

HEALTH TECHNICAL MEMORANDUM 07-07

Sustainable health and social care buildings

2011

STATUS IN WALES

APPLIES

This document has been created from the two
Space for Health website content manuals

It will eventually be superseded by a new
Welsh Health Building Note

HEALTH TECHNICAL MEMORANDUM 07-07

Sustainable health and social care buildings

Please Note that this is an interim document and no changes have been made to the two manuals from which it was created.

The Policy and Service Context Manual is followed by the Planning and Design manual each of which had its own contents page and page numbering.



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Shared Services
Partnership
Facilities Services

Sustainable health and social care buildings: Strategic overview

Version:0.2:Wales



Sustainable health and social care buildings: Planning, design, construction and refurbishment - Sustainable health and social care buildings: Strategic overview 3900:0.2:Wales

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Overview

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The success of a building's performance in terms of sustainability outcomes is dependent to a large degree on the decisions taken at the design, procurement and construction stages of a development.

This guidance focuses on the actions to be taken at these stages and also includes the relevant action required at the post-completion, operational and end-of-life stages. It draws upon and refers to sustainability policy and procedures that are already in place to direct development in achieving design excellence and national objectives.

Introduction

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This guidance urges healthcare organisations to aspire to excellence in sustainability in their healthcare buildings and not just to include the minimum necessary provision to meet statutory and regulatory requirements. Given the direction of travel of sustainability policy and the upward pressure on energy costs, such aspirations will also be in the long-term interests of the organisation.

Policy

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The Brundtland Report of the World Commission on Environment and Development (WCED) defines sustainable development as follows: “Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs” (Brundtland, 1987).

Welsh Assembly Government policy is to commit to sustainable development through 'One Wales: One Planet, The Sustainable Development Scheme of the Welsh Assembly Government' and to take it forward through the Climate Change Act 2008. The Government’s aim is to cut carbon-dioxide emissions by 80% before 2050 from a baseline of 1990. A more challenging aspiration is being delivered through the Government’s other policy networks to aspire to the ambition of attaining low- to zero-carbon buildings and net zero waste.

This manual explains these policy requirements and how they affect the capital development process. It aims to ensure that the right foundations are in place to work towards the aspiration of low- to zero-carbon buildings.

One Wales: One Planet, The Sustainable Development Scheme of the Welsh Assembly Government
Climate Change Act 2008

Government principles

3911

Principles of sustainable development

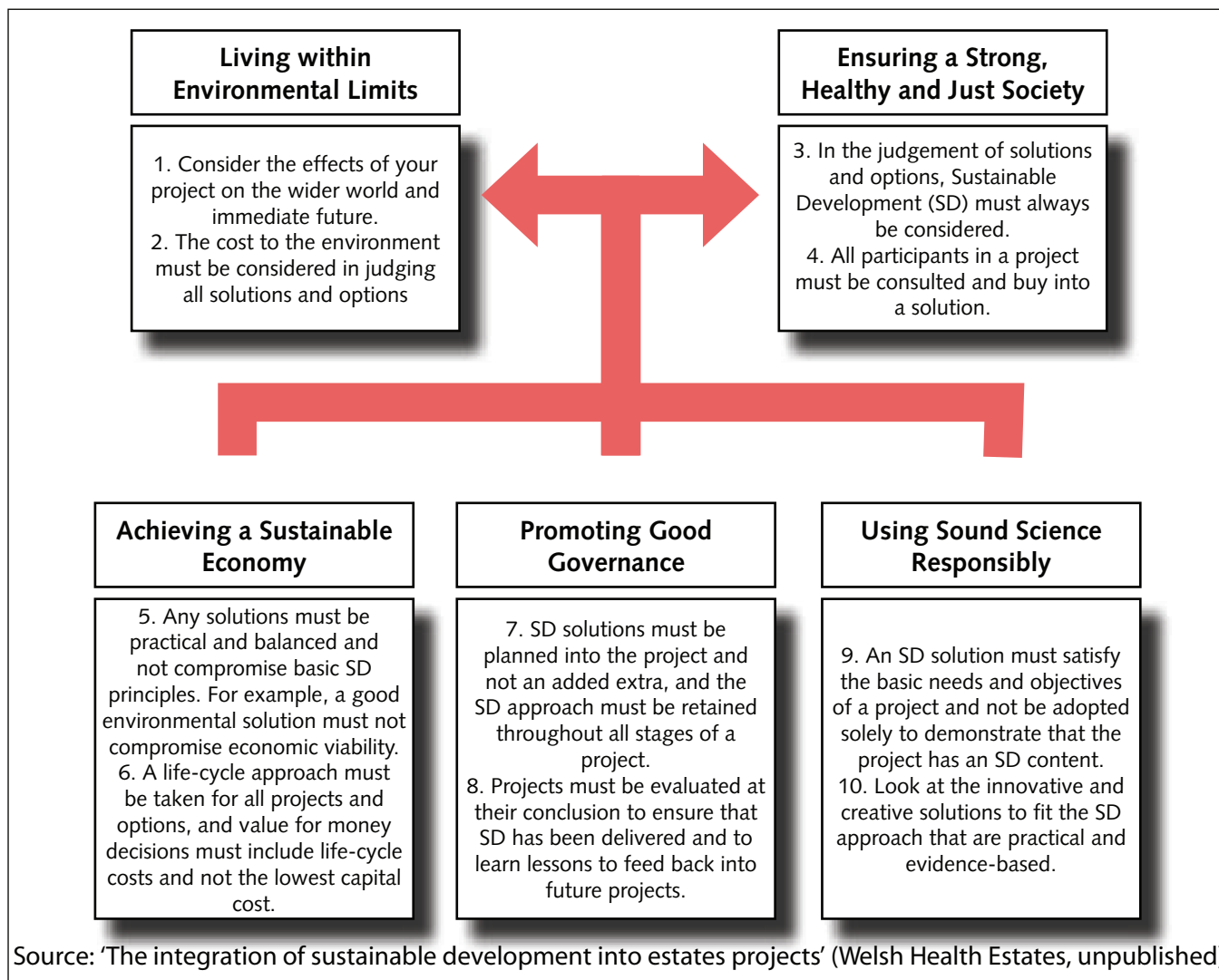
7107

As part of the sustainable development strategy launched in 2005, the UK Government, Scottish Executive, Welsh Assembly Government and the Northern Ireland Administration agreed upon a set of five principles that provide a basis for sustainable development policy in the UK ('One future – different paths: the UK's shared framework for sustainable development'). For a policy to be sustainable, it should respect the principles and hallmarks of sustainability described below.

One future – different paths: the UK's shared framework for sustainable development

The ten hallmarks of sustainability

3910



The ten actions (or “hallmarks”) of sustainability that relate to the UK government’s five principles for sustainable development policy

The ten hallmarks of sustainability were introduced in Welsh Health Estates information paper ‘The integration of sustainable development into estate projects’ (unpublished).

These hallmarks should be applied to all health and social care facilities developments to ensure sustainability. The main aim of this guidance is to help stakeholders understand what and how sustainable development can be achieved based on these underlying principles and actions.

Sustainability principles should be integrated throughout the capital investment and development process. This will only be achieved in partnership with others closely involved in the process (for example local planning authorities (LPAs) and private partners).

Refurbishments or new developments will only achieve true sustainable potential if the infrastructure is in place to support it, such as transport links and networks, water and other utilities, and a wide range of local and community services.

Legislation and government objectives

3915

Legislation

7108

Relevant legislation is listed below, with direct links. This list is representative and not exhaustive.

Note

The Code for Sustainable Homes is instrumental in setting the levels of sustainability that are likely to be applied throughout non-domestic sectors.

Building Regulations

Building Regulations Approved Document C – ‘Site preparation and resistance to contaminants and moisture’

Energy Performance of Buildings (Certificates and Inspections) England & Wales Regulations 2007 (which implements the EU Energy Performance of Buildings Directive (2002/91/EC))

Environmental Assessment of Plans and Programmes Regulations 2004

Sustainable and Secure Buildings Act 2004

Environmental Liability Directive (2004/35/CE)

Energy End-Use Efficiency and Energy Services Directive (2006/32/EC)

the European Union’s Emissions Trading Scheme (EU ETS) (2005)

Site Waste Management Plans Regulations 2008

Climate Change Act 2008

Carbon Reduction Commitment CO2 emissions trading scheme (due 2010)

Code for Sustainable Homes

Strategy for Sustainable Construction

Report on carbon reductions in new non-domestic buildings (Department for Communities and Local Government)

One Wales: One Planet, a new Sustainable Development Scheme for Wales

Welsh Assembly Government Climate Change strategy Policy Statement and Action Plan

What does sustainability mean for you?

3917

Strategic objectives

3916

The following points should be considered:

- * the greater sustainable and environmental benefits from refurbishment (see 'Scope for refurbishment' under 'How to build sustainable buildings');
- * the provision of healthy and sustainable environments by radically rethinking how to design, plan, create and operate genuinely sustainable developments;
- * climate-change mitigation and how existing buildings can be adapted, or how future developments can be resilient to predicted climate-change scenarios;
- * how to future-proof the design, functionality and maintenance of buildings with regard to level of utilisation, flexibility of use, energy and water efficiency, accessibility, waste prevention etc;
- * the better use and management of resources through a whole-life costing approach, ensuring a capital-and-revenue method to achieve efficiency.

How to build sustainable buildings

Leadership

4025

The healthcare capital development programme is an ideal opportunity for the healthcare sector to be leaders among public-service providers.

Leadership will give communities and residents access to well-designed health and social care facilities. Leadership entails the ability to offer a range of service models, to take advantage of emerging best practice and to understand the applicability of that best practice within the healthcare sector.

The life-cycle costs of a facility are:

- * the costs of acquiring it (including consultancy,
- * design and construction costs, and equipment);
- * the costs of operating it; and
- * the costs of maintaining it over its whole life through to its disposal – that is, the total ownership costs.

These costs include (among others) refurbishment costs and the costs relating to sustainability and health and safety aspects.

Whole-life approach

Beyond life-cycle costing, healthcare organisations may want to take a wider economic project evaluation, which could include:

- * whole-life costs (including non-construction costs (such as finance), business costs and also income from sales and disposals etc);
- * whole-life value/best value;
- * additional environmental benefits (for example carbon reductions);
- * additional health benefits (for example improvements in internal environments that lead to shorter recovery rates for patients);
- * economically most advantageous tenders etc.

The key role for any organisation considering a capital development project is to scope the requirements for a whole-life approach to the project.

See the European Commission's paper 'Life-cycle costing (LCC) as a contribution to sustainable construction: a common methodology'.

[Life-cycle costing \(LCC\) as a contribution to sustainable construction: a common methodology](#)

Roles and responsibilities

4026

Sustainability is not the prerogative of just one organisation – all key stakeholders (for example commissioners and regulators) need to make it happen.

The imperative for change – why do it?

4028

The imperative for change – why do it?

7111

Sustainable construction is important given the size and extent of the health and social care estate and its capital development programme, which is continuing to change to meet the needs of healthcare in the future.

Sustainable development policy has been developed to ensure that existing healthcare services and facilities, together with planned and future capital investment, include sustainable development practices, processes and products.

The health and social care sector now needs a new impetus to improve the standards and meet the ambitions necessary to combat climate change. To understand the carbon impacts of the healthcare estate and its activities, the NHS in Wales is completing a carbon footprinting study in conjunction with the Stockholm Environment Institute (SEI).

It is expected that this study will reflect earlier results from studies in England and Scotland demonstrating that procurement, materials and transport can have a greater carbon impact than the direct energy required to run a facility and, therefore, should be accorded equal weight when assessing impact, risk and cost of a capital scheme.

[One Wales: One Planet, a new Sustainable Development Scheme for Wales](#)
[Stockholm Environment Institute](#)

List of acronyms

3902

3901

AAP – area action plan

ABC – appointment business case

AEDET – Achieving Excellence Design Evaluation Toolkit

AIA – arboricultural implications assessment

AMS – arboricultural method statement

ASPECT – A Staff and Patient Environment Calibration Tool

BAP – Biodiversity action plan

BERR – Department for Business, Enterprise & Regulatory Reform (note: the Department for Business Innovation and Skills (BIS) formed June 2009)

BMS – building management system

BRE – Building Research Establishment

BREEAM – Building Research Establishment’s Environmental Assessment Method

CABE – Commission for Architecture and the Built Environment

CCL – climate change levy

CCS – considerate constructors’ scheme

CEMP – construction environmental management plan

CFBC – confirmatory full business case

CHP – combined heat and power

CIRIA – Construction Industry Research and Information Association

CLG – Department for Communities and Local Government

CSR – corporate social responsibility

D-BOQ – demolition bill of quantities

DEC – display energy certificate

Defra – Department for Environment, Food and Rural Affairs (note: the Department for Energy and Climate Change (DECC) formed October 2008)

DfT – Department for Transport

DH – Department of Health

DRI – demolition recovery index

EIA – environmental impact assessment

EMP – environmental management plan

EPBD – Energy Performance of Buildings Directive

EPC – energy performance certificate

ESCO – energy services company

ETF – Environmental Transformation Fund

EU ETS – European Union’s Emissions Trading Scheme

FBC – full business case

FIT – Fields in Trust

GJ – gigajoules

GSHP – ground source heat pumps

GWP – global warming potential

IDEAs – Inspiring Design Excellence and Achievements

IHT – Institution of Highways & Transportation

KDP – key demolition product

KPI – key performance indicator

LAP – local area for play

LCBP2 – Phase 2 of the Low Carbon Buildings Programme

LCC – life-cycle costing

LDF – local development framework

LEAP – local equipped area for play

LIFT – (NHS) Local Improvement Finance Trust

LPA – local planning authority

LVIA – landscape and visual impact assessment

MW – megawatts

NEAP – neighbourhood equipped area for play

NER – new entrant reserve

NHS PASA – NHS Purchasing and Supply Agency

OBC – outline business case

OGC – Office of Government Commerce

PCT – primary care trust

PFI – private finance initiative

PIR – passive infrared

SAC – special area of conservation

SDC – Sustainable Development Commission

SEA – strategic environmental assessment

SEI – Stockholm Environment Institute

SHA – strategic health authority

SHAPE – Strategic Health Asset Planning and Evaluation

SOC – strategic outline case

SPA – special protection area

SPD – supplementary planning document

SPTF – Sustainable Procurement Task Force

SRN – strategic road network

SSDP – strategic service development plan

SuDS – sustainable drainage system

SWMP – site waste management plan

TA – transport assessment

TCP – tree constraints plan

TMP – traffic management plan

TS – transport statement

UDP – unitary development plan

UKCCP – UK Climate Change Programme

UKCIP – UK Climate Impacts Programme

VOC – volatile organic compound

WCED – World Commission on Environment and Development

WLC – whole-life costing

WRAP – Waste & Resources Action Programme

WRAS – Water Regulations Advisory Scheme

Glossary

3904

Glossary

7655

Adaptability – the ease with which a building can be retrofitted or reconfigured to better meet the changing needs of occupants, maintenance and the larger community.

Area action plan (AAP) – a statutory planning document that sets out a council’s vision for what should be developed in a particular area over a particular period. It will also look at where new developments can happen and how existing facilities can be improved. Once developed, it will become part of the local development framework.

Biodiversity – the variety of life on earth. It includes all species, animals, plants, fungi, algae, bacteria and the habitats that they depend upon.

Biodiversity action plan (BAP) – a plan that sets specific, measurable, achievable, realistic and time-bound conservation targets for species and habitats.

Brownfield – land that is or was occupied by a permanent structure, which has become vacant, underused or derelict and has the potential for redevelopment.

Building Research Establishment’s Environmental Assessment Method (BREEAM) – an environmental assessment method that is used to describe a building’s environmental performance. Credits are awarded in nine categories. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent or Outstanding.

Building user manual – a guide that covers information relevant to staff, occupants, tenants and non-technical building managers on the operation and performance of the building. The project lead/contractor should complete the building user manual at the post-construction stage and hand it over to the estates/facilities and operational managers. It should contain the following information as a minimum:

- * building services information;
- * emergency information;
- * energy use and environmental strategy;
- * water use;
- * transport facilities;
- * materials and waste policy;
- * re-fit and rearrangement considerations;
- * reporting provision;

* training.

Climate change levy – a tax on the use of energy in industry, commerce and the public sector. The aim of the levy is to encourage users to improve energy efficiency and reduce emissions of greenhouse gases.

Combined heat and power (CHP) – a system that recovers the heat produced as a by-product of electricity generation instead of simply venting it via cooling towers. This recovered heat can then be used for domestic or industrial heating close to the plant.

Considerate constructors' scheme (CCS) – a UK certification scheme that encourages the considerate management of construction sites. The scheme is operated by the Construction Confederation.

Construction environment management plan (CEMP) – a strategy drawn up by the contractor to manage the potential impacts arising from construction activities, such as dust and mud, hazardous substances, pollutant gases, noise and vibration.

Demolition waste management plan – a plan that aims to segregate reclamation waste and to reduce waste to landfill.

Design and access statement – a document that explains the design thinking behind a planning application. It should show that the person applying for permission (the applicant) has thought carefully about how everyone will be able to use the places they want to build. The statement accompanies a planning application, but is not part of it.

Embodied energy – the energy used (and therefore the carbon dioxide emissions) in manufacturing, packaging and transporting a product, material or service.

Energy performance certificate – a certificate that confirms the energy rating of the building from A to G, where A is the most efficient and G is the least efficient. The better the rating, the more energy-efficient the building is, and the lower the fuel bills are likely to be.

Environmental impact – the environmental consequences of land or site development.

Environmental impact assessment (EIA) – an assessment that identifies and assesses the likely effects on the environment of a project, at the earliest possible opportunity, before a decision is made on whether to give consent to proceed with it. Under the Town and Country Planning (Assessment of Environmental Effects) Regulations 1988, an assessment is required to accompany planning applications for developments that are likely to have significant effects on the environment by virtue of their nature, size or location.

European Union's Emissions Trading Scheme (EU ETS) – Europe-wide scheme that aims to reduce emissions of carbon dioxide and combat the threat of climate change. The EU ETS puts a price on carbon, which businesses use; this, in turn, creates a market for carbon. The UK is committed to building on the EU ETS as its main way of pricing carbon in the economy. The scheme commenced on 1 January 2005. The first phase ran from 2005 to 2007. The second five-year phase started on 1 January 2008 and runs until the end of 2012. The next phase is likely to adopt the title of Emissions Trading System (visit the Environment Agency's website for further information).

Flood risk – the combination of the estimated probability of a flood occurring and the magnitude of the potential consequences of the flooding incident.

Flood risk assessment – a study to assess the risk of a site flooding and to assess the impact that any changes or development on the site will have on flood risk on the site and elsewhere. A flood risk assessment should be prepared according to the Department for Communities and Local Government's (CLG) Planning Policy Statement 25 – 'Development and flood risk'.

Good corporate citizenship – a term that describes how healthcare organisations can embrace sustainable development through their corporate activities – that is, as employers, purchasers of goods and services, landholders and commissioners of new buildings and refurbishments – in ways that benefit rather than damage social, economic and environmental conditions. See the 'Good corporate citizen' website.

Greenfield – either a site that has never been built on or one that has remained undisturbed for five years or more.

Greywater – waste water from taps, showers and laundries.

Highway authority – a county council, a metropolitan council or a unitary authority. Highway authorities are responsible for producing the local transport plan and for managing existing or proposed new local roads in the area.

Highways Agency – an executive agency of the Department for Transport, responsible for the construction, maintenance and management of the trunk road and motorway network.

Key performance indicator (KPI) – a benchmark by which an organisation can measure its environmental performance (for example carbon emissions, the amount of waste produced) in the context of achieving its wider goals and objectives.

Life-cycle costs – the total cost of a building or its parts throughout its life, including the costs of planning, design, acquisition, operations, maintenance and disposal (see **Whole-life costs**).

Locally-sourced materials – materials obtained from a defined radius around a project site, helping to support the local economy and reducing transportation costs and energy.

Local development framework (LDF) – a set of documents prepared by a district council, unitary authority or national park authority which outlines proposals for how land will be used or developed. Community involvement is crucial in the development of the documents.

Local planning authority (LPA) – the body responsible for formulating planning policies (in a local development framework), controlling development through determining planning applications and taking enforcement action when necessary. This is either a district council, a unitary authority, a metropolitan council or a national park authority.

Microgeneration – the production of heat and/or electricity on a small scale from a low-carbon source such as solar photovoltaics, solar thermal hot water, wind turbines and ground-source heat pumps.

New entrant reserve (NES) – (in relation to the EU ETS) carbon-dioxide allowances that have been reserved for installations which started operation between 31 December 2003 and 31 December 2007 and for extensions to existing permitted installations.

Passive building design – building configurations which take advantage of a natural, renewable resource (such as sunlight, cooling breezes etc). Passive design strategies typically do not involve any moving part or mechanical processes.

Potable water – drinkable and/or mains-supplied water (includes water obtained by borehole abstraction and water sourced from rivers, mountain streams, lakes etc).

Radon – a natural radioactive gas which enters buildings from the ground and increases the risk of lung cancer. Radon comes from the minute amounts of uranium that occur naturally in all rocks and soils. Geological conditions in certain areas can lead to higher than average levels in some buildings. The Health Protection Agency (HPA) has advised that radon in homes above an action level of 200 becquerels per cubic metre should be reduced. The Ionising Radiations Regulations 1999 come into effect where radon is present above the defined level of 400 becquerels per cubic metre and employers are required to take action to restrict resulting exposures. For more information, visit the Health Protection Agencies website, and their UK radon website and the Health and Safety Executive radon website.

Renewable energy – the use of energy from a source that does not result in the depletion of the Earth's resources, whether this is from a central or local source (for example wind turbines).

Responsible sourcing (of materials) – materials that have been harvested from sustainable managed sources which are natural, plentiful or renewable and have independent certification (for example certified wood).

Run-off – this is usually rainwater, but can also be groundwater or overspill from sewers and other sources.

Run-off rate – the rate of discharge of water from a surface.

Screening – the process of deciding whether a plan or programme needs a strategic environmental assessment.

Section 106 (Town and Country Planning Act 1990) – a section within the Town and Country Planning Act 1990 which allows a planning obligation to a local planning authority to be legally binding.

Secured by Design – a police initiative that seeks to encourage the construction industry to adopt crime-prevention measures in the design of developments, to assist in reducing the opportunity for and fear of crime.

SHINE – the alliance for sustainable buildings. This is a learning network for the healthcare sector.

Site waste management plan (SWMP) – a plan that details the amount and type of waste that will be produced on a construction site and how it will be reused, recycled and disposed of. Since 6 April 2008 (in England), SWMPs have been a legal requirement for construction projects over £300,000.

Strategic environmental assessment (SEA) – generic term used to describe environmental assessment as applied to policies, plans and programmes.

Strategic service development plan (SSDP) – a plan that describes how services across the whole health community will be developed and that identifies the costs and practical steps needed to make the plan a reality. SSDPs should be updated regularly and should be prepared with the participation of local healthcare representatives, community and voluntary groups, and local government.

Surface water run-off – water flowing over the ground surface to a drainage system. This occurs if the ground is impermeable, is saturated, or if the rainfall is particularly intense.

Sustainable communities – places where people want to live and work, now and in the future. They should be:

- * active, inclusive and safe;
- * well-run;
- * environmentally sensitive;
- * well-designed and built;

- * well-connected (good transport services and communications);
- * fair for everyone.

Sustainable drainage system (SuDS) – a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques. SuDS devices include:

- * holding ponds;
- * swales;
- * reed beds;
- * permeable paving – in areas where local geological and hydrological conditions allow this to function – for example block-paved surface on permeable sub-base over gravel bed to store the water and allow it to seep into the soil. For less permeable soils, the gravel layer might be deeper and the water taken to a soakaway, although this is not an option in some areas;
- * local or centralised soakaways either as full systems or as overflow or holding systems, in areas where local geological and hydrological conditions allow them to function;
- * run-off from roofs collected as a part of a rainwater-harvesting system;
- * run-off from roofs directed to a local soakaway or other holding facility such as tanks, ponds, swales etc;
- * green roofs.

Sustainable procurement – a process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money in terms of generating benefits to the organisation, society and the economy, whilst minimising damage to the environment.

Third-party developments – where a private contractor develops primary-care premises on behalf of GPs or PCTs.

Travel plan – a strategy for managing all travel and transport within an organisation, principally to increase choice and reduce reliance on the car by seeking to improve access to a site or development by sustainable modes of transport. A travel plan contains both physical and behavioural measures to increase travel choices and reduce reliance on single-occupancy car travel.

Wetland – a pond that has a high proportion of emergent vegetation in relation to open water.

Whole-life costs – all life-cycle costs plus non-construction costs (such as finance), business costs and income from sales and disposals etc (see **Life-cycle costs**).

Zero-carbon building – (with regard to all energy use in a building) a building that produces net zero carbon-dioxide emissions over the course of a year.

Note

At the time of writing, definitions associated with the low- to zero-carbon agenda are likely to be subject to Welsh Assembly Government consultation.

Welsh Assembly Government Sustainable Development

UK Biodiversity Action Plan

BREEAM Healthcare

Considerate constructors' scheme

Environment Agency

Planning Policy Statement 25 – Development and flood risk

Good corporate citizen

HPA website

HPA radon website

HSE radon web pages

SHINE

Sustainability drivers

5165

Implications of sustainability on health

7149

Anyone asking the question “why should I develop sustainably?” wants to know how sustainable development impacts on human health. For example, what are the effects of:

- * an increase in private transport on air quality, as a result of a poorly-located development?
- * inadequate alternative transport modes?
- * the use of internal paints with high levels of volatile organic compounds (VOCs)?

Some factors have a less direct impact, such as the effects of heat on health as a result of climate change (as explained by the ‘Heatwave plan for Wales’).

The ‘Heatwave plan for Wales’ is an annual report that has been published since 2004, drawing from updates of heatwave patterns in the latest climate change scenarios and indicating impacts on health, as well as preventative and preparedness measures.

In seeking to make progress it is important to harness lessons from the past. History shows us how important the links between environment and health can be. The emergence of the discipline of town planning in the nineteenth-century came out of an understanding of the impact of the environment and capital development on human health. For many years this link was dismissed until the Planning and Compulsory Purchase Act 2004 redefined the role of planning to take account of social, economic and environmental impacts of development (often referred to as the “triple bottom line”).

In the same vein, the health and social care sector should take account of the lessons learnt within the capital development process.

Sustainable development matters to all those involved in the provision and delivery of healthcare services and to all those who are affected by those services.

By following the above principles, healthcare organisations can benefit from a healthier population, improved staff morale and faster patient recovery rates.

[Heatwave plan for Wales](#)

[Planning and Compulsory Purchase Act 2004](#)

Climate-change impacts

6421

Energy and carbon efficiency – Low- to zero-carbon buildings approach

7156

The Welsh Assembly Government has a target to reduce carbon emissions by 3% per annum from 2011 with an ambition to make all new buildings zero-carbon and to move to produce as much electricity from renewable sources as we consume by 2025.

To assist the healthcare sector in contributing to these targets and ambitions, Health Technical Memorandum 07-02 – ‘Encode’ has been released in Wales. This publication provides guidance for energy managers on energy/carbon efficiency opportunities relating to both capital development schemes and the existing estate.

Energy consumption in new buildings is regulated by Approved Document L of the Building Regulations 2006, which sets minimum standards for construction, dealing specifically with energy consumption and areas such as airtightness, solar gains, and energy for heating, lighting and ventilation.

For larger, more energy-intensive buildings, energy is also capped for users through the Greenhouse Gas Emissions Trading Scheme Regulations 2005 (more usually referred to as the EU ETS). The requirement here is that any development anticipated to operate in excess of 20 MW thermal capacity will need to apply to the Environment Agency for an allocation of allowances from the “new entrant reserve” (NER).

Note

Defra/DECC are consulting on Phase II; the thermal capacity levels may be subject to change – refer to Defra’s website.

The Welsh Assembly Government is tasking the public sector to lead by example through its Sustainable Development Scheme 'One Wales: One Planet' and its Climate Change Strategy Policy and Action Plan.

One of the core objectives of these schemes, policies and action plans is to promote the improvement of the energy performance of buildings.

In addition to the above Welsh Assembly Government initiatives, the UK government has introduced the Climate Change Act and Energy Performance of Buildings Directive, both of which are applicable to Wales.

These UK directives have introduced the following requirements:

- * energy performance certificates (EPCs), which should be displayed in all non-domestic buildings when constructed, leased, rented or sold; and
- * display energy certificates (DECs) for larger buildings occupied by public authorities and institutions providing public services to a large number of people.

DECs are a requirement for buildings over 1000 m² from 1 October 2008 (see table below).

This should ensure a better understanding of the energy performance of the non-domestic building stock and make data collection and reporting consistent.

The UK government's implementation timetable for phasing-in the EPBD measures	
Date	European Energy Performance of Buildings Directive measures
01-Oct-08	EPCs required on the construction, sale or rent of all remaining buildings other than dwellings. DECs required for all public buildings >1000 m ² .
04-Jan-09	First inspection of all existing air-conditioning systems over 250 kW must have occurred by this date*.
04-Jan-11	First inspection of all remaining air-conditioning systems over 12 kW must have occurred by this date*.
<i>Source:</i> The EPBD Directive Implementation Advisory Group (DIAG)	

Health Technical Memorandum 07-02 – ‘Encode’

Climate Change Act 2008

Approved Document L of the Building Regulations 2006

Greenhouse Gas Emissions Trading Scheme Regulations 2005

Environment Agency

Defra

One Wales: One Planet, a new Sustainable Development Scheme for Wales

Department for Business, Enterprise & Regulatory Reform (BERR) – ‘Strategy for sustainable construction’

‘Report on carbon reduction in new non-domestic buildings: report from UK Green Building Council’ (CLG, 2007)

Energy Performance of Buildings (Certificates and Inspections) England & Wales Regulations 2007

EPBD Directive Implementation Advisory Group (DIAG)

Energy and carbon efficiency – Renewable and/or low carbon energy

5951

Energy and carbon efficiency – renewable and/or low carbon energy

7656

The Climate Change Act 2008 sets a target to achieve 26–32% of all energy from renewable sources by 2020.

If the generation of renewable energy on-site is physically possible and shown to be feasible, it is encouraged as a way of reducing the carbon footprint of the building. The energy produced may be used to supply electrical, heating and/or cooling needs or may supply the energy requirements of one particular system or section of a building. Advice on logistical and cost feasibility should be sought from an environmental engineer.

An opportunity may exist to share renewable energy generation with another development in the vicinity, either on-site or off-site. Information can be sought through the LPA and can be managed by a third party.

Efficient technology such as combined heat and power (CHP) systems, which use the heat from the generation of electricity to supply heat-energy requirements, is normally recommended in buildings with long operational hours. Provided that the spatial and access requirements can be satisfied, they are a feasible way of reducing energy demand.

If on-site or off-site generation is deemed unfeasible, another option is to switch to a “green” electricity tariff. There are two types:

- * Renewable energy tariff: for every unit of electricity used, the supplier will buy a unit of electricity generated by a renewable energy source;
- * Eco-funds tariff: the extra premium paid for the new tariff is invested in new renewable energy projects.

The NHS Sustainable Development Unit has issued ‘Saving carbon, improving health: NHS Carbon Reduction Strategy for England’. This addresses the key mechanisms for the NHS to understand and manage its activities to be in line with Government drivers.

[Climate Change Act 2008](#)

Waste

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Waste is linked to climate change activities, has potential for significant environmental impacts, is associated with carbon emissions and is therefore key in terms of efficiency savings likely to contribute to achieving the aims of low- to zero-carbon buildings for the future.

The Clean Neighbourhoods and Environment Act 2005 introduced a new requirement for site waste management plans (SWMPs) for construction and demolition projects. The Site Waste Management Plans Regulations 2008 make this a legal requirement for all construction projects over £300,000. They are designed to provide a structure for systematic waste management at all stages of a project's delivery.

Project leads should take early action on waste. They should prepare a SWMP and give it to the principal contractor to monitor and update during the project's life. Assistance is provided by the Waste & Resources Action Programme (WRAP).

It is also advisable to take action on waste management at the early project design stage to ensure sufficient space is provided for safe, secure storage of waste and recycling materials away from public areas.

[Clean Neighbourhoods and Environment Act 2005](#)

[Site Waste Management Plans Regulations 2008](#)

[Waste & Resources Action Programme \(WRAP\)](#)

Water

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Water is a scarce resource and should be managed efficiently. See Health Technical Memorandum 07-04 – ‘Water management and water efficiency’ for further guidance on the efficient management of water.

Note

Defra and CLG are currently investigating water efficiency measures in non-domestic buildings (‘Water efficiency in new buildings: a joint Defra and Communities and Local Government policy statement’). It is likely that the Water Supply (Water Fittings) Regulations 1999 will form the regulatory base for non-domestic buildings in order to establish higher water efficiency standards. Defra is also developing domestic waste reduction metrics for the non-domestic building stock.

[Health Technical Memorandum 07-04 – ‘Water management and water efficiency’](#)
[Water efficiency in new buildings: a joint Defra and Communities and Local Government policy statement](#)
[Water Supply \(Water Fittings\) Regulations 1999](#)

Procurement

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Procurement

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In Wales sustainable procurement is being taken forward by Value Wales through the introduction of its Sustainable Procurement Assessment Framework Tool (SPAF) to help organisations with sustainable procurement solutions. Welsh Health Supplies also adopts the SPAF and Healthcare Organisations in Wales are also mandated to use this tool by the Welsh Assembly Government.

The Welsh Assembly Government through its sustainable development scheme *One Wales: One Planet and Climate Change Policy and Action Plan*, has a commitment to the use of BREEAM for new and refurbishment schemes for which it has invested capital monies. Such schemes are required to achieve a BREEAM score of Excellent for new build and Very Good for refurbishments.

From September 2009 the use of BREEAM for non domestic buildings has been made a condition of planning in Wales and further information on how it is to be applied can be found in the Welsh Assembly Government's Technical Advice Note TAN 22.

Notes

Capital development schemes are required to use BREEAM Healthcare to demonstrate that healthcare projects are built with sustainability in mind.

BREEAM Healthcare superseded the NHS Environmental Assessment Tool (NEAT) in 2008.

[Procuring the future: Sustainable procurement national action plan – recommendations from the Sustainable Procurement Task Force](#)
[Procuring for health and sustainability 2012: sustainable procurement action plan](#)
[Energy End-Use Efficiency and Energy Services Directive](#)
[BREEAM Healthcare](#)

Transport

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Transport

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All vehicles contribute to climate change because their engines burn fuel and therefore produce carbon dioxide. These emissions need to be reduced. The transport requirements of staff, patients, visitors, ambulances and suppliers should be considered in assessing the sustainability of new schemes.

Transport plans are a necessary part of the local authority's planning approvals process. Combating congestion and nuisance whilst providing essential services is key to creating a community-integrated healthcare scheme. Further details about transport plans and transport management are available in Health Technical Memorandum 07-03 – 'Transport management and car parking' or from the Department for Transport's (DfT) website.

The NHS in Wales has also produced its own travel plan toolkit and all Local Health Boards and NHS Trusts in Wales are mandated by the Welsh Assembly Government to have a travel plan for all their major sites.

Partnering with public transport coordinators should ensure that maximum potential is derived from using train and bus services and from providing safe and secure cycling and walking routes.

Undertaking transport and travel surveys is part of the planning process. Data collection requirements should be addressed in any management data collection system. Transport data should capture business-related journeys; patient visits; contractor movements; and visitors' travel requirements. This will help not only to ensure that the site can cope with on-site traffic movements, but also to provide necessary information with regard to the carbon footprint, taking into account the increasing carbon emissions related to traffic. This will also be essential information in ensuring resilience of supply during adverse weather events caused by climate change.

If procuring fleet vehicles for transport, consideration should be given to the benefits of leased vehicles to reduce obligations not only on procurement and maintenance but also on disposal as laid down in the End-of-Life Vehicles Regulations 2003 and the End-of-Life Vehicles (Producer Responsibility) Regulations 2005. Further, when procuring or leasing vehicles, low-carbon-emission green-fuel options such as electric or dual fuel should be considered.

Transport distance will inevitably be a deciding factor in procurement and contracting decisions across a range of services and supplies.

Roles and responsibilities

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A definition of the roles and responsibilities of those involved at the various stages in the capital project.

In addressing the question of which healthcare organisations should be involved – it is clear that all should. The successful introduction of sustainable principles requires a mix of formal responsibility and moral obligation to make a difference. Progress requires conscious action – not passive acquiescence – to make it happen.

Roles

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Sustainability champion/catalyst

This refers to the project's design champion, the sustainability champion (if different), specialist agencies (for example Community Health Partnerships), and external agencies (such as SHINE). These champions will act as a catalyst to ensure that sustainability is addressed continuously throughout the capital development programme.

Strategic authorities

This refers to bodies such as strategic health authorities (SHAs), local health boards, health agencies, special boards and also government health departments whose responsibility it is to require evidence of sustainable development objectives other than demanding justification for a health and social care service requirement.

The project lead/project manager

The project lead/project manager is responsible for ensuring that suitably ambitious sustainable development objectives/requirements are set at the development's inception stage and are carried through to the handover of the building.

The contractor

The contractor (the construction firm or development company) is responsible for:

- * undertaking the building, construction and other works;
- * the management of the site; and
- * the receipt, storage, utilisation and disposal of building and other materials.

Specialist advisers

The specialist adviser is responsible for providing professional, up-to-date advice and support to the project lead and the project team in order to help achieve the sustainability objectives in the most feasible way possible.

Estates/facilities and operational managers

Estates/facilities and operational managers have the responsibility of being aware of the intended performance and operations of the building, are aware of its true performance, and seek continuous improvement through investigation,

communication, training and maintenance by developing or using approved monitoring, audit and review procedures.

SHINE

Responsibilities of healthcare organisations and other bodies 5965

Responsibilities of healthcare organisations and other bodies 7577

Organisations involved in commissioning and approving business cases for capital development projects have a key role in ensuring the appropriateness and sustainability of service delivery.

In discharging their sustainability responsibilities, healthcare organisations pursuing capital investments will need to actively engage with contractors and constructors of new and refurbished premises in order to ensure that appropriate sustainability actions are undertaken.

Who has to do what and when

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Who has to do what and when

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There are a number of stages of a building's life. These are broken down in the table and figure below, and expanded upon in greater detail in 'How to build sustainable buildings'.

Note that these project stages apply equally to refurbishment and new build.

Local Health Boards and NHS Trusts that are tenants of third-party developers should follow the sustainability principles at the relevant project stages.

Ideally, GPs who aspire to best practice in their developments may find these principles helpful.

Project stage	Actions
<p>Justification (a)</p>	<p>At this stage, a strategic outline case (SOC) (or equivalent) may be developed to describe the business outcomes and service/works requirements in a way that is unambiguous. The total project scope will be described and requirements will usually be specified in terms of outcome, based on “what” rather than “how” (see the OGC’s website).</p> <p>The justification stage is a crucial opportunity to ensure that any development is proposed with a holistic sustainable approach from a social and environmental point of view as well as the economic perspective. This implies consideration of issues such as:</p> <ul style="list-style-type: none"> * the reuse of existing buildings as opposed to new build; * reducing travel by private transport; * community-scale solutions (for example for energy) and contributions to local regeneration and development plans; * the preference to using brownfield land; * scope to improve the ecological value of greenfield land. <p>For this reason, it is important to engage with planning authorities and entities such as the Highways Agency at this early stage in order to understand other strategic priorities beyond those of health and social care services</p>

	<p>and any quality and sustainability objectives that require approval by third parties (for example the Environment Agency).</p> <p>At this stage the project lead should develop plans for service delivery in health and social care, as well as sustainability objectives, ideally in the form of a sustainability strategy for the project.</p> <p>After a SOC has been established, a design review workshop is encouraged to ensure that all design options are considered/explored as early as possible, in order to achieve an eventual optimum design solution.</p>
<p>Scoping (b)</p>	<p>At this stage, the project team should formally test the project to ensure that it accords with local and national policy and that it is affordable. The outline business case (OBC), or equivalent, confirms that each of the criteria approved from the strategic case has been met.</p> <p>The project leads should undertake the following:</p> <ol style="list-style-type: none"> a. Confirm availability of site. b. Update financial projections. c. Produce initial concept designs. d. Calculate site-specific outline costings. e. Check delivery against sustainability objectives. f. Produce a planning application. <p>Sustainability work at this stage should include a detailed assessment to investigate sustainability options and to verify targets and key performance indicators (KPI) that are deliverable and affordable. All this should be done within the context of community and planning requirements; therefore, discussions with the relevant third parties are critical at this stage.</p> <p>The project lead should also develop a project brief at this stage, drawing on the results of community involvement, a thorough site investigation, reports on constraints and opportunities, and sustainability assessments. This will establish the requirements for procurement of a project team and the desired outcomes of the development. This level of investigation obviously requires a team of experts</p>

	<p>– in particular, planners, cost consultants, architects and sustainability consultants.</p> <p>At this stage, and prior to OBC submission, a design review is encouraged to ensure that the optimum design solution is included in the preferred option.</p>
<p>Procurement (c)</p>	<p>This is the stage that takes forward all the issues from the OBC for finalisation in the full business case (FBC) or equivalent. It includes information required for planning approval, the tendering process, sustainability accreditation, site mobilisation and sustainable site activity.</p> <p>The most important sustainability obligations at this stage are ensuring that the right skills are on board and that the sustainable development objectives are communicated clearly. In terms of communication, it is crucial that the criteria from the outline design stages are known by all team members and are not considered too late in the design process when they become harder to achieve. In terms of skills, two very important roles for which active engagement is required are the environmental designer/engineer and the certified BREEAM Healthcare assessor.</p> <p>At this stage, and prior to FBC submission, a design review is encouraged to ensure that an optimum final design solution is taken forward.</p> <p>Note: Local Health Boards and NHS Trusts working with third-party developers should discuss with the district valuer the merits of offsetting rental costs against energy costs in order to deliver low-carbon buildings (for example using energy bills instead of “square-metre” costs – this will also need to take into account whole-life cost principles).</p>
<p>Commitment (d)</p>	<p>This stage marks the signing off of finalised information, which enables works to proceed on site. Preparing for the construction phase implies the involvement of new members of the project team who should be made aware of the aims and objectives that have been set for the development. This can be assisted through early dialogue during the tendering process, preferably involving sustainability advisers and specialists in key areas (for example energy) from both the project lead and contractor teams.</p>

	<p>The contractor should also ensure that signed-off drawings and details of the proposed development continue to achieve the committed sustainability objectives. This should include a completed BREEAM Healthcare assessment and other evidence of pre-determined KPIs that may be required.</p>
<p>Construction (e)</p>	<p>This marks the stage between site mobilisation and handover of the building. It is relevant to new build and refurbishment. It includes details of site preparation with a focus on mitigating the impact of activities on the community and environment and ensuring design quality.</p> <p>The key activity during this phase of development is management, regular monitoring and reporting, in accordance with project objectives at both the design and construction level.</p> <p>In design terms, changes to the design and instructions issued by the design and engineering team, which may be required during the course of site works, should be approved by the project lead or an appointed representative. It should be ensured that such alterations do not impact on the project’s sustainability objectives – this should ideally be reviewed by a specialist sustainability adviser.</p> <p>For site activities, monitoring and reporting should be in line with methodologies set out in industry schemes such as the SWMP and commitments outlined in the “considerate constructors’ scheme” (CCS) etc. The contractor should also commit to ensuring that site activity causes minimum disruption for the community and environment. This is done through the CCS and by submission of the construction environmental management plan (CEMP) report prior to mobilisation.</p>
<p>Post-construction (f)</p>	<p>The main objective of this stage is to prepare the building and users for occupation. The building should undergo a commissioning process in accordance with regulatory requirements and contractual obligations to sign off completion and to ensure that the building and equipment is functioning as intended.</p> <p>End-users will have a significant impact on the carbon footprint, water consumption and waste produced. For this reason, it is fundamental that staff are informed and trained</p>

	<p>about building operations and systems put in place to reduce the building’s impact on the environment.</p> <p>Furthermore, commissioning will be required following building handover (after construction works have been deemed satisfactory) and before occupancy. This commissioning should be monitored by an appropriate team member, both for compliance to current building regulations and guidance and against the intended sustainability performance.</p>
<p>Operation (g)</p>	<p>In a similar way to the construction phase, the key activities relating to sustainability of building operations include management, monitoring, reporting and post-project evaluation.</p> <p>The project leads should prepare a programme for monitoring the different aspects of the building that were intended to influence its sustainability performance. Monitoring could be in the form of user surveys, meter readings and third-party surveying work.</p> <p>Once a sustainable building is ready to receive staff and visitors, the users’ behaviour will determine whether it is truly sustainable. The project lead should appoint a person with the responsibility of keeping activities within and around the building sustainable through user communication, good management and monitoring. The “good corporate citizen” self-assessment test is a good start for assessing and improving operational behaviour in key areas.</p> <p>After a year of occupation, an operational stage BREEAM Healthcare assessment is required to verify the intended performance and for formal design and procurement certification. BREEAM credits developments that are seasonally commissioned during the first year of occupation.</p> <p>Planned preventive maintenance should be identified for the continued efficient sustainable running of the building through its life-cycle.</p>
<p>End of life (h)</p>	<p>This stage defines the end of ownership, occupation or rental, hence implying opportunities for conversion or change of use, or demolition when there is no environmental and financial benefit from reusing the building.</p>

In the first instance, the **owner** or **landlord** of a healthcare facility is responsible for evaluating the condition of the estate and investigating opportunities for reuse in response to strategic service and planning requirements.

In addition, the **owner** of the healthcare facility should make sure that whatever happens to the estate is done in the most sustainable manner possible. As good practice, a demolition/disposal plan, including steps to mitigate impact on the community and the environment, should be produced prior to any on-site works related to its disposal.

Process flowchart

Key principles **The five principles and the ten hallmarks of sustainable development (see Figure 1)**

		a	b	c	d	e	f	g	h	
Project Stages (see Table 2, pp 18–20)		JUSTIFICATION	SCOPING	PROCUREMENT	COMMITMENT	CONSTRUCTION	POST-COMPLETION	OPERATION	END OF LIFE	
WHO AND WHEN?	Activities during each stage	Strategic context, Service need, Design principles, Options, Asset ownership & a ordability, Timetable & deliverability	Function and capacity Design brief; Options appraisal; A ordability; Third party engagement; Planning permission; Choose procurement route	Tendering process; Procurement; Design; Evaluation of bids; Selection of preferred bidder	Finalise & sign-o contracts & design; Site mobilisation; Enabling Work	Site compounds; Delivery and storage; Construction; Site management; Waste management; Building & services commissioning	Installing remaining equipment; Getting systems operational; Sta. training; Patient commissioning	Monitoring & reporting Management & maintenance	End of NHS tenancy and/or ownership, Site disposal	
	Capital procurement	Strategic Case eg SOC/SSDP	Outline Business Case, including LIFT Stage 1	Full Business Case, including LIFT Stage 2 & PFI ABC/FCBC	Sign o s & start on site	Handover of new/ refurbished facilities	Building User Manual & opening of facility in operational use	Reporting, Hard facilities management & life-cycle management	Refurbishment, alternative use, deconstruction or disposal of site	
	Notes			Schemes going for single stage FBC still need to complete stages a & b well before approval	Including sign o by district valuer and PCT agreement to reimburse rentals for third-party developer schemes					
	Key stakeholders to involve:	<ul style="list-style-type: none"> • Health service commissioners. • Health organisation boards. • Other health & social care providers. • Strategic authorities. 								
	Healthcare organisations									
External authorities	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE)	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE) plus Planning authorities	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE) plus Building Control plus BREEM audit	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE)	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE)	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE)	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE) plus BREEM audit	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE)	Local authorities (eg planning etc). Government health departments (for large schemes). Government agencies (eg EA, HSE)	
Other stakeholders	Service partner agencies. Other potential occupants, Public & patient involvement, Sustainability champion	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	Other service providers, Public & patient involvement, Sustainability champion, BREEM assessors	

Part 1

Procurement routes (adapted from the process flowchart)

Issues to be considered

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The 13 “issues” that should be addressed at each project stage are outlined in a table in the attached PDF (click on the links in the PDF for further information and guidance).

NOTE:

if you are intending to print out the "13 issues" PDF you will find it easier to read if you instruct Acrobat/Adobe Reader to "Tile large pages" in your Print dialog.

Actions that should be taken at each stage are explained in 'How to build sustainable buildings'.

[13 issues.pdf](#)

[How to build sustainable buildings](#)



GIG
CYMRU
NHS
WALES

Partneriaeth
Cydwasaethau
Gwasanaethau Cyfleusterau

Shared Services
Partnership
Facilities Services

Sustainable health and social care buildings: Operational guide Version:0.2:Wales



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Overview

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3913

The success of a building's performance in terms of sustainability outcomes is dependent to a large degree on the decisions taken at the design, procurement and construction stages of a development.

This guidance focuses on the actions to be taken at these stages and also includes the relevant action required at the post-completion, operational and end-of-life stages. It draws upon and refers to sustainability policy and procedures that are already in place to direct development in achieving design excellence and national objectives.

How to build sustainable buildings

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'How to build sustainable buildings' summarises what should be done (**commitment**) at each project stage and what works should be completed or developed at each stage (**recommended action**).

6023

It details the various project stages of a building's life, namely:

- a. justification
- b. scoping
- c. procurement
- d. commitment
- e. construction
- f. post-construction
- g. operation
- h. end of life

Scope for refurbishment

6024

In terms of resource use, minimising adverse environmental impacts and other sustainability perspectives, the adaptation of an existing building may prove to be a superior option to new build. This can only be determined by a robust option appraisal that includes life-cycle considerations. The European Commission has provided methodological guidance in 'Life-cycle costing (LCC) as a contribution to a sustainable construction: a common methodology'.

There are several opportunities for improvement to the social, economic and environmental sustainability of an existing building. These range from an upgrade of operations to reduce and improve their impact on the community and environment, to physical changes to the building that improve it in terms of quality and environmental performance.

If physical changes to an existing building are planned, this should also be managed in such a way that reduces the impact on the community and environment.

[Life-cycle costing \(LCC\) as a contribution to a sustainable construction: a common methodology](#)

Process flowchart

6873

The process flowchart maps out the content of the guidance with paragraph numbers for easy reference to further information found within the various chapters of this document. The flowchart visually sets out all the actions in the context of the overall process and the applied procurement route.

How to use the flowchart

NOTE: if you are intending to print out the flowchart it will be much more legible if you use an A3 printer.

The flowchart works on the same principle as a matrix.

Each of the 13 “issues” identified under “Issues to be considered” has been given a number based on its hierarchy in that table. “Community” is first in the list and is therefore assigned “01” in the flowchart. “Local environment” is second in the list and is assigned “02” – and so on until the last of the 13 (“pollution”), which is accordingly assigned “13”. These subjects are ranged down the left-hand column in Part 2 of the flowchart.

Each of the eight project stages shown under “Who has to do what and when” is ranged along the top row of the flowchart in the order of project progress. “Justification” (being the first stage) is assigned the alphabetic value “a”; “scoping” is assigned “b” etc.

Information can be found on the issues to consider at each project stage by scanning across the top row and down the left-hand column, then reading the information in the cell where the two sites intersect each other. For example, to find out about local environment issues at the justification stage, scan down to “02” in the left-hand column and scan across to “a” along the top row, and read the intersecting cell for a basic summary of information needed. A cross-reference is then given to the main narrative, which gives more detailed information. See the figure below.

The subheadings relating to the “13 issues” are given alphanumeric values (based on their position in the flowchart) for easy cross-reference back to the flowchart. Thus, in the example in the previous paragraph, the subheading would read “a-02 Local environment” – which refers to the subtitle “local environment” within the section on “justification”, prefixed by its alphanumeric value (that is, “a-02”).

a	b	c
JUSTIFICATION	SCOPING	PROCUREMENT
Strategic context, Service need, Design principles, Options, Asset ownership & affordability, Timetable & deliverability	Function and capacity; Design brief; Options appraisal; Affordability; Third party engagement; Planning permission; Choose procurement route	Tendering process; Procurement; Design; Evaluation of bids; Selection of preferred bidder

Issues:			
01. Community	Strategic planning requirements, Community facilities, Third party partnerships, Good Corporate Citizen, Enquiry by Design (paras 5.16–5.19)	Third party partnerships, Enquiry by design, S106 agreement, Shared facilities & inclusive design (paras 5.86–5.91)	Community service, facilities & amenities, Inclusive Design Strategy, Access action plan, Third-party consultation (paras 5.161–5.163)
	02. Local environment	Site accessibility, Public transport, PPS1, Brownfield land, Planning requirements, Low construction impact (paras 5.20–5.29)	Site investigation, Opportunities & constraints, Planning applications, S106 agreement, Risk assessments & costs, Pre-CEMP (paras 5.92–5.97)

[process_flowchart.pdf](#)

Issues to be considered

Who has to do what and when

Justification (a)

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Commitment

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Capital projects require approval by internal bodies. This internal approvals process seeks to ensure that all new developments are fully consistent at national, regional and local levels.

Priorities include not only current and future needs in terms of service delivery but also known sustainability objectives such as the energy-efficiency targets described in 'Energy and carbon efficiency – Low- to zero-carbon buildings approach'.

Any individual building project for health and social care should be considered in the context of a strategic service development plan (SSDP) for the local area or relate to a Local Health Board or NHS Trust's strategic plans and annual operational plans. The aim is to ensure that any investment in premises will improve services. As part of an SSDP, existing services should be reviewed with respect to the distribution of medical resources, current capacity and delivery patterns.

Once the broad principles and “ideal scenario” for developing new premises in a particular locality have been documented, it is necessary to examine how existing premises fit with this vision. The pattern and condition of existing premises should be documented using available tools such as SHAPE and the Estates Audit Toolkit.

An options appraisal should be carried out to establish the optimal configuration of services across a local area. This should be a collaborative exercise involving local healthcare providers (for example GPs), the community, the voluntary sector, social services staff, local government managers and patients.

The justification stage is a crucial opportunity to ensure that sustainability – and not just economic benefits – are taken into account when any development is considered. This implies consideration of issues such as:

- * the reuse of existing buildings as opposed to new build;
- * social accessibility, which also factors in the aim to reduce travel by means of private transport;
- * using brownfield land with a scope to improve the ecological value of greenfield land.

For this reason, it is important at this early stage to engage with planning authorities, public transport providers and entities such as the Highways Agency in order to understand other strategic priorities beyond those of health and social care

services and also the wider determinants of quality and sustainability objectives that may be required by third parties.

It should be demonstrated from the outset (for example in the SOC) that sustainability is key to the development proposed, by clarifying objectives, aims and key performance indicators (KPIs) for the issues described in 'Recommended action – a-01 Community'.

Aims, objectives and KPIs are not finite and, if the proposal is approved, should be explored, detailed and improved at the next stage of development, the “scoping” stage, through an option appraisal study that sets out the design brief and business case.

Recommended action – a-01 Community

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An SSDP/SOC should investigate opportunities for the local community. Ongoing public consultation with patients, service users, carers and wider stakeholders within the community should form an integral part of the planning process. Such a consultation process can help healthcare organisations to ensure that they meet the needs of their local communities.

By working in partnership with local government, other public services and community-based organisations, healthcare organisations can find new ways to deliver better healthcare, for example through exercise referral programmes and mutual volunteering initiatives such as “time banks”. This can help to promote social cohesion and wellbeing.

Since healthcare facilities are often located within existing communities, they can contribute to health in ways that go well beyond their clinical functions, by helping to provide resources such as sports and arts facilities, meeting rooms, cafés and restaurants.

Facilities can be further developed to:

- * complement the core social and healthcare services;
- * improve accessibility by all travel models, taking into account users’ needs and the opportunities and limitations of different social groups;
- * provide a focal point for the local community;
- * fill gaps that may be present in the local healthcare or social economy;
- * provide opportunities to improve the skills of local people;
- * make the building more attractive and a caring, healing environment for users;
- * improve the affordability of the project.

Methodologies and tools are listed in 'Links' below.

[BREEAM Healthcare](#)

[Good Corporate Citizen self-assessment test](#)

[Prince’s Foundation’s “Enquiry by Design” planning tool](#)

Recommended action – a-02 Local environment

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At this stage, matters of concern with respect to the local environment relate to the suitability of the location – namely, accessibility and the quality of the land that is proposed for development.

Transport flows and accessibility are key issues for all developments. Adequate walking and cycling networks, safe access, and the provision of a good level of public transport are crucial factors.

The Institution of Highways & Transportation (IHT) gives guidance on acceptable locational and accessible transport infrastructure ('Guidelines for planning for public transport in developments').

The introduction of new transport nodes for larger development proposals could be of benefit to a currently under-serviced part of the community, therefore turning an identified constraint into an opportunity.

The other main issue with respect to the choice of location is the type of land to be built on and its quality.

The reuse of existing buildings or use of brownfield land is encouraged as part of a national objective to develop more sustainably (see CLG's Planning Policy Statement 1 – 'Delivering sustainable development').

Before acquiring land, the project lead should check with the local authority that planning consent for the required use will be granted.

Early on in the process, it is advisable for project managers to make themselves familiar with their local authority's planning policy and development objectives by speaking to planning officers (planners) and studying the local authority's unitary development plan (UDP).

Once planners have an understanding of the site-related requirements for health and social care buildings, they can often assist in helping to find a suitable site. This may be a mixed-use development, which may assist with integrating the building into the locality and making it affordable.

Contractors should also commit to mitigating the impact of construction works on the local environment by signing up to:

- * an effective SWMP; and

* the “considerate constructors’ scheme” (CCS)

and by preparing a construction environmental management plan (CEMP).

Guidelines for planning for public transport in developments
CLG’s Planning Policy Statement 1 – ‘Delivering sustainable development’
Considerate constructors’ scheme

Recommended action – a-03 Design quality

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Tools such as Inspiring Design Excellence and Achievements (IDEAs), A Staff and Patient Environment Calibration Tool (ASPECT) and Achieving Excellence Design Evaluation Toolkit (AEDET Evolution) specify design criteria that can help to achieve the level of quality required by healthcare environments. They assist designers at the outline stage and throughout the evolution of the design process.

AEDET Evolution assessment criteria are used to evaluate design requirements at the early stages and are referred to throughout the design process to identify design strengths and weaknesses. In refurbishment projects, the same criteria can be used to identify opportunities for design improvement.

ASPECT focuses on design aspects that can impact on the levels of satisfaction shown by staff and patients, the health outcomes of patients and the performance of staff.

After a SOC has been established, a design review workshop is encouraged to ensure that all design options are considered/explored as early as possible, in order to achieve an eventual optimum design solution.

See also the NHS Design Review Panel guidance on the Department of Health website.

[IDEAs](#)

[ASPECT](#)

[AEDET Evolution](#)

[NHS Design Review Panel guidance on the Department of Health website](#)

Recommended action – a-04 Flood risk and SuDS

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When locating a new development, the susceptibility of the site to flooding will affect planning requirements. For guidance, refer to the Environment Agency’s “flood map” website.

Development on sites that are at high (greater than 1-in-75 chance of flooding in one year) and medium (between 1-in-200 and 1-in-75) risk of flooding is discouraged, and the location of a new development should take this into consideration.

CLG’s Planning Policy Statement 25 – ‘Development and flood risk’ uses a “spatial planning system” to ensure that developments are directed away from high-risk areas and ensures that surface water drainage systems for new developments do not increase flood risk. Approved Document H of the Building Regulations (‘Drainage and waste disposal’) also encourages the use of sustainable drainage methods.

Developments should be designed in such a way that peak run-off rates and annual volumes of run-off are no worse than the existing conditions for the site. Surface water should be managed on-site using a sustainable drainage system (SuDS).

The concept behind SuDS is to mimic natural hydrological and hydrogeological cycles. A project lead/contractor should not aggravate or damage the existing conditions for a site and should have in place a surface water management strategy, ideally including SuDS.

A detailed flood risk assessment identifies the risks and implications and proposes mitigation measures.

[Environment Agency’s “flood map” website](#)

[CLG’s Planning Policy Statement 25 – ‘Development and flood risk’](#)

[Building Regulations 2000: Approved Document H – Drainage and waste disposal](#)

Recommended action – a-05 Future-proofing

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The development proposal should be forward-looking by addressing future service and planning requirements. From the outset (for example at the SOC stage), there should be clear commitment to this objective of flexibility and adaptability, giving broad descriptions on how the building will prepare for future needs and changes in terms of its size, function and environmental context. Additionally, future-proofing needs to take account of the government's strategic aims and objectives as well as legislative requirements.

Recommended action – a-06 Health and well-being

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All developments should ensure that lighting, noise levels, internal pollution levels, external views etc comply with regulatory requirements and achieve the appropriate criteria specified using IDEAs, ASPECT, AEDET Evolution and BREEAM Healthcare. A new/refurbished development can also commit to providing facilities and spaces that encourage healthy lifestyles such as outdoor spaces, cycle facilities and safe links to pedestrian paths.

IDEAs

ASPECT

AEDET Evolution

BREEAM Healthcare

Recommended action – a-07 Energy and carbon emissions

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Recommended action – a-07 Energy and carbon emissions

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Health Technical Memorandum 07-02 – 'Encode' includes energy efficiency targets together with good practice advice and guidance for energy efficient design, which are summarised below:

- * reduce levels of primary energy consumption by 15% or 0.15 million tonnes of carbon emissions from a base year of 1999/2000 to March 2010;
- * achieve 35–55 GJ/100 m³ energy performance for all new capital developments and major redevelopments/refurbishments and 55–65 GJ/100 m³ for existing facilities.

In the case of an individual development, there should always be a clear commitment from the outset (for example at the SOC stage) to:

- * contribute to the above targets through a high level of credits from BREEAM Healthcare in design and specification; and
- * reduce and monitor the building's use of energy.

The baseline requirement will be influenced by the Welsh Assembly Government's requirements for the design and planning approval of non domestic buildings, the local planning body's energy and carbon strategy (contained in, for example, the Welsh Assembly Government's Technical Advice Note TAN 22 Planning for Sustainable Buildings), and will encourage the introduction of renewable energy sources.

At this stage it may be difficult to establish an exact energy/carbon efficiency level for the development, but a commitment is required for an options appraisal at the scoping stage (if an approval is granted) which should determine feasible operational levels and associated KPIs.

[Welsh Assembly Government Technical Advice Note TAN 22 Planning for Sustainable Buildings](#)

Recommended action – a-08 Transport

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Recommended action - a-08 Transport

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New or extended buildings should address site accessibility and sustainable transport considerations. This should be encapsulated in a robust transport plan.

Sustainable transport is about encouraging walking, cycling and the use of public transport and about making sure that pollution and carbon-dioxide emissions are minimised.

There is scope at this early stage to embrace wide area transport plans as envisaged by the local highway authority and to understand opportunities and obligations with respect to transport and travel.

Healthcare organisations should produce a travel plan, which is a package of site-specific initiatives aimed at improving accessibility and the availability and choice of travel modes to and from a development. It should also aim to promote practices or policies that reduce the need for travel. The NHS in Wales has produced a travel plan toolkit which is designed to help healthcare organisations produce a travel plan.

Co-location of primary, community, acute health and social care services is important in terms of reducing the transport needs of patients, and hence the polluting effects of vehicles.

Recommended action – a-09 Water use

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Healthcare organisations should demonstrate a commitment to reducing and monitoring the use of potable water.

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They should also monitor and commit to reducing use and wastage of potable water during construction. This can be achieved by ensuring adequate provision of meters and submeters.

Recommended action – a-10 Materials

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Recommended action - a-10 Materials

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The choice of location for the proposed development can have a considerable influence on the consumption of resources and the impact of construction materials on the environment.

Early consideration should be given to opportunities for refurbishment and reuse as opposed to new build. All developments should try to optimise the potential of existing resources on site.

A project lead should commit to requiring a remediation and/or demolition statement and to a presumption to retain existing buildings and reuse materials where possible.

The local sourcing of raw and reclaimed materials can also be beneficial. Locating a development close to a sustainable forest or quarry can reduce the carbon footprint of the construction process.

In line with sustainable procurement objectives, healthcare organisations can invest considerably in the local economy and community – and thereby contribute to regeneration – by buying from a mix of small, medium and large businesses and social enterprises.

Choosing the right materials can lead to a reduction in harmful environmental impacts. For example:

- * it can lead to reduced waste generation;
- * the need to transport goods can be minimised;
- * it can reduce carbon emissions and other pollutants.

Examples of ways of achieving this are by specifying:

- * materials with high environmental ratings (for example, limiting the options to environmental ratings between A+ and C, as rated by BRE's 'Green guide to specification');
- * materials with higher than average recycled content; and
- * materials that do not harm health and the environment (for example low global warming potential (GWP) insulation and low volatile organic compounds (VOC) coatings (that is, paints)).

NHS Wales Shared Services Partnership – Facilities Services (NWSSP-FS) has already agreed a KPI and a minimum standard of 15% in its framework contract for major projects, and WRAP is supporting DH in providing guidance and support to health developments.

Recommended action – a-11 Waste

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A commitment is required to reduce waste from the construction and operational phases of any development. The design should ensure that the siting of waste receptacles is taken into account (to comply with legislation and segregation issues).

A project lead should commit to the preparation of an SWMP in accordance with the Site Waste Management Plans Regulations 2008 and BERR's 'Strategy for sustainable construction' with the aim of reducing waste during construction and managing waste efficiently to reduce the impact on the community and environment, and to cut costs.

For waste generated during the building's operational phase, the LPA should be consulted to find out about current and future waste collection, segregation and reduction strategies. A KPI for a proposed development should tie in with this approach.

The project lead should commit to the required infrastructure (in particular, storage and access needs) to support a waste segregation and a reduction procedure.

KPIs will be explored in the next stage when the feasibility of various options is analysed.

A useful tool is SMARTWaste, which helps to calculate performance indicators.

[Site Waste Management Plans Regulations 2008](#)

[BERR's 'Strategy for sustainable construction'](#)

[SMARTWaste](#)

Recommended action – a-12 Land use and ecology

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The reuse of existing buildings and development on brownfield land are preferred to development on greenfield land.

Although greenfield land is naturally likely to have more ecological value than land that is already developed, brownfield land may support features of biodiversity value (such as the presence of bats in existing buildings).

Legislation requires project leads/contractors to commit to producing a biodiversity action plan (BAP) that involves:

- * an investigation of the ecological value of the proposed site;
- * protecting existing ecology;
- * enhancing biodiversity; and
- * setting a management plan for maintenance and monitoring.

Engaging or partnering with local wildlife groups could be beneficial.

Recommended action – a-13 Pollution

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Pollution policy, especially because of its direct implications in human health and the environment, should be set at this early stage. The project lead should commit to specifying systems and materials that do not pollute by way of their application and operational processes, notably nitrogen oxides in heating systems, GWP from insulation products and VOCs from coatings.

Reducing pollution from vehicles should be addressed by commitment to a travel plan (see 'Recommended action – a-08 Transport').

Recommended action – a-08 Transport

Scoping (b)

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scoping (b)

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Many of the tasks and activities listed under the scoping and procurement stages overlap and can be regarded as a continuum rather than specific to an individual stage. Thus project teams will need to determine when to apply these activities in these stages so as to best enhance the sustainability credentials of their scheme.

With the strategic context and vision agreed, a capital procurement plan should now be prepared.

The choice of procurement route is based on the type of development and available funding.

Financial models are essential for determining whole-life costing calculations, value for money, affordability and budgetary requirements (both capital and revenue).

The formal approval of any scheme will be subject to a prescribed business case process or similar.

The type of business case needed for any particular project will depend on the following:

- * the capital procurement route that will most probably be used;
- * the size of the project being considered;
- * the advice of the lead trust.

The development of a business case should give all interested stakeholders a clear view of:

- * what the project will involve;
- * how much it will cost;
- * how it will be funded;
- * the proposed timetable; and
- * what services the new building will be able to deliver.

An outline business case should:

- * describe the business outcomes and service/ works requirements in a way that is unambiguous;
- * outline the total project scope;
- * specify requirements in terms of outcome, based on “what” rather than “how”;

- * include information on availability of site;
- * include financial projections;
- * show initial concept designs;
- * calculate site-specific outline costings; and
- * identify sources of funding.

Moving the project from the feasibility stage to the detailed project briefing stage involves a considerable change in the scope and scale of information to be gathered and decisions to be made. Other stakeholders and organisations may need to be involved in the process in order to provide specialist knowledge and to ensure support for the proposals from the outset.

A detailed assessment should be undertaken to investigate sustainability options and to verify requirements and key performance indicators (KPIs) with respect to delivery and affordability. All this should be done within the context of community and planning requirements, and should involve discussions with experts such as planners, cost consultants, architects and sustainability consultants.

The results of community and third-party involvement, a thorough site investigation, identified constraints and opportunities, and sustainability assessments should all be incorporated in the design brief. In turn, the brief should inform the type of project team needed and the desired outcomes of the development. A thorough and articulate design brief is a critical part of the design process as it helps develop trust and understanding between the client and designer and serves as an essential point of reference for both parties.

Commitment

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At the scoping stage, it is important to verify the aims, objectives and mechanisms (that is, KPIs) for sustainable development and to integrate these into the design brief.

Site investigation and community engagement are required to inform an option appraisal, which assesses opportunities and constraints in terms of costs and deliverability.

A team of experts, including a BREEAM Healthcare assessor, should:

- * carry out a site investigation for the different disciplines of site- and community-related factors (such as community-wide energy solutions or renewable energy types);
- * conduct a feasibility study to establish the aims, objectives and KPIs in order to verify sustainability factors.

Feasibility studies covering any option appraisal for the proposed development should be assessed by considering life-cycle costing (LCC), which includes:

- * the cost of design and construction;

- * the long-term operational and maintenance costs; and
- * the costs associated with disposal.

The LCC study should be for a period of 25 to 30 years (as applicable – but ideally up to 60 years), and should be shown in real, discounted and non-discounted cash-flow terms.

A programme for delivering the project should be established from the outset. Initially this should be a “broad-brush” bar chart which should develop over time to include all aspects of the project, as well as timescales for project procurement, commissioning and occupation.

Recommended action – b-01 Community

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Recommended action - b-01 Community

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This is the stage at which a decision should be made about how to involve the community and other third parties that are affected/interested in the proposed development.

Partnerships between healthcare organisations and third-party organisations can lead to facilities that are better designed to meet users' needs (see the National Strategic Partnership Forum's (2007) 'Making partnerships work: examples of good practice').

The Prince's Foundation's "Enquiry by Design" planning tool encourages workshops that explore key issues, test initial concepts and develop a vision. These workshops should take place throughout the development of the design up to the final presentation. The structure of this process can be tailored to the requirements of local development frameworks (LDFs) and area action plans (AAPs).

At this stage, the community and third-party organisations can flag up key issues and help develop a vision that is then locked into the design brief and sustainability statement for further development following procurement. The issues identified at this stage may become part of conditions attached to planning permission (such as a requirement for a community centre or shared facilities in the area or an improvement to public transport services).

All facilities need to be physically accessible to all. The design brief should include an inclusive design strategy including AAPs for any existing buildings.

CABE's (2006) 'The principles of inclusive design' suggests that successful designs should be:

- * inclusive, so that everyone can use them safely, easily and with dignity;
- * responsive, taking account of what people need and want;
- * flexible, so that different people can use them in different ways;
- * convenient, so that everyone can use them without too much effort or separation;
- * accommodating, for all people, regardless of age, gender, mobility, ethnicity or circumstances;
- * welcoming, with no disabling barriers that might exclude some people; and

- * realistic, offering more than one solution to help balance everyone's needs and recognising that one solution may not work for all.

Recommended action – b-02 Local environment

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Recommended action - b-02 Local environment 7585

A baseline investigation should be undertaken at this stage to find out about the local environment and to identify opportunities and constraints for development.

For this, it is important to undertake a site appraisal. This should have input from a multidisciplinary environmental team. The type of assessments that should be considered would include the following:

- * planning context (current policies, applications and consents);
- * strategic context (links to the wider area and relationships to surrounding development);
- * local and immediate context (adjacent land uses and links to the area or site);
- * site and statistics (size, proportions, boundary definition);
- * site and area characteristics (contours, ecology, landscape, hydrology, ground conditions, crime pattern analysis);
- * site and area infrastructure (roads, services, utilities);
- * statutory constraints (listed buildings, tree preservation orders);
- * development feasibility, including an assessment of market demand;
- * important structuring elements such as axes, historic routes, watersheds and main points of site access;
- * a site's/area's capacity for development.

Outline and full planning applications will normally be required during the development process, although responsibility for these and exactly where they occur in the development process will vary, depending on the procurement route selected.

Any Section 106 conditions (of the Town and Country Planning Act 1990) attached to a planning permission may also add to the opportunities and constraints, such as a requirement to respect the local environment/area.

The baseline investigation may reveal a requirement for preparatory works and additional cost implications such as contaminated-land remediation works, a protected species or an opportunity to reclaim material from existing structures. This should be factored into the budget when the business case is put together. A costed risk assessment should therefore be completed and mitigation measures identified.

The baseline investigation should also inform an outline construction environmental management plan (CEMP), which should be developed by the site contractor. A CEMP should identify potential impacts, performance objectives, management actions and strategies, performance indicators and monitoring aspects for a number of factors in a construction site. The contractor should submit the CEMP to the LPA before commencing construction.

Recommended action – b-03 Design quality

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Recommended action – b-03 Design quality

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All Local Health Boards and NHS Trusts embarking on new developments, whether they are refurbishment or new-build projects, should appoint a design champion to their board of directors.

The design brief should specify the expected design quality standards, referring to assessment methods such as AEDET Evolution and ASPECT. It should include information on principles and standards, the strategy for growth and change, and explain how to update operational briefing information, room data sheets and accommodation schedules.

At this stage, and prior to OBC submission, a design review is encouraged to ensure that the optimum design solution is included in the preferred option.

See also the NHS Design Review Panel guidance on the Department of Health website.

[AEDET Evolution](#)

[ASPECT](#)

[NHS Design Review Panel guidance](#)

Recommended action – b-04 Flood risk and SuDS

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A flood risk assessment outlines the main flood risks to a development site and presents recommendations for mitigating measures to reduce the impact of flooding to the site and surrounding area. It helps to establish the nature and scale of the existing risk, and how this may change over time or as a result of any flood risk management measures. The Environment Agency continually monitors present water levels and develops models from this data to predict the course and severity of future floods.

Siting developments in areas of low flood risk (less than 1 in 1000 years risk of flooding) and specifying measures to minimise the risk of localised flooding is credited by BREEAM Healthcare.

A surface water management strategy should include a commitment to uphold water quality and to control the pollution of natural watercourses and the ground table. Biodiversity objectives could also be included (for example the creation of a range of wet habitats in conjunction with a SuDS scheme).

Features of a basic SuDS design include porous pavements, swales, ponds, wetlands, infiltration trenches and filter drains. Designs are dependent on site-specific factors, as run-off rates are a result of rainfall and local climatic and ground conditions, which vary considerably throughout the UK. Project lead/contractors should focus on a design that achieves simple drainage and flood control and also takes into consideration improvements to biodiversity, local land use, the requirements of the local community and measures to prevent pollution of surface run-off.

An option appraisal should demonstrate the cost and environmental implications of using SuDS, green roofs, permeable surfaces etc.

The feasibility of water management proposals should therefore be assessed in the context of predicted changes to local climatic patterns.

[Environment Agency: flood maps](#)
[BREEAM Healthcare](#)
[SuDS](#)

Recommended action – b-05 Future-proofing

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The design brief should identify future plans for change. They should be indicated clearly and visually from a strategic level down to the detailed level.

Perceived change should go beyond the boundary of the development and should draw upon local planning objectives and amenities. In addition, planned preventive maintenance should be identified for the continued efficient sustainable running of the building through its life-cycle (see 'Future-proofing of healthcare buildings').

Whatever the longevity of a building, flexibility in design is important; therefore adaptability should be planned in at every level of design and detail. A hierarchy of flexibility should be created, based on:

- * service-requirement patterns;
- * activities;
- * useful life; and
- * accessibility criteria.

Other considerations include durability, long-term suitability, opportunities for reclaiming construction materials and accessibility for maintenance and upgrade needs. The whole-life costing of a development maps out projected maintenance and replacement intervals, thus highlighting accessibility and longevity objectives for the design brief.

Changes in climatic patterns will have an impact on internal environments (overheating), the expected function of materials (such as increased expansion and contraction patterns or increased moisture levels due to rain), flood issues, biodiversity and landscape maintenance strategies etc. The brief should clearly require evidence that the building is prepared for climate change in accordance with the latest reports by the UK Climate Impacts Programme (UKCIP), or similar.

[Future-proofing of healthcare buildings](#)
[UK Climate Impacts Programme](#)

Recommended action – b-06 Health and well-being

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The design brief should emphasise the role of the development in improving the health and wellbeing of the users and community.

The baseline investigation should identify areas for improvement – such as sources of local noise and vibration, air quality, overshadowing and wind microclimate impacts – which can be developed into strategies and assessed for feasibility.

The preferred option should be described in the brief together with key requirements and KPIs using IDEAs, ASPECT, AEDET Evolution and BREEAM Healthcare.

IDEAs

ASPECT

AEDET Evolution

BREEAM Healthcare

Recommended action – b-07 Energy and carbon emissions

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Recommended action - b-07 Energy and carbon emissions

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An energy and carbon emissions options appraisal starts with an exercise to determine the expected energy demand of the proposed development. This should be used as a baseline from which the various options to reduce energy demand and carbon emissions are assessed on a case-specific scenario with respect to:

- * patterns of use;
- * security of provision;
- * opportunities for renewable energy sources;
- * community energy solutions/district heating schemes;
- * deliverability; and
- * long-term costs.

The design brief should encourage techniques such as passive solar heating, natural ventilation and natural lighting, which aim to reduce the need for artificial heating, cooling and lighting. Mechanical solutions should be limited to core areas (for example sanitary facilities, dirty utilities and those rooms where clinical or functional requirements have specific environmental needs).

Building services engineers should specify technology that is energy-efficient (for example heat-recovery systems).

Grant opportunities and the advantages of feed in tariffs for renewable energy technologies need to be explored.

Recommended action – b-08

Transport

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The local highway authority and planning authority should be consulted to provide information about projected transport developments.

Transport assessments (TA) and transport statements (TS) address the potential implications of a development on the entire transport system, including the public transport system, the strategic road network (SRN) and local highways and footways.

TAs and TSs enable highway authorities and contractors to assess whether any highway and access improvements, in relation to all modes of transport, are likely to be needed as a result of new or modified developments and, if so, the nature of those improvements.

The findings should be included in the design brief that informs the travel plan framework.

Recommended action – b-09 Water use

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The baseline water-use requirements for the proposed development should be calculated. Strategies for reduction should then be explored with respect to sustainability, deliverability and costs.

The design brief should specify the use of water-efficient and leak-detection fittings, as well as covering the recycling opportunities of greywater and rainwater. Accordingly, the likely yield of rainwater or greywater systems should be determined.

Opportunities for using greywater and rainwater in the healthcare environment are explained more fully in 'Water management and water efficiency – best practice advice for the healthcare sector'.

There should be sufficient storage for the anticipated demand on the system.

All non-domestic buildings should be metered by water companies. The project lead should also put into place a requirement for monitoring of water use during construction work. This should form part of the water management strategy, which identifies the aims and KPIs for the specific development.

Water management and water efficiency – best practice advice for the healthcare sector

Recommended action – b-10 Materials

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When it is not feasible to retain existing site buildings and structures, pre-demolition audits are recommended to identify the volumes of on-site waste that a contractor can reuse, recycle or recover prior to starting works. Tools such as BRE's SMARTAudit help to:

- * identify markets for recycled or recovered material;
- * identify the reclamation and reuse potential (both on-site and off-site);
- * value the demolition material in terms of costs and environmental qualification.

An understanding of land and building contamination at this stage will determine whether materials and/or structures on site can be reclaimed. Contaminated materials and structures to be reused should undergo on-site or off-site treatment, which will impact on the feasibility study and budget.

If materials cannot be reclaimed from site, there may be reclamation sites in the locality.

The sourcing of construction materials and labour is important as it affects opportunities in the labour/skills market, regeneration and transportation distances, and can contribute to the local economy. Early negotiations with supply chains will establish a link between these opportunities and the preferred design brief.

BRE's (2002) 'Green guide to specification' rates a range of possible construction composites for the main parts of the building fabric using a rating methodology that takes account of whole-life environmental impacts.

Note

The updated edition of the 'Green guide to specification' uses overall ratings between A+ and E.

BREEAM Healthcare gives credits for the responsible sourcing of materials. This ties in with the NHS sustainable procurement agenda for:

- * the (socially and environmentally) responsible sourcing of raw materials;
- * manufacturing processes; and

- * the specifying of materials with high recycled content and low pollution indicators (see 'Recommended action – b-13 Pollution').

The suitability of materials is based on functional requirements such as insulation values, durability, maintenance, their low carbon impact and future reusability.

Recommended action – b-13 Pollution

SMARTAudit

Green guide to specification

BREEAM Healthcare

Recommended action – b-11 Waste

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Recommended action - b-11 Waste

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Early collaboration between the project team and the supply chain to design out waste should improve construction efficiency.

The overarching principle for managing waste is based on the waste hierarchy. This dictates that waste is managed – the first aim being prevention. Waste should be reused or recycled before being used as a source of energy. Final disposal of waste in a landfill site is the lowest priority in the waste hierarchy. It is recommended that this approach be sought in the design brief.

The amount of waste that goes to landfill can be reduced by reclaiming materials from site and specifying recycled content.

SWMPs contribute to a greater reduction of waste from construction.

The availability and accessibility of landfill, alternative technology treatment plant, incineration facilities and recycling services all impact on the waste management strategy and aims/objectives for minimising waste.

Waste storage areas should be adequate and suitable for purpose and should include ward-level stores, bulk storage areas, refrigerated storage, and composting and compacting facilities. They should have enough storage and access capacity to match the proposed frequency of internal and external collection.

Waste segregation and management is covered in Health Technical Memorandum 07-01 – ‘Safe management of healthcare waste’; Health Technical Memorandum 07-05 – ‘The treatment, recovery, recycling and safe disposal of waste electrical and electronic equipment’; and Health Technical Memorandum 07-06 – ‘Disposal of pharmaceutical waste in community pharmacies’. In Wales the Welsh Assembly Government’s *Healthcare waste strategy* applies and will need to be complied with.

BREEAM Healthcare gives credits for dedicated storage spaces that cater for recyclable materials, provided they:

- * are compliant with Health Technical Memorandum 07-01; and
- * are clearly labelled for recycling.

BREEAM Healthcare also gives the minimum requirements for the internal storage of recyclable materials.

Discussion with the local authority may reveal an energy-from-waste scheme in the locality, which should be considered in the option appraisal for both waste and energy in operation.

Recommended action – b-12 Land use and ecology

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A qualified ecologist should be commissioned at the beginning of the site investigation stage to undertake a detailed investigation of the site's biodiversity plan, taking into account seasonal constraints.

Planning, construction, development and regeneration should have minimal impact on biodiversity and enhance it wherever possible. Regional and local BAPs are required for species and habitats that are under threat and in decline. The European Union has now made the further commitment to halt biodiversity loss by 2010 (see CLG's Planning Policy Statement 9 – 'Biodiversity and geological conservation').

The Environment Agency should be consulted for advice about obligations, required consents, information that needs to be provided, protection and enhancement opportunities.

An "appropriate assessment" under Regulation 48(1) of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) may be required in respect of any plan or project which:

- a. either alone or in combination with other plans or projects would be likely to have a significant effect on a European site; and
- b. is not directly connected with the management of the site for nature conservation.

Note

"Appropriate assessment" is required by law for all European sites (Regulation 48).

A European site is any classified special protection area (SPA) and any special area of conservation (SAC). Appropriate assessment is also required for potential SPAs, candidate SACs and listed Ramsar sites (a European designation which protects wetlands) for the purpose of considering development proposals affecting them (see CLG's Planning Policy Statement 9 – 'Biodiversity and geological conservation').

BREEAM Healthcare credits:

- * the use of land of low ecological value;
- * the protection of ecological features during construction work;
- * the mitigation of ecological impact by the proposed development;

- * the enhancement of existing features of ecological value; and
- * long-term ecological management.

The design brief should clearly set out these objectives.

A tree condition survey and evaluation is carried out based upon a topographical survey, whose details should be agreed with an arboriculturalist and landscape architect. Following the tree survey, it is recommended that a tree constraints plan (TCP) be prepared by the arboriculturalist, which should be used later to assist with site layout.

Should trees of significance be retained and potentially affected by the scheme, an arboriculturalist should be consulted to carry out an arboricultural implications assessment (AIA), which will inform the landscape and visual impact assessment (LVIA) and the provision of arboricultural method statements (AMS).

The outline CEMP should clearly set out works to be undertaken in accordance with an approved ecological/landscape management plan for the protection of features of ecological value as identified in the baseline assessment.

Planning Policy Statement 9 – Biodiversity and geological conservation
Environment Agency
Conservation (Natural Habitats, &c.) Regulations 1994
BREEAM Healthcare

Recommended action – b-13 Pollution

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The design brief should clarify the low pollution specification objectives determined in the previous stage, including guidance on labelling systems and certificates as evidence of compliance with the development's requirements.

Procurement (c)

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Procurement (c)

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Many of the tasks and activities listed under the scoping and procurement stages overlap and can be regarded as a continuum rather than specific to an individual stage. Thus project teams will need to determine when to apply these activities in these stages so as to best enhance the sustainability credentials of their scheme.

Depending on the procurement and contract routes being followed, project briefing documents can be used in two ways to procure new premises:

- * to further develop the detailed design brief; or
- * in a tender situation, to bring designers on board.

The project team should formally test the project to ensure that it accords with local and national policy and that it is affordable. The full business case (FBC), or equivalent, confirms that each of the criteria approved from the outline business case have been met.

Once the OBC has been approved, the project lead should ensure that the following are taken to completion in the FBC:

- * availability of site;
- * financial projections;
- * site-specific outline costings;
- * security of the site;
- * planning application;
- * detailed design;
- * sources of funding.

The project team should have the required expertise; this will be determined by site-specific constraints and opportunities together with sustainability needs.

The designs are developed iteratively up to the planning submission stage and then amended further for the tendering process and to support works on site.

Procurement routes

For guidance on procurement routes see 'Designed for Life: Building for Wales' (a procurement framework for publicly-funded NHS capital schemes in Wales)

[Designed for Life: Building for Wales](#)

Commitment

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When putting together a project team for a sustainable development scheme, it is important that the right skills and range of expertise are on board and that sustainable development (and other scheme) objectives are communicated clearly.

Any potential gaps in skills and experience should be identified and any misunderstandings clarified before a contractual agreement or procurement decision is made.

An environmental designer/engineer and a certified BREEAM Healthcare assessor should be consulted to help to achieve the aims and objectives established in the brief.

The project lead should commit to ensuring that the team works together towards the sustainability goals and that, as the work develops, it is continuously cross-checked against sustainability objectives.

It is crucial that the goals are known and sought from the outline design stages and are not considered too late in the design process when they become harder to achieve.

Recommended action – c-01

Community

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An outline design should show the location of, and access to, community facilities and amenities that need to be provided, as described in the committed design brief.

It is recommended that a design champion and/or access consultant be involved at this stage to develop an inclusive design strategy for the project, including “access action plans” for any existing buildings. The proposed strategy should continue to develop at the various design stages and should be outlined in the design and access statement that accompanies the outline planning application.

Other occupants and partner service agencies should be involved at different stages of the design development, in particular for feedback when concepts of their vision are being tested up to the final designs.

Recommended action – c-02 Local environment

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Recommended action - c-02 Local environment 7590

Information from the baseline investigation should be used to mitigate the development's impact on the local environment. The proposed development should not be designed in isolation but in the context of its built, social and natural environment.

A screening process should be carried out, which assesses a scheme with respect to how it will impact on the environment. The screening process should be developed in discussion with bodies such as the Environment Agency and Cadw, who will form an opinion on whether a full environmental impact assessment (EIA) will be required.

In terms of a development's impact on the surrounding environment, the site factors that should be considered include:

- * land quality;
- * townscape and visual implications;
- * cultural heritage;
- * traffic and transport;
- * flood risk;
- * ecology;
- * air quality;
- * odour;
- * noise;
- * vibration;
- * socioeconomics and community effects;
- * wind; and
- * overshadowing.

An EIA is a procedure that should be followed for certain types of project before they can be given "development consent". It enables environmental factors to be given due weight, along with economic or social factors, when planning applications are being considered. From the project lead's point of view, preparing an environmental statement in parallel with the project design will provide a useful framework within which environmental considerations and design development can interact. Taking these steps is likely to make the formal planning approval stages run more smoothly.

The environmental statement's purpose is to provide information to the public and other interested parties about the proposed measures to enhance the environment and to mitigate any negative impacts by the proposed development.

Environment Agency

Cadw

Recommended action – c-03 Design quality

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Recommended action - c-03 Design quality

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AEDET Evolution assists designers in determining and managing their design requirements from initial proposals through to post-project evaluation.

AEDET Evolution evaluates a design by posing a series of clear, non-technical statements, encompassing the three key areas of impact, build quality and functionality.

ASPECT deals with the way the healthcare environment can impact on the levels of satisfaction shown by staff and patients, in particular the health outcomes of patients and the performance of staff.

It can be used as a stand-alone tool or it can be used to support AEDET Evolution to provide a more comprehensive evaluation of the design.

Although both toolkits should be used to set a minimum score which all developments are expected to achieve, a sustainable development should aim for a maximum practically-achievable score subject to the usual affordability and value-for-money constraints for all the assessment criteria.

If planning application is needed, a design and access statement is now required to accompany this application. A design and access statement explains the design thinking and helps local authorities to understand the likely effect of any development proposals (see CABE's (2007) 'Design and access statements: how to write, read and use them'). Planning authorities will expect project leads to commission competent design professionals when preparing planning applications.

All development proposals should conform to statutory approvals, Building Regulations and statutory undertakings.

At this stage, and prior to FBC submission, a design review is encouraged to ensure that an optimum final design solution is taken forward.

Recommended action – c-04 Flood risk and SuDS

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A flood risk assessment outlines the mitigation measures needed to reduce the associated risks. Mitigation measures should be developed with the project team at an early stage to ensure that design and engineering works are included in the design scope and integrated with the overall design proposal.

Areas at high risk from pollution such as car parks, waste disposal facilities and plant areas should be treated or protected using oil separators or filtration systems to prevent pollution of natural watercourses from surface water run-off.

Specialised advice may be required for water management systems such as SuDS for both design detailing and specification for procurement.

Recommended action – c-05 Future-proofing

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The flexibility and preparedness of a design proposal should be demonstrated graphically in such a way that it can be referred to in the future when changes are planned.

A hierarchy of core, movable and less essential parts is helpful in demonstrating future-proofing. For example, the core structure should last 60 years; engineering services should have a 15- to 25-year lifespan (depending on size and complexity of facility); and the internal layout should be sufficiently flexible to meet anticipated service changes every two or three years.

Consideration should be given to planned preventive maintenance schedules for windows, heating and cladding renewals halfway through service life. The building fabric should be specified and procured in such a way that future reclamation of materials is simplified.

Rooms within a building should be of a generic rather than bespoke design. This will facilitate a room's change of use from one function to another in the future. Bespoke solutions are only encouraged insofar as they do not hinder a reconfiguration of space and function. Generic multi-purpose spaces are far more likely to be successful in the long term than bespoke specialised designs. This approach is not intended to hinder innovation, but redirects creative energy towards a future-proof solution.

Circulation and service infrastructure should be planned strategically in such a way that they continue to serve various rearrangements of the building's use and form.

Future-proofing also emphasises the need to demonstrate that regular and long-term maintenance is unhindered and that the building is prepared to respond to climate change.

Recommended action – c-06 Health and well-being

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The project team needs to show evidence that health and well-being criteria for IDEAs, ASPECT, AEDET Evolution and BREEAM Healthcare are being achieved.

ASPECT includes criteria such as patient privacy and environmental control, views and outdoor spaces.

BREEAM Healthcare includes daylight calculations based on finalised drawings. The assessment credits developments with a large percentage of patient, staff and public areas that have a view of the sky or of an outdoor environment, as well as the provision of an accessible outdoor space for use by the building's occupants.

The requirement, provision and access to quality outdoor space are important elements of a healing and working environment. Research has shown that access to, and views of, a landscaped environment can contribute significantly to the healing process.

A variety of outdoor spaces should be included within the grounds of the facility – some that offer a relative amount of privacy, others that allow more social interaction. They should include:

- * ease of access, with or without assistance, to a variety of outdoor spaces;
- * ease of access along paths that link different types of space and event;
- * healing/therapeutic opportunities (for example “green gyms”, which have proved beneficial to patient treatment/recovery rates);
- * visual stimulation from and within the outdoor area, such as long-distance views, water features etc;
- * biodiversity features such as plants and planting groups and the wildlife they support.

IDEAs

ASPECT

AEDET Evolution

BREEAM Healthcare

Recommended action – c-07 Energy and carbon emissions

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Recommended action - c-07 Energy and carbon emissions

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An energy-efficient design strategy to reduce the demand of artificial means of heating, cooling, ventilation and lighting should be developed and tested throughout the design development with the help of specialised advisers.

The most important influencing factors in the design of the external building fabric are high insulation, airtightness, shading, and avoidance of thermal bridging. The building form, orientation, external elements and aperture size, location and function will also be influential in reducing the base energy demand.

Owing to the high energy demand in health and social care buildings, it is recommended that any additional heating, cooling, ventilation and lighting requirements, as well as appliances/equipment (such as for offices and catering areas), are specified as energy-efficient/low carbon footprint types.

Low-carbon and renewable energy systems should be used. Early feasibility studies should indicate the best options for supplying the estimated energy demand by these means.

In larger healthcare buildings that require an independent energy generation system, CHP is recommended. Good quality CHP is exempt from the climate change levy (CCL), which reduces the payback period and increases the cost savings. The installation of CHP alone should, in most cases, be sufficient to reduce the organisation's emissions in line with national mandatory targets.

Community groups and public- and non-profit-sector applicants can make a claim under Phase 2 of the Low Carbon Buildings Programme (LCBP2) for up to 50% of the costs (limited to a maximum of up to £1 million in grant funds per site and a maximum of three eligible technologies) of installing approved microgeneration technologies, namely:

- * solar photovoltaics;
- * solar thermal hot water;
- * wind turbines;
- * ground-source heat pumps;
- * automated wood pellet stoves;
- * wood-fuelled boiler systems.

The Low Carbon Buildings Programme is managed for BERR by BRE. It is part of the Environmental Transformation Fund (ETF), a joint BERR/Defra fund to bring forward the demonstration and deployment of carbon energy and energy efficiency technologies.

Designers should also take note of the opportunities offered by feed in tariffs for the installation of renewable technologies.

Health Technical Memorandum 07-02 provides guidance on the options available for renewable and low carbon generation, as well as for energy-efficient systems.

If an energy services company (ESCO) is required for management of energy generated on site, maintenance and operation, discussions should start at an early stage in order to ensure that the design satisfies their requirements. What distinguishes these companies from the traditional energy consultants or equipment suppliers is that they can also finance or arrange financing for the operation, and their remuneration is directly tied to the energy savings achieved.

See the Joint Research Centre's (JRC) website on energy service companies.

BREEAM Healthcare gives credits for the submetering of substantial energy use within a building to enable better monitoring of energy use. It is recommended that, as a minimum, space heating, cooling plant, any humidification plant, major fans and lighting are submetered, and likewise small power on separate floors or departments.

Recommended action – c-08 Transport

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Recommended action - c-08 Transport

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The travel plan framework (developed with the project team and reflected in design proposals) should bring about the better use of public transport, improved accessibility, improved movement around the site and opportunities for physical activities such as walking and cycling, taking into account security and safety.

A travel plan uses the information derived from a transport assessment to ensure compliance with planning and development control requirements. It will influence the design of access and routes to accommodate pedestrians, cyclists, cars and delivery vehicles. It will also indicate additional spatial requirements such as cycle storage facilities and the maximum car-parking spaces recommended.

For the location of new developments, the Institution of Highways & Transportation's (IHT) 'Guidelines for planning for public transport in developments' recommends a walking distance of 400 m from the nearest bus stop and 800 m from the nearest railway station (200 m from the nearest bus stop in city centres). These distances can be used to determine the location of new public transport links to serve a new development or improve an existing one. In larger complexes, they can be used to determine the need for internal (environmentally friendly) transport linkages and to ensure that core services and amenities are within a comfortable walking distance.

BREEAM Healthcare credits projects based on their proximity to a public transport node and good public-transport service frequency (relative to the facility's opening hours).

The creation or improvement of cycle paths and pedestrian links to and from a facility will not only encourage cleaner modes of transportation by the local community, but, if integrated with a wide-area transport scheme, will contribute to improving users' lifestyles, air quality and health and well-being.

Traffic-calming measures make for safer environments and could be used to discourage through traffic in residential neighbourhoods. Note: access of emergency vehicles must not be impeded or cause discomfort to those injured or ill.

For guidance on the design of residential streets, see DfT/CLG's 'Manual for streets'.

Health Technical Memorandum 07-03 identifies best practice in developing travel plans and the NHS in Wales has produced a travel plan toolkit to help healthcare organisations in developing travel plans.

Recommended action – c-09 Water use

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Water fittings and equipment recommended in the feasibility study should be detailed and specified accordingly at this stage.

When considering the installation of water-efficient fixtures and fittings, they must comply with the Water Supply (Water Fittings) Regulations 1999, which make provision for preventing the contamination, waste, misuse, undue consumption and erroneous measurement of water supplied by a water undertaker. Products approved by the Water Regulations Advisory Scheme (WRAS) and listed in the Water Fittings and Materials Directory (WRAS, 2006) should be considered.

[Water Supply \(Water Fittings\) Regulations 1999](#)
[Water Regulations Advisory Scheme \(WRAS\)](#)

Recommended action – c-10 Materials

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Materials should all be selected within the parameters set at the options appraisal stage.

The design team should have a clear understanding of the characteristics and potential uses of available materials, in particular reclaimed and locally sourced raw materials.

When considering the desired longevity and performance of the construction, the durability of materials and climate change impacts will influence the choice of materials.

The description of materials in bills of quantities should include the sustainability requirements targeted by the development, such as:

- * certified timber from sustainable sources;
- * carbon impact;
- * a required recycled content by value; and
- * insulation with low GWP.

These factors are covered by BREEAM Healthcare, although further improvement should be sought in the specification of materials, in particular because of cost-neutral opportunities in this field.

BREEAM Healthcare

Recommended action – c-11 Waste

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The design proposal should address waste storage and access requirements. This should tie in with waste management plans and waste collection schemes.

Partnership working with the local authority or waste disposal contractor should be explored to monitor the weight of waste and recyclables produced. The most efficient method of weighing collected materials is by wheeled bins fitted with electronic chips, which enable the property to be identified.

Publicising the results of waste minimisation and recycling efforts may be a useful method of encouraging improvements in waste management, and may be included as part of a contract or service level agreement.

Recommended action – c-12 Land use and ecology

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Recommended action - c-12 Land use and ecology 7594

At this stage, outline proposals should show how a site's biodiversity can be incorporated within the design and how it can be enhanced. Ecological enhancements should be integrated into the scheme design rather than treated as separate.

Schemes should be designed in consultation with the Environment Agency (where appropriate) and the local authority ecologist (where appropriate).

Buildings should be sited in ways that minimise disruption to existing ecosystems and should be designed in ways that minimise ecological footprints.

An intention to increase the biodiversity on site could be integrated with design proposals for a SuDS, outdoor space design, green roofs and living walls.

In collaboration with ecologists, the proposed measures should form part of the project team's design brief to ensure that they serve their intended purpose.

Recommended action – c-13 Pollution

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The contractor should specify materials and systems that minimise levels of pollution.

Commitment (d)

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The commitment stage marks the signing off of finalised information which enables works to proceed on site. This includes information required for planning approval, the outcome of the tendering process, sustainability accreditation, site mobilisation and sustainable site activity.

It is a critical step for ensuring that sustainability objectives sought out and committed to at the earlier stages are reflected in the information produced for signing off.

Preparing for the construction phase includes involving new members of the project team, who should be made aware of the intended outcome of the development.

For low-impact site activity, this phase includes the signing off of key documentation such as the CEMP and the SWMP as well as good practice commitments such as the “considerate constructors’ scheme” (CCS) in agreement with the preferred site contractor.

Considerate constructors’ scheme

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The project lead should ensure that signed-off drawings and details of the proposed development continue to achieve the committed sustainability objectives. This should include a completed BREEAM Healthcare assessment and other evidence of pre-determined KPIs that may be required.

Once a development permit is granted, the procurement specification should outline the sustainability requirements and KPIs clearly. Discussions during the tendering process should focus on prioritising and clarifying these objectives.

Before site mobilisation, the contractor should sign up to the CCS and, before work starts, should also submit the construction-phase CEMP to the LPA.

The following section, “Construction (e)”, describes the CCS and CEMP objectives in more detail.

Construction (e)

Considerate constructors’ scheme” (CCS)

Recommended action – d-01 Community

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To reduce environmental impact from construction activity, the contractor should register the site with the CCS in agreement with the preferred site contractor. Sites that register with the scheme are monitored against a “code of considerate practice”, which is designed to encourage best practice beyond statutory requirements. The main areas of concern fall into three main categories:

- * the environment;
- * the workforce; and
- * the general public.

They each cover issues such as cleanliness, respectfulness, safety and good neighbourliness.

BREEAM Healthcare credits developments that comply with the CCS and acquire formal CCS certification. An additional credit is awarded if the evidence provided demonstrates a commitment to go significantly beyond best-practice site-management principles.

Considerate Constructors’ Scheme (CCS)

BREEAM Healthcare

Recommended action – d-02 Local environment

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By submitting a CEMP, the site contractor has committed to reducing the impact of site activity on the local and wider environment.

A CEMP should identify potential impacts, performance objectives, management actions and strategies, performance indicators and monitoring aspects for a number of environmental factors, including hazardous substances, noise and vibration, odours, visual impact and ecological impact.

Recommended action – d-03 Design quality

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When signing off drawings for building works and services, the project lead should ensure that they are sufficiently and thoroughly detailed for use by contractors and workers on site. Additional information and updates may be required to respond to changes required by contractors, but these should always be carried out within the parameters of sustainability objectives and commitments.

It is recommended that a site manager is appointed with overall responsibility for site management and for ensuring quality of construction and installation, especially where construction work will affect the environment and the environmental performance of the building. The appointed person should have a thorough knowledge of the sustainability objectives and the relevant details.

Recommended action – d-04 Flood risk and SuDS

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The final drawings should illustrate any flood mitigation measures and/or SuDS, including any necessary calculations and engineering details that may be required for the proposed arrangement.

The BREEAM Healthcare assessor will require evidence of any flood risk assessments, mitigation measures to minimise the risk of localised flooding, and measures to prevent the pollution of watercourses.

The CEMP should describe a methodology to prevent uncontrolled discharge of water, the site's drainage system, consents required for discharge of water to existing sewer systems or surface water, and a water testing regime for water treatment and monitoring prior to discharge.

In addition, it should include an emergency preparedness plan in response to flood risk on site and measures that should be implemented to prevent any uncontrolled discharge to the ground/groundwater. No discharge to groundwater can be made without appropriate consent from the Environment Agency.

Recommended action – d-05 Future-proofing

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The objective to ensure that the development is future-proofed should be made clear to all contractors at the procurement stage in order to avoid site works and alterations.

The site manager should ensure that important details that affect the longevity and maintenance of the development are adhered to or are altered/developed within informed constraints.

Recommended action – d-06 Health and well-being

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The BREEAM Healthcare assessment should be finalised at this stage.

The health and well-being section of BREEAM Healthcare requires daylight calculations and evidence of lighting specification (glare and flicker control and lighting levels) and design (zones and controls), thermal comfort and control, acoustic performance, contamination control, safety, air quality and low internal pollution levels.

Outdoor spaces should be designed to reflect the principles highlighted in ‘Recommended action – c-06 Health and well-being’ with respect to accessibility and design quality. Designs should be sufficiently detailed to provide clear instructions to the contractors and ensure that the landscape is maintainable.

The CEMP should outline measures to mitigate the impact of construction activities such as dust and mud, hazardous substances, pollutant gases, noise and vibration.

**Recommended action – c-06 Health and well-being
BREEAM Healthcare**

Recommended action – d-07 Energy and carbon emissions

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At the tendering stage, the project's energy/carbon advisers should specify the correct systems and equipment required for the chosen strategy. They should also engage with potential contractors and users before the project lead makes any procurement commitments.

The BREEAM Healthcare assessor should gather any relevant information and KPIs to complete the assessment at this stage. Part of the evidence should be supplied by engineering and architectural drawings and calculations before sign-off, and other information should be verified by the tender specification, requiring evidence from suppliers.

The CEMP should describe the KPIs and methods needed for monitoring and reporting on carbon-dioxide emissions arising from site activities.

Recommended action – d-08

Transport

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Any signed-off drawings should accommodate the travel plan's objectives.

The BREEAM Healthcare assessor will require evidence about cyclist facilities, pedestrian and cyclist safety, car-parking capacity, travel information space/s and delivery/waste accessibility.

During construction, the site contractor should have a strategy for minimising site deliveries and off-site disposal, and have in place traffic management plans to reduce local traffic impacts (to be agreed with highway authorities). This should be described in a detailed CEMP.

Recommended action – d-09 Water use

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Clarification should be sought during the tendering process – and before any contractual commitments have been made by the project lead – that water-efficient fittings and systems have been specified.

The BREEAM Healthcare assessor will need evidence that sustainability objectives have been achieved up to this stage of the development. He/she will seek evidence on the implementation of a water strategy and the specification of:

- * water-efficient fittings;
- * leak-detection systems/devices;
- * automatic water-supply shut-off systems;
- * water recycling strategies; and
- * irrigation systems.

Specified requirements, KPIs and a methodology for monitoring and reporting on water consumption during construction should be included by the site contractor in the CEMP before site mobilisation.

Recommended action – d-10 Materials

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The BREEAM Healthcare assessor should gather evidence about the materials, finishes and hard landscaping with respect to their environmental rating and design robustness. Evidence of responsible sourcing should be collated from contractors and suppliers.

Design details may need to be amended in accordance with procured construction systems and specific material properties, but should always be within the sustainability parameters committed to by the project lead. (For example, are off-site preformed materials a sustainable cost-effective procurement solution?)

The CEMP should also commit to the responsible sourcing, and the low environmental impact, of materials to be used on site during construction (for example certified timber).

Recommended action – d-11 Waste

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The drawings and tender documents should ensure that there is adequate provision for storage areas, access routes and systems related to waste segregation and waste reduction. Before sign-off, any technical and design issues should be clarified in tender negotiations.

The BREEAM Healthcare assessment requires evidence of storage for recyclable waste, compost and compacting plant.

As part of the CEMP, an SWMP must be prepared before the site mobilisation stage in accordance with the Site Waste Management Plans Regulations 2008.

[Site Waste Management Plans Regulations 2008](#)

Recommended action – d-12 Land use and ecology

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Design details and site instructions should reflect the ecologist's recommendations for enhancements to the site's ecology during works. This will be required as evidence for the BREEAM assessment and to comply with relevant legislation.

The CEMP should describe work to be undertaken in accordance with an approved ecological/landscape management plan for the protection of features of ecological value as identified in the baseline assessment.

Recommended action – d-13 Pollution

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The BREEAM Healthcare assessor will require evidence of measures to reduce the potential for pollution.

Methodologies for mitigation of pollution arising from site activity are an important part of the CEMP, as described in section e-02 “Local environment”.

Recommended action – e-02 Local environment

Construction (e)

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This is the stage between site mobilisation and handover of the building.

The key activities during this phase are site management, regular monitoring and reporting in accordance with the methodology set out in the CEMP and SWMP, commitment to the CCS, and site issues associated with design quality and sustainability.

Considerate Constructors' Scheme (CCS)

Commitment

6149

The contractor should commit to ensuring that site activity causes minimum disruption for the community and environment. This can be achieved by submitting the CCS and CEMP report before the site mobilisation stage.

The contractor should manage the construction site against the CCS code of practice and as described in the CEMP. The contractor should aim for the higher levels of CCS compliance.

Changes to the design and any instructions issued by the design and engineering team, which may be required during the course of site works, should be approved by the project lead or an appointed representative. Such alterations should not impact on the sustainability objectives committed to by the contractor.

To manage the complex activities and obligations of a construction site, the contractor should appoint a site manager as a key point of reference and to supervise construction quality and good practice.

Considerate Constructors' Scheme (CCS)

Recommended action – e-01

Community

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All considerate-constructor-scheme-registered sites are given a score indicating the level of performance they have reached against the code of considerate practice. A score of 3 indicates compliance with the scheme; scores of 4 “High level beyond compliance” or 5 “Excellent measures taken” should be sought (visit the CCS website for further information).

Registered sites are monitored by an experienced industry professional to assess their performance against the eight-point code of considerate practice, which includes the categories:

- * **Considerate:** all work is to be carried out with positive consideration to the needs of traders and businesses, site personnel, visitors and the general public. Special attention is to be given to the needs of those with sight, hearing and mobility difficulties.
- * **Environment:** be aware of the environmental impact of the healthcare site and minimise as far as possible the effects of noise, light and air pollution. Efforts should be made to select and use local resources wherever possible. Attention should be paid to waste management. Reuse and recycle materials where possible.
- * **Cleanliness:** the working site is to be kept clean and in good order at all times. Site facilities, offices, toilets and drying rooms should always be maintained to a good standard. Surplus materials and rubbish should not be allowed to accumulate on the site or spill over into the surroundings. Dirt and dust from construction operations should be kept to a minimum.
- * **Good neighbour:** general information regarding the scheme should be provided for all neighbours affected by the work. Full and regular communication with neighbours, including adjacent residents, traders and businesses, regarding programming and site activities should be maintained from pre-start to completion.
- * **Respectful:** respectable and safe standards of dress should be maintained at all times. Lewd or derogatory behaviour and language should not be tolerated. Pride in the management and appearance of the site and the surrounding environment is to be shown at all times. Operatives should receive training on how to deal with the general public.

- * **Safe:** construction operations and site vehicle movements are to be carried out with care and consideration for the safety of site personnel, visitors and the general public. No building activity should be a safety risk to others.
- * **Responsible:** ensure that everyone associated with the site understands, implements and complies with this code.
- * **Accountable:** the CCS poster is to be displayed where clearly visible to the general public. A site's contact details should be obvious to anyone affected by its activities.

Considerate Constructors' Scheme (CCS)

Recommended action – e-02 Local environment

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In addition to the CCS, site activity should be monitored for its impact on the local environment through the CEMP.

The CEMP should consider the following:

- * archaeology;
- * contaminated land;
- * contamination of surface water;
- * contamination of groundwater;
- * flooding;
- * dust and mud;
- * energy and carbon-dioxide emissions;
- * hazardous substances;
- * hoardings;
- * local community;
- * liaison with client or indirect client due to live site;
- * lighting;
- * litter;
- * noise and vibration;
- * odours/vapours/gases/smoke;
- * regulators and special interest groups;
- * transport;
- * visual impacts;
- * waste management;
- * water consumption;
- * wildlife/ecology/biodiversity/habitat/flora and fauna;
- * security; and
- * material resources.

A CEMP should also include:

- * key environmental aspects identified by a thorough site investigation;
- * requirements identified by a sustainability assessment;
- * requirements in relation to the reuse of demolition materials and other site-won (reclaimed) materials;
- * requirements related to credit achievements in the BREEAM assessment;

- * a suggested approach to the assessment of construction-phase environmental risks; and
- * items to be included in the environmental management plan (to be prepared for the construction phase of the project).

BREEAM Healthcare credits construction sites that are managed in an environmentally sound manner in terms of resource use, energy consumption, waste management and pollution.

BREEAM Healthcare

Recommended action – e-03 Design quality

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The appointed site manager and/or site architect are responsible for supervising works on site and making sure that enough detail is provided, the detail is clear and the works are carried out in accordance with design and engineering instructions. If amendments to these instructions are required during construction, they should not compromise sustainability.

Recommended action – e-04 Flood risk and SuDS

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A surface water management plan should be used to manage pollution from the construction site. This forms part of the full CEMP.

CIRIA's C532 – 'Control of water pollution from construction sites: guidance for consultants and contractors' focuses on the potential sources of water pollution from within construction sites and the effective methods of preventing its occurrence. Pollutants include suspended solids, oil, chemicals, cement, cleaning materials and paints.

Wherever possible, the project lead/contractor should install SuDS at the outset of a project to deal with construction site run-off. The SuDS may be retained or modified, as required, as a permanent surface-water treatment facility.

Recommended action – e-05 Future-proofing

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Any changes to site instructions should remain within the intended future-proofing objectives for the building.

Recommended action – e-06 Health and well-being

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Some issues that may affect human health and mitigation methodologies (as described in the CEMP) could include:

- * **dust and mud:** work methods should be such as to minimise dust emissions, as far as reasonably practical (for example by damping down with water and maintenance of access roads). Vehicles leaving the site should be wheel-washed and open loads should be covered;
- * **hazardous substances:** there should be a monitoring regime for the storage, treatment and transportation of hazardous substances;
- * **site hoardings:** hoardings should be reused as much as possible. There should also be a strategy when using hoardings for the purpose of public and on-site safety and of screening the site to reduce visual impact;
- * **lighting:** there should be a strategy for ensuring that site lighting does not inconvenience neighbours (and does not disrupt the site's ecology);
- * **noise and vibration:** working hours should be restricted so as not to be a cause of nuisance to the neighbourhood (this may need to be agreed with the local authority). Seasonal sensitivities with respect to the site's ecology should be taken into consideration (for example the location of the site's activities with respect to woodland during the bird-breeding season). Noisy or vibrating site activities should be located as far as possible from noise-sensitive areas (hospitals, places of worship, schools etc). Plant should be maintained and fitted with effective silencers, where possible;
- * **odours/vapours/gases/smoke:** work methods to minimise odours, vapours and gases should be adopted.

Recommended action – e-07 Energy and carbon emissions

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The CEMP should outline ways to monitor and reduce energy generated by site activities (for example switching off plant that is not in use).

The Environment Agency has created a carbon calculator that calculates the embodied carbon dioxide of materials plus the carbon dioxide associated with their transportation. It also considers personal travel, site energy use and waste management. (Visit the Environment Agency's website.)

[Environment Agency carbon calculator](#)

Recommended action – e-08

Transport

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Local sourcing of materials, off-site construction and waste management will help to reduce haulage to and from a construction site. Site-generated transport should be monitored throughout the construction phase in accordance with the methodology described in the CEMP.

The CEMP should also include a construction traffic management plan (TMP), which is a strategy to control the movement of vehicles, pedestrians and plant that are present on the site. This should be drawn out in a plan showing routes, storage areas, structures, parking, emergency access and exits etc for different phases of the development. The benefits of a TMP are more efficient movement and work progress and pedestrian/workforce safety.

Recommended action – e-09 Water use

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Water consumption during construction should be metered, and the CEMP should describe what measures should be put in place to make sure that water is not wasted. There may also be opportunities to recycle rainwater for secondary uses such as cleaning and spraying (for damping down dust).

Recommended action – e-10 Materials

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The carbon footprint left by the transportation and delivery of materials should be monitored. The results of the contractor's statement of construction efficiency, off-site assembly and local sourcing should be compared with industry benchmarks.

The CEMP should describe how delivered materials should be:

- * stored in accordance with suppliers' recommendations;
- * protected against risk of damage or loss/misdirection; and
- * stored in such a way that they do not impact on the local community and environment.

The skills and technique of assembly should be supervised to ensure that the quality and performance objectives of the design are achieved.

Recommended action – e-11 Waste

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A SWMP forms part of the CEMP and consists of the following nine stages:

- * Allocate a waste champion to be responsible for the SWMP.
- * Record the types and quantities of waste that will be produced during the project.
- * Allocate a waste management option.
- * Allocate waste management sites and ensure Duty of Care is being met.

Note

The Duty of Care is set out in section 34 of the Environmental Protection Act 1990 and associated regulations. The duty applies to any person who produces, imports, carries, keeps, treats or disposes of controlled waste.

- * Organise SWMP training for in-house and trade contractors.
- * Agree SWMPs with main contractors.
- * Plan for efficient materials and waste handling and set KPIs for each waste type/stream.
- * Measure quantities and types of waste produced and compare against agreed parameters.
- * Monitor the implementation of the SWMP and update as necessary.

SMARTWaste is a SWMP tool to help the industry to meet forthcoming legislation and improve waste management. SWMPs provide a structure for systematic waste management at all stages of a project's delivery. They can have a significant impact on the amount of waste the construction industry produces and on how it is subsequently managed.

[Environmental Protection Act 1990](#)
[SMARTWaste](#)

Recommended action – e-12 Land use and ecology

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Construction sites can harm natural habitats. The CEMP should describe how ecological features will be protected. Therefore, an ecology specialist should be appointed to supervise the works on site.

BRE and CIRIA have developed a set of complementary biodiversity indicators that allow the impact of construction projects on biodiversity to be measured (see CIRIA's (2003) 'Biodiversity indicators for construction projects'). CIRIA has also published a number of guidance documents (C650 – 'Environmental good practice on site' and C503 – 'Environmental good practice: working on site') on how to avoid causing harm to wildlife during construction.

These indicators are used by BREEAM Healthcare, which also credits the protection of ecological features during construction.

Biodiversity indicators for construction projects
C650 – Environmental good practice on site
BREEAM Healthcare

Recommended action – e-13 Pollution

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Methods for controlling and reducing pollution from construction activities are described in the CEMP.

Post-construction (f)

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The main objective of this stage is to prepare the building and users for occupation.

The building should undergo a commissioning process in accordance with regulatory requirements and contractual obligations. This is to ensure that the building and equipment is functioning as intended. Seasonal and annual commissioning is also recommended.

At this stage, the project lead/contractor should complete a building user manual and hand it over to the estates/facilities and operational managers.

End-users will have a significant impact on the building's carbon footprint, water consumption and waste produced. For this reason, staff should receive training on the building's operations and the systems put in place to reduce its impact on the environment. This should be carried out at the pre-occupation stage and regularly thereafter for new staff.

Information about sustainable travel arrangements and signs that give information on the efficient use of electrical equipment should be displayed publicly for visitors.

Commitment

6178

The aim of the commissioning stage is to ensure optimum performance of the building under occupancy conditions prior to handover. Commissioning should be monitored by an appropriate team member (appointed at an earlier stage) for compliance with current Building Regulations and with the building's intended performance as specified by the technical design team.

The building user manual is a simple guide that covers information relevant to staff, occupants, tenants and non-technical building managers on the operation and performance of the building. It should contain the following information as a minimum:

- * building services information;
- * emergency information;
- * energy use and environmental strategy;
- * water use;
- * transport facilities;
- * materials and waste policy;
- * re-fit and rearrangement considerations;
- * reporting provision;

* training.

The project lead should appoint an estates/facilities manager and ensure that all staff are informed about the building design and performance prior to occupation.

It should be the estates/facilities manager's role to disseminate the building user manual and update it, when required.

Recommended action – f-01 Community

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Visitor and patient areas, as well as shared community facilities, should have proper signage with information that goes beyond safety and access. Information may be required to support such objectives as energy and water conservation and waste recycling.

Controls for internal environmental conditions (such as light switches and space-heating controls) should be unambiguous and accessible to authorised users.

A document to describe the location, access to, and use (especially by those with special needs) of shared facilities should be provided to all parties involved in the consultation exercise.

Recommended action – f-02 Local environment

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The transition from construction site to operational building may have both positive and negative impacts on the local environment. The project lead should:

- * establish a final landscape management plan and outline the procedures for monitoring and evaluating the management plan;
- * explore and support local employment opportunities;
- * seek the inclusion of the local community in the opening and use of the new development.

Recommended action – f-03 Design quality

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Design quality is assessed as part of the agreed quality assurance process.

Any maintenance information that pertains to safeguarding the intended longevity and sustainability of the building should be made available to the project lead/ estates manager.

Recommended action – f-04 Flood risk and SuDS

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Any engineered works in relation to flood mitigation, including pollution filtration installations and SuDS, should be checked before the development becomes operational.

The building user manual should provide information to the estates manager about flood mitigation measures, the emergency flood response plan and the maintenance requirements of water management systems such as drains and SuDS.

Recommended action – f-05 Future-proofing

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All design intentions for future-proofing the development should be made available to the project lead/estates manager.

Project designers and engineers are obliged to make available as-built drawings at handover.

Recommended action – f-06 Health and well-being

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Sound insulation tests should be in accordance with BS EN ISO 140-4 and BS EN ISO 140-7. Tests should be carried out by a body accredited by the United Kingdom Accreditation Service (UKAS) or the Association of Noise Consultants (ANC).

Airborne and impact sound insulation, indoor ambient noise levels and reverberation times should comply with recommended performance benchmarks for each type of noise-sensitive space as set out in Health Technical Memorandum 08-01 – ‘Acoustics’. Remedial work should be carried out if performance standards are not met. Health Technical Memorandum 08-01 sets out a programme of acoustic performance testing.

All lighting installations and their corresponding control systems should form part of the commissioning works to be carried out post-completion. Tests should be performed on auxiliary systems such as daylight and passive infrared (PIR) sensors, glare and flicker control, sun pipes etc.

Health Technical Memorandum 08-01 – ‘Acoustics’

Recommended action – f-07 Energy and carbon emissions

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Most of the equipment tested during the commissioning process will relate to the building's energy consumption during operation. This is therefore a critical step for ensuring that the energy performance is satisfactory and fine-tuned to its optimum efficiency and that the building is prepared for occupancy and monitoring.

Airtightness tests (mandatory for non-domestic buildings) can be used to identify air-leakage points, which can lead to increased heat losses and therefore increased heating requirements.

BREEAM Healthcare credits developments that recognise and encourage an appropriate level of building services commissioning that is carried out in a coordinated and comprehensive manner to ensure optimum performance of the building under occupancy conditions.

BREEAM Healthcare

Recommended action – f-08

Transport

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The travel plan should be completed and signed off before occupancy. It should be tailored to the unique characteristics of the site location and may include both physical and behavioural measures to increase travel choice and reduce reliance on single-occupancy car travel.

Travel plans can:

- * reduce on-site parking congestion;
- * improve accessibility of a site by all modes of transport;
- * reduce the cost of commercial travel for a business;
- * support staff retention and recruitment through improved accessibility;
and
- * promote the corporate social responsibility (CSR) credentials of an organisation.

Recommended action – f-09 Water use

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Water systems should also be commissioned and described in the building user manual. Commissioning should reduce the likelihood of wastage and leaks during operation.

Recommended action – f-10 Materials

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Information on how to best maintain the building fabric should be passed on to the project lead/estates manager at handover.

The building user manual should include the environmental policy on materials, with particular regard to sustainable procurement, to ensure good practice in operational and maintenance purchasing requirements.

Recommended action – f-11 Waste

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Systems relating to the waste strategy, such as wheeled bins with electronic chips and compactors, should be commissioned at this stage.

The waste policy should form part of the building user manual in order to inform the estates manager about the intended waste management strategy and the operation of systems installed to support the strategy.

Recommended action – f-12 Land use and ecology

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The landscape and wildlife management plan should be passed on to the estates manager or the person appointed with the responsibility of maintaining and monitoring the site's biodiversity during the operational phase.

The management plan should take into account the effects of climate change (for example extreme weather conditions such as drought, storms and heavy rainfall).

Recommended action – f-13

Pollution

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The building user manual should emphasise the adopted pollution prevention policy so that procurement of materials and systems during operation is in line with sustainable objectives.

Operation (g)

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Operation (g)

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At this stage, the key activities relating to sustainability include management, monitoring, reporting and post-project evaluation.

The project lead should develop a programme for monitoring the different aspects of the building which were intended to influence its sustainability performance. Monitoring could be in the form of user surveys, meter readings and third-party surveying. A philosophy of continuous improvement should be adopted.

Commitment

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Once a sustainable building is ready to receive staff and visitors, the users' behaviour will determine whether the facility is truly sustainable.

The project lead should appoint a person with responsibility for maintaining sustainability.

The Good Corporate Citizen self-assessment test should be used to assess and improve operational behaviour in key areas such as transport, procurement, facilities management, employment and skills, and community engagement.

After a month of occupation, the estates/facilities manager is encouraged to commission a BREEAM Healthcare "existing buildings" assessment. A pre-assessment estimator is used to identify issues and improve the sustainability of the building and operations.

After a year of occupation, an "operational stage" BREEAM Healthcare assessment is required not only to verify the intended performance but also for formal design and procurement certification. (BREEAM Healthcare credits contractors that appoint an appropriate team member to carry out seasonal commissioning during the first year of occupation.)

[Corporate citizen website](#)
[BREEAM Healthcare](#)

Recommended action – g-01 Community

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Healthcare organisations can help to improve the health of local people, promote social cohesion and regeneration, and tackle health inequalities. The management board should conduct community surveys to assess whether the facilities are serving their intended purpose.

Recommended action – g-02 Local environment

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Neighbourhood surveys should be used to identify any problems caused by the presence of a healthcare/social care facility which are impacting on the local environment and community's health and well-being, such as traffic congestion and noise. This information can then be used to instigate improvements to the facility throughout its operation.

Recommended action – g-03 Design quality

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User surveys should also be conducted to gauge the success of a design using the principles in AEDET Evolution and ASPECT against user perception and maintenance issues.

Assessments can also be made through existing programmes such as CABA's "healthy hospitals" campaign, which commissioned research to look at nurses' opinions of their working environment, illustrating how the quality of hospital environments impacts on hospital staff, patients and visitors.

[AEDET Evolution](#)

[ASPECT](#)

[CABA's Healthy Hospitals](#)

Recommended action – g-04 Flood risk and SuDS

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Estates/facilities and operational managers should assess the effectiveness of water management systems, rainwater harvesting systems, SuDS etc and monitor any local flooding problems in order to introduce mitigation measures where necessary.

Recommended action – g-05 Future-proofing

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The healthcare organisation should regularly assess the building's adaptability to future needs and change and whether it is conducive to ease of maintenance. The findings could be used as a learning resource for future developments.

Recommended action – g-06 Health and well-being

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In addition to the BREEAM Healthcare “existing buildings” assessment, issues relating to health and well-being can also be assessed against ASPECT’s criteria with respect to user perception (staff and visitors) through surveys.

A healing environment should be continuously improved through such assessments; users and visitors are the most valuable source of information.

Some of the results drawn from surveys about hospital environments in CABE’s “healthy hospital” campaign include the following:

- 32% of the people surveyed prioritised space;
- 22% talked about light;
- 16% talked about the need for fresh air;
- 16% picked cleanliness as an important factor;
- 12% talked about a warm, friendly atmosphere;
- 11% wanted to see colour;
- 10% wanted more gardens;
- 9% wanted more privacy;
- 5% wanted more use of technology;
- 5% were concerned about noise levels.

BREEAM Healthcare

ASPECT

CABE’s Healthy Hospitals

Recommended action – g-07 Energy and carbon emissions

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Occupants should be asked about their satisfaction with their internal environment in terms of thermal comfort, fresh air and ease of control using standard surveys such as the PROBE (post-occupancy review of buildings and their engineering) questionnaire, or similar.

Temperature, lighting and humidity levels within different parts of a building can be measured throughout a year to compare data to occupant feedback.

PROBE was a research project that ran from 1995 to 2002 under the Partners in Innovation scheme.

The performance of low-carbon and renewable-energy generation systems should be monitored and reported as a learning resource for future projects.

Seasonal commissioning is credited by the BREEAM assessment method and can help estates/facilities and operational managers fine-tune energy-consuming systems and equipment to their optimum performance.

PROBE (post-occupancy review of buildings and their engineering) questionnaire

Recommended action – g-08 Transport

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Recommended action - g-08 Transport

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With a travel plan in place at project completion, estates/facilities and operational managers should continue to improve and update the plan during occupancy.

Further opportunities to reduce carbon emissions from transport include the provision of a wider range of health and other services within the community, an increase in the amount of information and advice available (for example telephone helplines or authoritative Internet advice such as NHS Direct) without the need to visit healthcare facilities, and replacing petrol- or diesel-powered fleet vehicles with low- or zero-fossil-fuel vehicles.

A transport survey for regular and irregular users to the facility can help inform decisions and provide a baseline against which improvements to the travel plan can be introduced. A survey should assess the modes of transport that staff and visitors use and should identify morning and evening peak hours on the local road network. The survey should identify the volume of vehicular and non-vehicular traffic generated, vehicle occupancy levels and the directions in which staff and visitors are travelling. It should also determine whether:

- * public transport information is sufficient;
- * any difficulties have been encountered; and
- * commitments implemented in the travel plan (such as car sharing or a remote health information service) are achieving their aims to reduce single-occupancy vehicle use, to increase public transport use, and to encourage physical activity such as walking/cycling.

Recommended action – g-09 Water use

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Monitoring of water use during occupancy is beneficial for self-assessment and benchmarking.

Regular maintenance of water-related systems and auxiliary equipment, such as meters and leak detection systems, will ensure that wastage does not go unnoticed.

The use of water, as with energy, is dependent on user behaviour. Creating awareness of water conservation among staff and visitors is therefore recommended.

Recommended action – g-10 Materials

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Recommended action - g-10 Materials

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Healthcare organisations should collect information on the performance and maintenance of materials and feed this information back to the healthcare sector and construction industry.

Recommended action – g-11 Waste

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Surveys should ask whether waste storage and access facilities are sufficient and whether problems have been encountered in the management of waste.

Continuous monitoring of waste using technology such as microchips for weighing segregated waste will help benchmark performance.

Recommended action – g-12 Land use and ecology

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A qualified ecologist should be commissioned to monitor the site's biodiversity, assess the effectiveness of ecological enhancements and propose any adjustments that may be required as a consequence of changes to the climate.

Recommended action – g-13 Pollution

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The development's low pollution policy should be observed throughout the operation of the facility for all procurement and maintenance requirements.

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The internal levels of pollution can also be measured through routine environmental monitoring by third-party quality-control tests.

End of life (h)

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End of life (h)

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Ownership of the property or equipment should remain with the project lead throughout the period of the lease.

A lease is a legal document to show an agreement between the project lead (landlord) and the users of a property or equipment.

This stage defines the end of the healthcare organisation's tenancy agreement, hence implying opportunities for conversion or change of use, or demolition when there is no environmental and financial benefit from reusing the building.

For other procurement routes, at the end of the lease term (typically 25 years from completion) the default position is that the tenant can "walk away" leaving the project company as freehold owner to dispose of the property by conversion, demolition or otherwise. Alternatively, the tenant may negotiate an extension to the lease or exercise a right to "buy back" the freehold of the property from the project company.

Commitment

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This stage marks the point at which the healthcare organisation's management team has made a decision to vacate a facility and is in a position (depending on the procurement route/contractual agreement) to decide whether to decommission, recycle or demolish the building or space that they occupied.

This section assumes that, whichever procurement route is chosen to develop the facility, all opportunities to adapt and refurbish the building to the changing needs of the healthcare sector have been explored and undertaken throughout the life of the building/lease agreement.

Preference should always be given to refurbishment, which could be a better way of reducing long-term carbon-dioxide emissions.

In the first instance, the owner or landlord of a healthcare facility is responsible for evaluating the condition of the estate and investigating opportunities for reuse in response to strategic service and planning requirements. This is done through existing frameworks such as an updated SSDP and through discussions with the LPA.

In addition, the owner of the healthcare facility should make sure that whatever happens to the estate is done in the most sustainable manner possible.

A plan should be produced to mitigate any impact on the community and the environment.

Recommended action – h-01 Community

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SSDPs should be updated regularly (preferably annually). Ideally they should be prepared with the participation of local healthcare representatives, community and voluntary groups, and local government. This will identify current and local gaps in healthcare and social care service provisions that may be housed within a reconfigured existing facility.

The vacation of a building is also an opportunity to give something back to the community. Community engagement and discussions with local authorities should take place to identify new uses for public services and facilities (such as for education, housing, recreation and integration).

The Prince's Foundation's "Enquiry by Design" planning tool is recommended for bringing interested parties together to collaborate on a vision for a vibrant community and influence the final outcome.

If any works are to take place on site, an environmental management plan should describe the measures for minimum impact on the local community.

[Prince's Foundation for the Built Environment: Enquiry by Design](#)

Recommended action – h-02 Local environment

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The LPA should incorporate the estate into a strategic plan for local redevelopment and improvement.

Improvements to the local environment could include:

- * enhancing green and open communal spaces to the public and making them accessible;
- * introducing play areas (local area for play (LAP), local equipped area for play (LEAP) and neighbourhood equipped area for play (NEAP)).

LAP, LEAP and NEAP are defined in the Fields in Trust's (FIT) 'Planning and design for outdoor sport and play', which gives useful advice on the detailed requirements for different types of children's play space based on the current national thinking reflected in CLG's (2002) Planning Policy Guidance 17 – 'Planning for open space, sport and recreation'.

- * "greening" public spaces and introducing green corridors for ecology and safe pedestrian/cycling routes;
- * improving public transport services to reduce the use of cars in the area;
- * improving the safety of the area using "Secured by Design" principles traffic-calming and well-lit overlooked routes.

Best practice advice on improving urban spaces can be found in CLG/CABE's (2000) 'By design – urban design in the planning system: towards better practice'.

A new environmental management plan should describe the measures that should be taken during site works to mitigate any negative impact on the local environment.

[Fields in Trust \(FIT\)](#)

[Secured by Design](#)

[By design – urban design in the planning system: towards better practice](#)

Recommended action – h-03 Design quality

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A decision to demolish a building may mean that the materials chosen and maintenance of the fabric were poor; it is valuable to understand why this has happened and what can be improved in future developments.

If the facility is poorly designed in terms of its spatial arrangements and function, it should be ascertained whether there is potential for improvement. AEDET Evolution and ASPECT should be used to understand existing issues. Expert advice could then be sought to propose changes for making good and modernising the facility.

AEDET Evolution
ASPECT

Recommended action – h-04 Flood risk and SuDS

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The disposal of an estate can be an opportunity to restore the natural water and hydrogeological cycles of external surfaces.

Increasing the permeability of surfaces can help to address local flooding problems, which may have increased as a consequence of climate change. Updated information about flood issues around the site can be found from the estates/ facilities and operational managers, from the Environment Agency's flood maps and from climate change updates on UKCIP.

[Environment Agency: flood maps](#)

[UK Climate Impacts Programme \(UKCIP\)](#)

Recommended action – h-05 Future-proofing

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The decision to demolish a building might point to a failure of the future-proofing strategy. It is therefore worth evaluating why the intended flexibility to growth and change has not been as successful as intended.

If demolition is necessary because of other factors, such as poor maintenance, future-proofing should at least ensure that it is feasible to reclaim construction materials for reuse.

Recommended action – h-06 Health and well-being

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When vacating a building, there may be opportunities to improve the local environment by promoting healthier lifestyles and a cleaner atmosphere (see the examples in 'h-02 Local environment').

The new environmental management plan (EMP) should include mitigation measures to reduce the impact of noise, dust and other forms of pollution that may affect the health and well-being of the community and local environment.

Recommended action – h-02 Local environment

Recommended action – h-07 Energy and carbon emissions

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The refurbishment of existing buildings rather than demolition saves embodied energy and makes a valuable contribution to avoiding carbon emissions.

If a decision is made to demolish the building, reclaiming materials will also contribute to savings of embodied energy, in particular if the materials are reused/ stored on the same site or within the locality, thus potentially reducing emissions from transportation.

If the energy to the existing facilities is supplied by low-carbon and renewable energy technology that can continue to serve other buildings in the vicinity, the feasibility of such options should be investigated.

Recommended action – h-08 Transport

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The disposal and redevelopment of a vacated site is an opportunity to improve the sustainability of transport in the area (such as by linking existing cycle paths, introducing new pedestrian links or improving connectivity to public transport services).

Site works during demolition or any other form of site works should aim to reduce the number and frequency of vehicles coming to and leaving the site. The intended strategy should be described in the EMP.

Recommended action – h-09 Water use

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An environmental management plan for any works to be carried out following a decision to dispose or redevelop the area should describe a methodology for controlling, monitoring and reporting on water consumption.

Existing rainwater systems can be used for cleaning and other uses during site works to reduce the use of potable water.

Recommended action – h-10 Materials

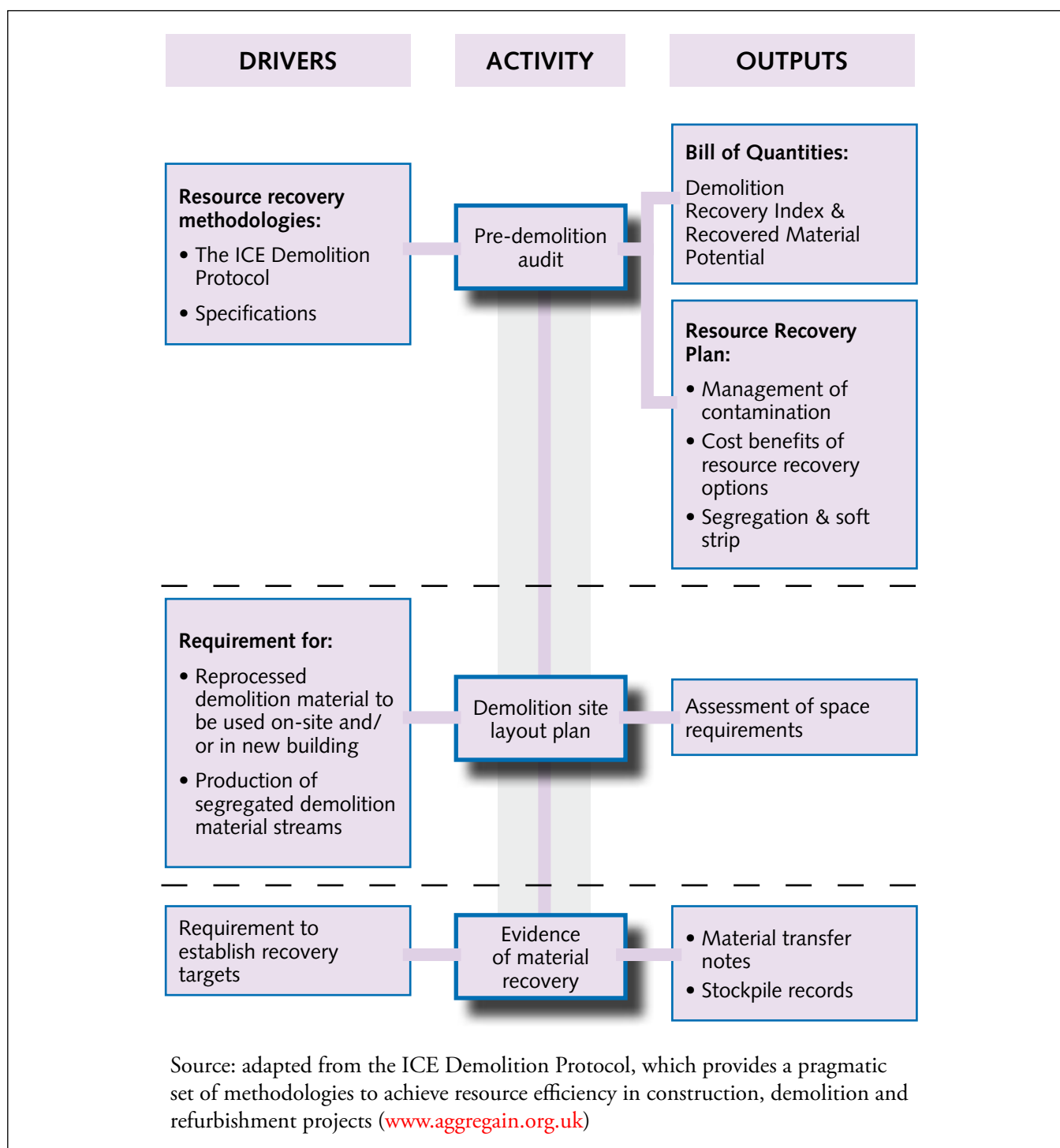
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The potential to reclaim construction materials from existing buildings depends on the type of material. WRAP's AggRegain demolition module provides guidance on a methodology for reclaiming demolition materials (see figure below – source: adapted from the ICE Demolition Protocol, which provides a pragmatic set of methodologies to achieve resource efficiency in construction, demolition and refurbishment projects). This methodology should be used to structure the demolition waste management plan (see 'h-11 Waste'):

- * The potential of a building should be assessed for maximum material recovery.
- * A demolition bill of quantities (D-BOQ) should be produced, which identifies tonnages and potential applications of materials.
- * A demolition recovery index (DRI) should be created from the D-BOQ, providing a quantifiable measure of the potential for recovery of the materials.
- * An informed approach to material segregation should be taken, considering the potential impacts of contamination and cost benefits.

A pre-demolition audit can be carried out using BRE's SMARTAudit methodology, which applies a mapping system to identify key demolition products (KDPs) generated from a demolition project (for example timber, concrete, bricks and blocks).



Key activities, drivers and outputs involved in the demolition process to achieve best practice

Recommended action – h-11 Waste
 WRAP’s AggRegain demolition module
 SMARTAudit

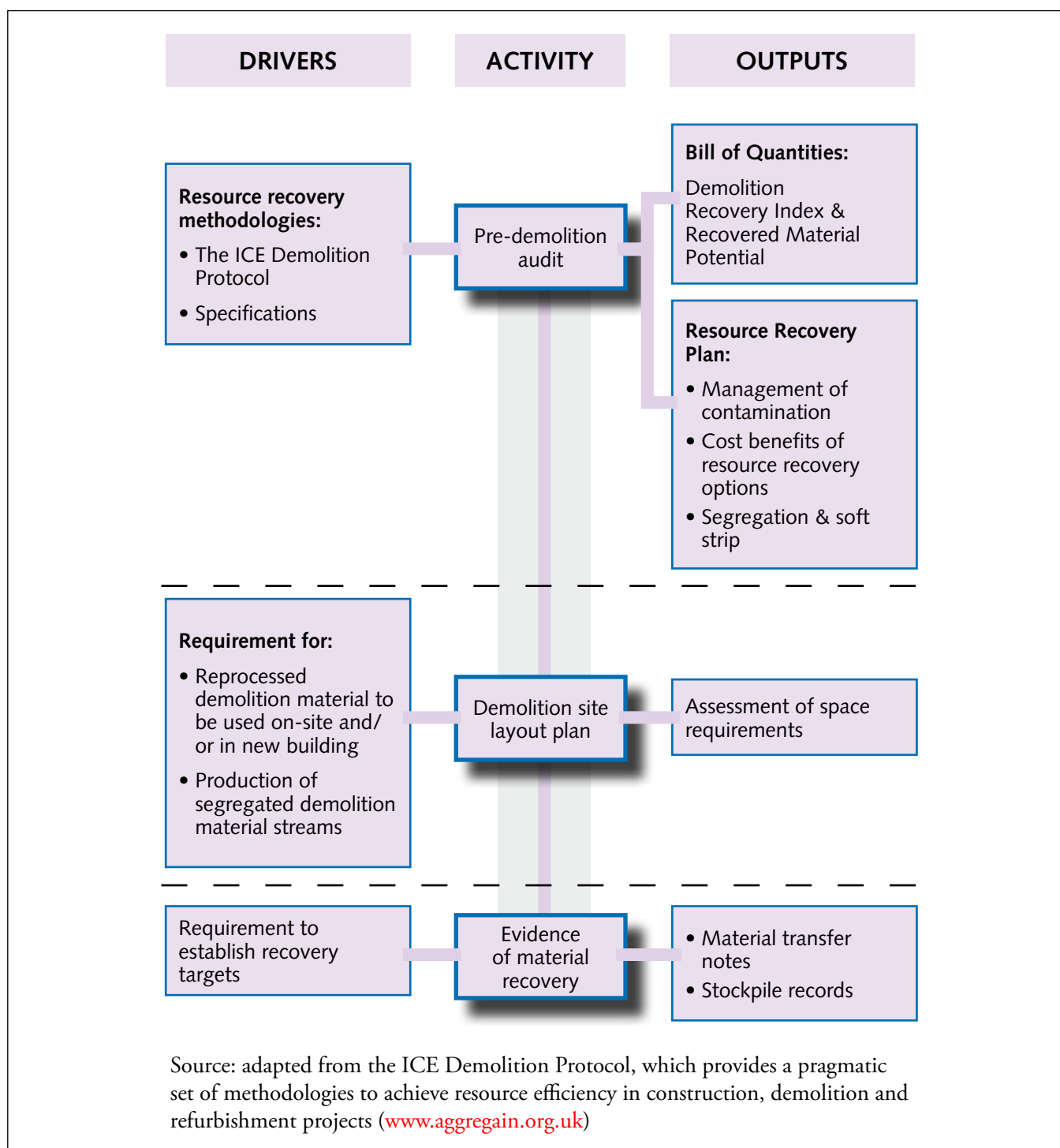
Recommended action – h-11 Waste

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A demolition waste management plan (similar to a SWMP) should be prepared as part of the CEMP prior to any works on site. This should have the primary aim of segregating reclamation waste and reducing waste to landfill, and should be based on the ICE demolition protocol with guidance from WRAP's step-by-step demolition module (see 'Recommended action – h-10 Materials'; and 'Key activities, drivers and outputs involved in the demolition process to achieve best practice' – source: adapted from the ICE Demolition Protocol, which provides a pragmatic set of methodologies to achieve resource efficiency in construction, demolition and refurbishment projects).

Materials that cannot be salvaged or reused should be recycled whenever possible. There are a large number of organisations throughout the UK taking equipment and preparing it where possible for reuse or alternatively recycling components. The local council should be contacted for advice on the location of local recycling centres.



Key activities, drivers and outputs involved in the demolition process to achieve best practice

Recommended action – h-10 Materials

ICE Demolition Protocol

WRAP (Waste & Resources Action Programme)

Recommended action – h-12 Land use and ecology

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An opportunity for improvement to the local environment is to ecologically enhance a disposed site.

It is recommended that ecology and tree surveys are carried out or updated by a qualified ecologist and arboriculturalist, similar to the baseline work carried out at the scoping stage of the development. Any ecological/landscape management plan used during the estate's operation could be used to update this information.

The surveys should then be used to inform the work to be carried out to enhance the site following disposal.

ICE Demolition Protocol

Recommended action – h-13 Pollution

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An environment management plan prepared for demolition works should include a methodology for investigating potential sources of air, water and ground pollution and on control measures to be applied during works.

Case study 1 – Breathing Space Centre, Rotherham

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For further case studies, see SHINE’s website: the learning network for sustainable healthcare buildings.

An example of an energy-efficient and healthy respiratory centre



Perspective view of the Breathing Space Centre in Rotherham

[SHINE website](#)

Context

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The Breathing Space Centre is the hub for the largest respiratory rehabilitation programme in the country. The £11 million national pilot, which includes a purpose-built facility on the site of the former Badsley Moor Lane Hospital near the centre of Rotherham, will offer bespoke rehabilitation in a community environment. The project is the result of a partnership between the Coalfields Regeneration Trust (CRT), Rotherham Primary Care Trust (RPCT) and Rotherham Metropolitan Borough Council (RMBC). Around £7 million of the funding came from the Office of the Deputy Prime Minister (ODPM) via the CRT, with the remainder from the PCT.

There was a clear need for a specialist facility in the region. Because Rotherham and South Yorkshire has a history of mining and heavy industry, chronic

obstructive pulmonary disease (COPD) is more widespread here, with one in five deaths in South Yorkshire the result of respiratory disease. Rotherham has nearly twice the national average incidence of COPD.

It is anticipated that nearly 1800 people a year will benefit from the Breathing Space Centre: 950 patients will have individually tailored day and residential rehabilitation programmes, and around 800 people will be given education and support for self-management and lifestyle packages.

Coalfields Regeneration Trust

Implementation – key success factors

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One of the key success factors of this scheme was the clear vision established at the outset. The choice of materials and the heating and ventilation strategy were developed as a direct result of this vision, and this in turn helped to determine the form and construction of the building.

The partnership between the RMBC, RPCT and the CRT was essential to deliver the funding package needed for the Centre. The CRT might not be an immediately obvious partner in a healthcare project, but its aims are in harmony with those of the other project partners, and its support catalysed the funding package.

“Breathing Space is a perfect example of how the CRT can drive forward projects targeting local needs and demands which might otherwise not be possible” (Peter McNestry, vice-chair of the CRT).

Sustainability results

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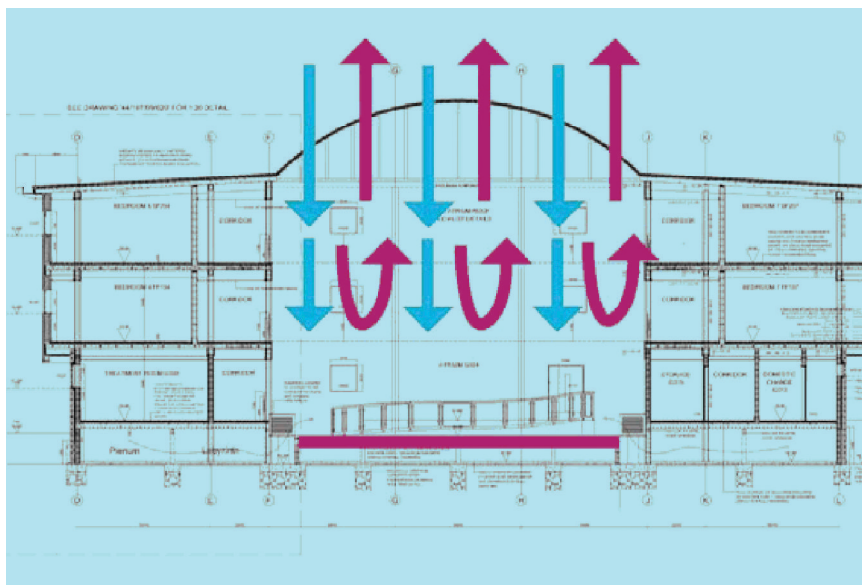
- * Use of ground-source heat pumps (GSHP) to provide heating and hot water, reducing carbon emissions by 40 tonnes per annum (an estimated 37 tonnes of carbon produced per year by the GSHP by comparison with 77 tonnes for heating with natural gas).
- * Solar preheating of hot water provision: the sun’s energy is used as a secondary heating source to preheat the water supplied to a conventional hot water tank.
- * Natural ventilation with thermal mass labyrinth: an underground labyrinth is used to preheat the air in spring and autumn and to cool it in summer. Air is extracted via high-level windows, with fan assistance at high external temperatures. In winter, ventilation enters at atrium roof level in a mixing mode.
- * Careful materials selection to reduce pollution as well as irritation of respiratory conditions.
- * Vapour-permeable external walls to control humidity and remove particulates.
- * Hygroscopic internal walls to control humidity.
- * Use of thermal mass for energy efficiency.

Costs

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- * The overall costs of the pilot project, including two years' running costs, are around £11 million.
- * The “turnkey” building cost is £7.2 million.
- * The GSHPs have running costs of around £6000/year compared with predicted bills of over £8000 for natural gas. Maintenance costs are also anticipated to be low.
- * Initial estimates, including the benefits from natural rather than mechanical ventilation, suggested a reduction in utility costs of £12,500 per year.

Full cost and performance data is not yet available for this building, as construction has only recently been completed; further details will be added once cost and post-occupancy data is available.



Natural ventilation and underfloor heating in winter

Benefits

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- * This project assists RMBC and RPCT in achieving a number of public healthcare objectives (a priority because of the high levels of respiratory disease in this part of the country).
- * It provides support for families and carers of sufferers, enabling them to understand and in turn support the patients better.
- * People will be supported in managing their own condition more effectively (resulting in improved quality of life for them, and at the same time reducing the levels of hospitalisation).
- * Better outcomes in terms of patient management – enabling people to be treated in a community environment rather than in hospital or being isolated in their own homes.

- * Reduction in inappropriate admissions to hospital and reduced lengths of stay when admitted.

Summary

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The key sustainability aspects of this case study are energy efficiency, the heating and ventilation strategy, and the use of healthy materials that would not irritate the respiratory conditions of the building users. The designers had a clear vision of what they wanted the building to deliver, and this informed the whole scheme throughout the design and construction process.

Case study 2 – Innovate Green Office, Thorpe Park, Leeds

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This building has achieved the highest BREEAM rating at the time of writing

"The formal rating system has allowed us to benchmark the scheme against other existing buildings throughout the country and will be used as a tool to inform future projects within the client's portfolio. Achieving such a high EXCELLENT rating also gives recognition to the client and their team, confirming that all their hard work and effort has resulted in a truly sustainable building of which Innovate can be proud." *Mike Bezzano, Mirus Management Services Ltd.*

About the building

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Innovate Green Office at Thorpe Park is a commercial development (4008 m²) that provides office space for small-, medium- and large-sized businesses. The total cost amounted to £6 million.

The site covers approximately one hectare, and the accommodation consists of one three-storey and one two-storey block with a central unheated street atrium.

The University of Leeds has been commissioned to carry out a post-occupancy evaluation study, measuring the building's performance against its environmental design targets. This crucial part of the design process will allow the project lead to ensure that the most successful aspects of the scheme are integrated within future projects.

With a score of 87.55% under the 2005 BREEAM Offices scheme (assessment completed in October 2006), Innovate Green Office is the highest-ever-scoring BREEAM development to date (taken across all the BREEAM schemes).

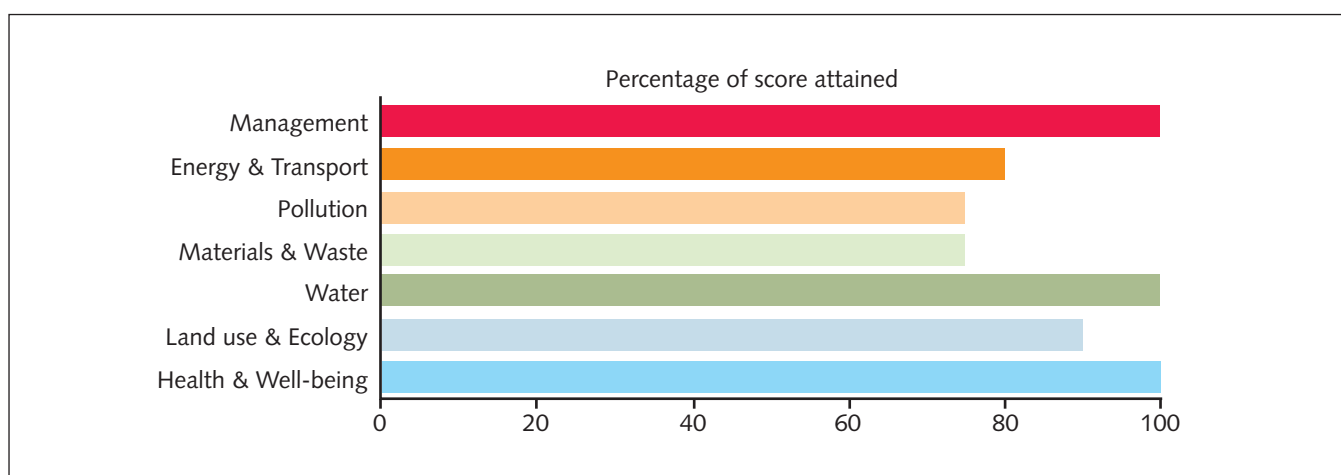


Figure 6 BREEAM percentage scores attained for each category

BREEAM Healthcare

Overview of environmental features

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This development benefits from:

- * high thermal mass;
- * heating and cooling within the building fabric;
- * SuDS wastewater filtration and attenuation system;
- * daylight sensors to internal lighting;
- * absorption chilling;
- * condensing boilers;
- * combined heat and power;
- * rainwater harvesting for WC flushing;
- * waterless urinals;
- * 100% recycled aggregate and 65–80% recycled cement replacement;
- * ecologist's recommendations implemented;
- * permeable roads and paving.

The BREEAM assessment

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The development has achieved a BREEAM “excellent” rating – scoring 119 credits out of a possible 139, making a total percentage of 87.55%. The site has gained full credits for the following BREEAM categories:

- * management;
- * health and well-being;
- * water;
- * ecology.

Other categories achieved close to full credits.

BREEAM Healthcare

Building services

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The development is built of high thermal mass concrete using a Termodeck system. Hollow channels within the fabric allow for heated or cooled air to be passed through for warming or cooling.

The development is naturally ventilated, with good daylighting levels throughout. Lighting control has also been zoned using PIR (passive infra-red) detectors.

A CHP plant backed up by condensing boilers provides the warm air for heating the building and the heat for the ammonia-absorption chillers. Ammonia-absorption chillers were used for their high cooling efficiency and the environmentally-inert behaviour of the gas.

Water consumption has been kept to a minimum by harvesting rainwater for use in WC flushing. The WCs are vacuum-flush and have a water consumption of only 1.2 litres. Further water savings are made through specifying waterless urinals.

Green strategy

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The innovative fabric design is complemented by the use of a high percentage of recycled aggregate, recycled cement replacement, and the specification of certified timber.

All run-offs from the site are dealt with using an extensive SuDS, comprising a large wetland area/balancing pond fed via a lined pond and a new stream/swale.

All hard landscaping is permeable paving with soakaway drainage, while the water run-off from roofs is harvested for toilet flushing. This combination of water handling effectively results in run-off reduction of 100%.

Innovative design, good material and services specifications, good handling and use of rainwater and a sympathetic approach to ecological issues have resulted in the BREEAM “excellent” rating.

BREEAM Healthcare

Key background, guidance and reference documents

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Please note that this is not an exhaustive list.

- * HM Treasury (2008) 'Budget 2008', paragraph 6.59.
- * HM Treasury (2007) 'The Stern Review: the economics of climate change'.
- * Defra (2007) 'Sustainable development indicators in your pocket 2008'.
- * Defra (2007) 'Waste strategy for England 2007'.
- * DfT (2005) 'Visioning and backcasting for UK transport policy'.
- * DH (2008) 'Health effects of climate change in the UK 2008: an update of the Department of Health report 2001/2002'.
- * DH (2004) 'Choosing health: making healthy choices easier'.
- * DH (2004) 'Total waste management: best practice advice on local waste management for the NHS in England'.
- * DH (2004) 'Carbon/energy management in healthcare – best practice advice'.
- * Health Technical Memorandum 07-01 – 'Safe management of healthcare waste'.
- * Health Technical Memorandum 07-02 – 'Encode: making energy work in healthcare'.
- * Health Technical Memorandum 07-03 – 'Transport management and car parking'.
- * Health Technical Memorandum 07-04 – 'Water management and water efficiency'.
- * Health Technical Memorandum 07-05 – 'The treatment, recovery, recycling and safe disposal of waste electrical and electronic equipment'.
- * Health Technical Memorandum 07-06 – 'Disposal of pharmaceutical waste in community pharmacies'.
- * BERR (2007) 'Meeting the energy challenge: a White Paper on energy'.
- * Faculty of Public Health (2008) 'Sustaining a healthy future: taking action on climate change'.
- * HM Government (2005) 'Securing the future: delivering the UK sustainable development strategy'.
- * HM Government (2006) 'Climate change: the UK Programme 2006 – tomorrow's climate, today's challenge'.

- * Intergovernmental Panel on Climate Change (IPCC) (2007) 'Climate change 2007'.
- * Killoran et al (2006) 'Transport interventions promoting safe cycling and walking: evidence briefing'.
- * King's Fund (2002) 'Claiming the health dividend: unlocking the benefits of NHS spending'.
- * King's Fund (2005) 'Sustainable food and the NHS'.

Budget 2008

Sustainable development indicators in your pocket 2008

Waste strategy for England 2007

Visioning and backcasting for UK transport policy

Health effects of climate change in the UK 2008: An update of the Department of Health report 2001/2002

Choosing health: making healthy choices easier

Health Technical Memorandum 07-01 – 'Safe management of healthcare waste'

Health Technical Memorandum 07-02 – Encode: making energy work in healthcare'

Health Technical Memorandum 07-03 – 'Transport management and car parking'

Health Technical Memorandum 07-04 – 'Water management and water efficiency'

Health Technical Memorandum 07-05 – 'The treatment, recovery, recycling and safe disposal of waste electrical and electronic equipment'

Health Technical Memorandum 07-06 – 'Disposal of pharmaceutical waste in community pharmacies'

Meeting the energy challenge: a White Paper on energy

Sustaining a healthy future: taking action on climate change

Securing the future: delivering the UK sustainable development strategy

Climate change: the UK Programme 2006 – tomorrow's climate, today's challenge

Future-proofing of healthcare buildings

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Plan for uncertainty – Design for change

- * Avoid creating new environments for old services and systems
- * Buildings will always have to flex
- * Even new buildings need refreshing as they come into use

Optimise investment

- * Make best use of resources, people and infrastructure
- * Generate a development control plan – dynamic and regularly updated

Invest in quality real estate

- * Avoid bespoke solutions that are closely fitted to suit a specific service plan or even to health
- * Distinguish between core, movable and non-essential – provide appropriately

Master plan the site

- * Look beyond the immediate site boundaries and make best use of local amenities
- * Plan layout and infrastructure strategically

Maximise the potential to expand and contract the buildings and recognise that elements of the building have different life-spans

- * Structure and vertical circulation – 30–60 years
- * Engineering services – 15 years
- * Internal layout – 2–3 years

Distinguish between parts of the building

- * Group activities with similar technical requirements

Create clear and unobstructed circulation routes

- * Avoid cul-de-sacs
- * Position key elements with due consideration (for example lifts, stairs)

Design shape and form to change over time

- * Use networks of spaces – buffers of hard and soft spaces
- * Shell and fit out

Standardise

- * Make more universal room sizes
- * Make four-bed bays convertible to single rooms

Use space as resource not territory

- * Use spaces interchangeably – rooms named by activity not people!
- * Make spaces generic rather than bespoke

Long life, loose fit

- * Embrace sustainable communities
- * Engage with partners and other service providers to optimise the wider community network and infrastructure, ie transport and renewable technologies