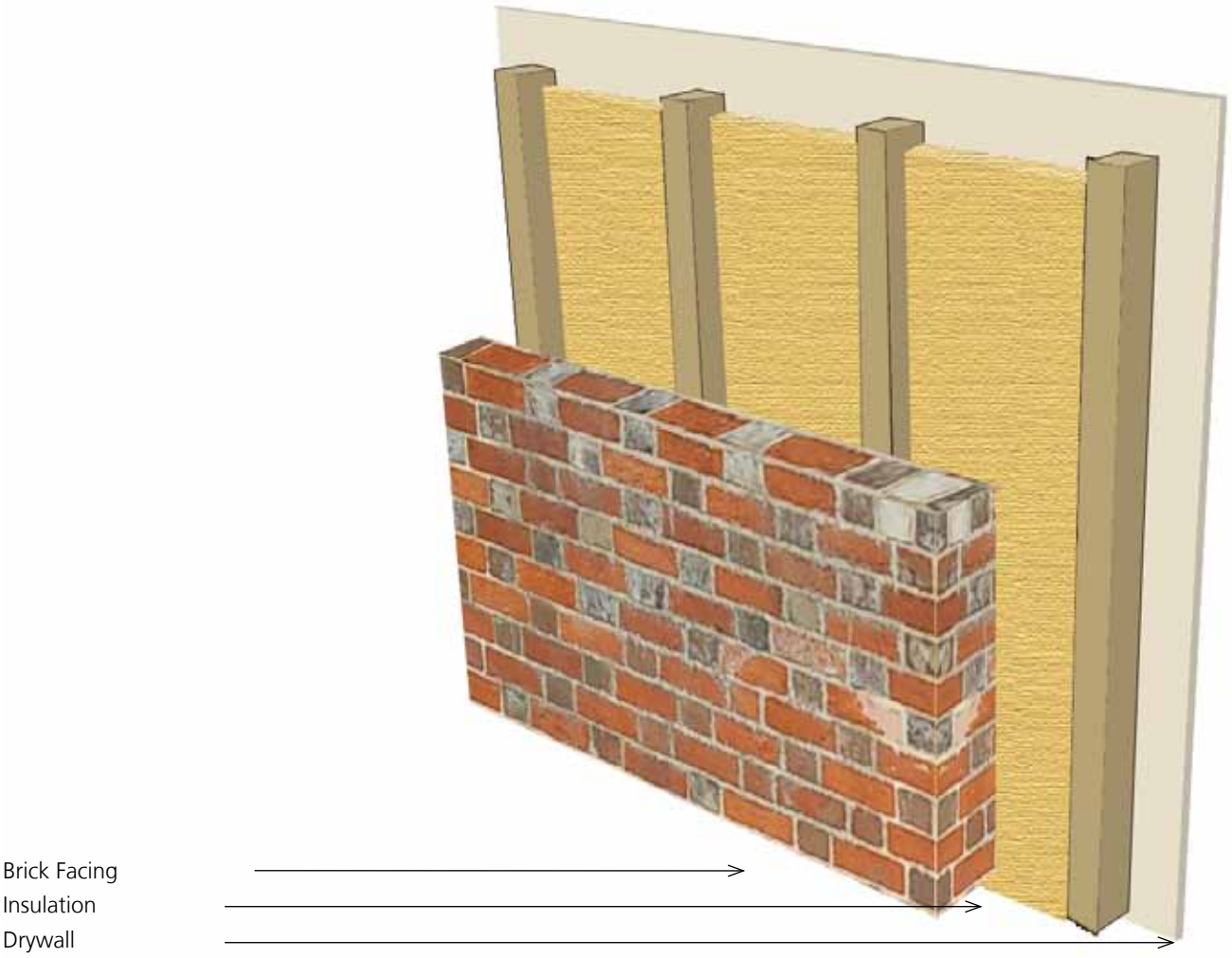
Insulate buildings

Insulation should be incorporated into buildings to reduce heat loss in winter and overheating in summer. Where possible, insulation made from recycled or natural sources should be used. Insulation should be properly installed to avoid thermal bridges (cold spots) as this will reduce the risk of condensation and will minimise heat loss.

Use energy efficient windows and doors

Energy efficient windows, rooflights and glazed doors should normally be used, although they will not normally be appropriate on listed buildings. In conservation areas care should be taken to ensure that they respect traditional details.

406 **Shutters can reduce heat loss in old buildings**



407 **Building insulation**

3.9 How to Deliver Sustainable Development

Energy Technology

Heat and energy for buildings can be generated from a number of different sources including sunlight, wind and geothermal heat. Where possible, energy technologies should be integrated into the design of the building from the outset as part of an overall design approach.

Make the most of the sun

Solar energy can be used to produce electricity, heat water or for space/air heating.

Solar water systems require a collector that can either be roof* or wall mounted. Solar space heating systems require a roof collector*, but demand a larger surface area for the collector than water systems. These systems tend to be visually obtrusive and should be carefully sited and designed from the outset. With care they can be positive design elements of a roofscape or an elevation.

Solar cells (photovoltaics) are used for electricity generation. Cells can be retrofitted to roofs as glass fronted panels* or they can be "building integrated", incorporated into the building envelope as solar roof tiles or transparent solar membranes on conservatories. "Building integrated" photovoltaics, such as solar roof tiles provide an opportunity to maximise energy generation on a building without significant compromise to the building design. They can make a positive contribution to the design of buildings, particularly where a contemporary statement is required.

Installing solar panels on houses does not generally require planning permission; however permission may be required in certain circumstances, for example when installing a solar panel on the roof of flats.

*For optimum performance, panels should be located on south-facing, unshaded roof aspects on a pitch of less than 40 degrees.

408 Retrofitted solar water heater

409 Retrofitted photovoltaics

410 Building integrated photovoltaics, Ecos Homes

411 Building integrated photovoltaics and solar heater, RuralZED

3.9 How to Deliver Sustainable Development

Harness the wind.

Wind energy can be used to generate electricity but including wind turbines on buildings can present a very significant design challenge and can cause problems to neighbouring properties from noise and vibration. A careful approach must therefore be taken to ensure that turbines are appropriate to the building and context.

Maximise the potential of water

Small scale hydro-power can be used to convert energy from flowing water into electricity. Even the smallest streams can be used to generate electricity.

Design issues that should be taken into account and the appearance of turbines and associated infrastructure they may have on neighbouring properties from noise and vibration. The impact of the system on the habitats and species in the watercourse may also need to be addressed. Natural England and the Environment Agency should be contacted for further information.

Planning permission is required for all water turbines.

Harness energy from the earth

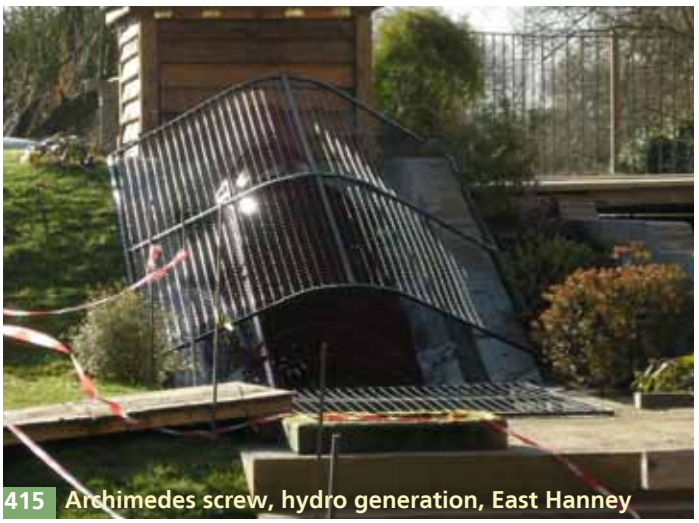
Ground source heat pumps (GSHP) transfer heat from the ground into a building to provide space heating and, in some cases, to preheat domestic hot water. Planning permission is not usually required to install these systems and usually they will not have any design implications.

Air and water source heat pumps are also available. Air source heat pumps can be fitted outside a house or in the roof space but can be visually obtrusive and should therefore be carefully sited to minimise impact on the character of the area.

412 Community wind generation, Watchfield

413 Micro wind generation

414 Wind turbines designed into building design, by RuralZED



415 Archimedes screw, hydro generation, East Hanney

3.9 How to Deliver Sustainable Development

Use biomass and waste.

For large scale new developments, biomass (wood pellets, wood chips and logs) can be burnt to produce energy. Equipment for burning biomass should be sited so that any flues and vents are discretely located and there are no harmful impacts from emissions.

Biomass can either be burnt in a stove or in a boiler and connected to central heating and hot water systems. In larger developments, biomass or in some circumstances, waste can be burnt in combined heat and power (CHP) engines to produce heat and electricity.

The siting and location of CHP engines within a development should be carefully considered to ensure ease of access for maintenance and delivery and to minimise impact on the streetscene.

Water Technology

Reuse grey water

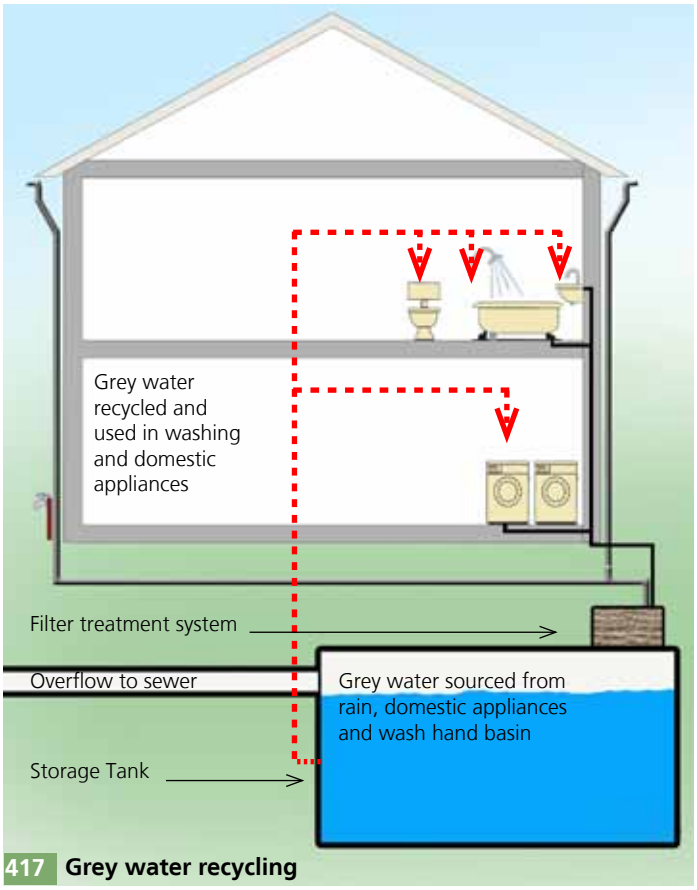
Grey water recycling systems reuse waste water from hand wash basins, baths and showers. Grey water systems can be installed in new or existing properties and have the potential to meet a significant proportion of domestic demand for water.

Grey water storage tanks are best located in roof spaces or underground so that they do not affect the exterior of a building or the street scene.

Harvest the rain

Rainwater storage systems harvest rainwater for irrigation, garden watering, toilet flushing or car washing. The simplest form of rainwater storage is a garden water butt and can usually be located on rear elevations. Underground storage should be considered in some sensitive locations or where the storage vessels are larger.

416 Wood can be burnt for heat and hot water



417 Grey water recycling

418 Water butt

3.9 How to Deliver Sustainable Development

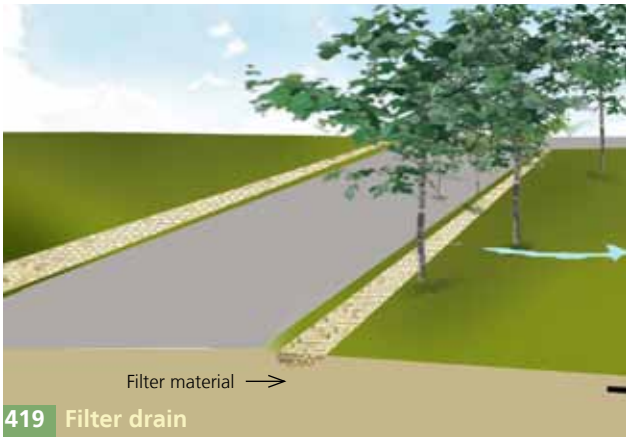
Flooding & Drainage

Incorporate Sustainable Urban Drainage Systems

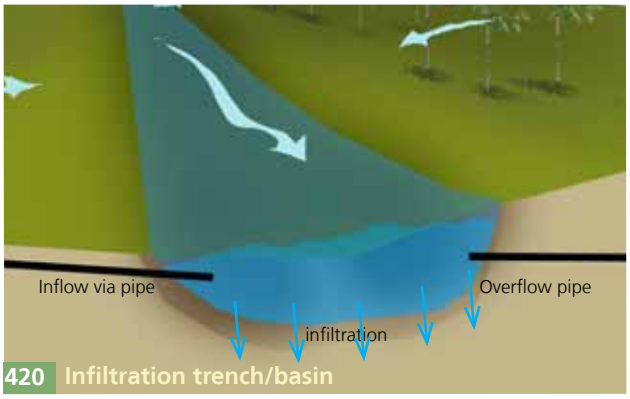
Sustainable urban drainage systems (SUDS) are an alternative to traditional approaches of managing run-off from buildings and hard-standing. SUDS reduce the amount of surface run-off that runs directly to rivers through storm water systems.

SUDS can be applied to rural and urban sites and is appropriate for a range of development sizes. SUDS systems can incorporate some of the water saving measures identified above, but can also include swales, ponds and permeable paving surfaces and sustainable drainage for roads, footpaths and car parking. Images 419 to 424 illustrate and explain these techniques.

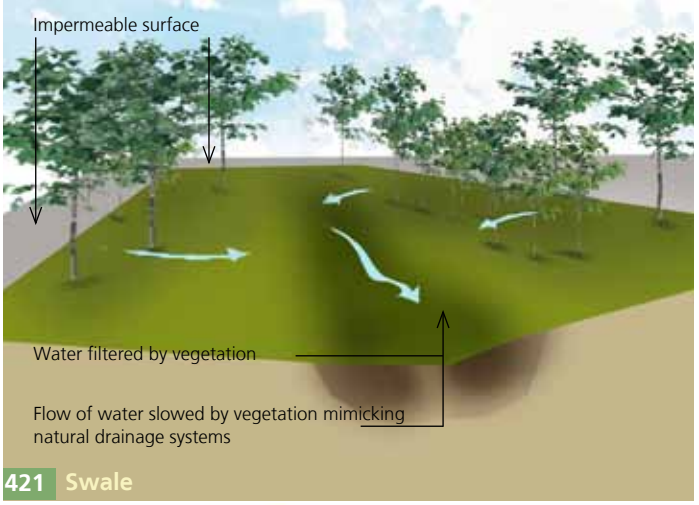
SUDS should be designed into the development from the outset as features such as ponds and wetlands when combined with landscaping can make a very positive contribution to the character and appearance of a development and help to improve biodiversity.



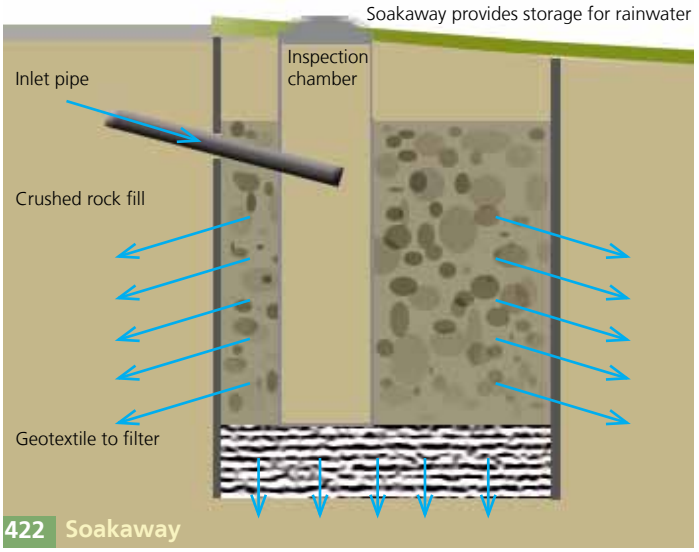
419 Filter drain



420 Infiltration trench/basin



421 Swale



422 Soakaway

423 Pond integrated into landscaping scheme

424 Permeable surfaces

3.9 How to Deliver Sustainable Development

Waste & Recycling

The provision of waste management facilities within developments is fundamental if waste reduction and recycling targets are to be met. Waste is a significant design issue as unsightly bins, bins stores and composting facilities can detract from the character and appearance of an area.

Provide space for waste

Adequate space should be provided for waste facilities for all types of waste including general waste, recyclable waste and compostable waste, both internal to developments (kitchen storage) and in external waste storage facilities.

Design waste storage facilities in accordance with the character of an area

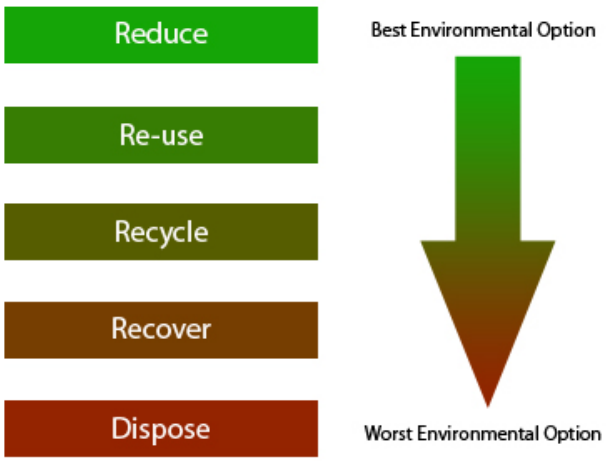
On larger residential schemes waste storage should ideally be provided in separate waste storage buildings.

The siting and design of separate waste storage facilities should ensure safe and easy access for residents and collection vehicles, but should not be located so close to dwellings that they could cause disturbance to the occupiers.

Road widths and turning heads should be able to accommodate waste collection vehicles and be designed to prevent parking from obstruct access to the facility. Waste storage facilities should also be designed to reflect the character of the development and the area (see section 3.4). Appropriate landscaping can be used to soften the appearance of facilities, however this should not visually or physically obscure collection points.

425 **Vale of White Horse green box recycling scheme**

426 **Successful waste storage buildings**



427 **Waste management hierarchy**