

# Unit 3: Managing in the Natural and Built Environment

Unit code: T/504/4337

QCF level: 6

Credit value: 15

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## Aim

This unit gives learners an understanding of the close relationship that exists between the natural and built environments, the environmental challenges that cause actual and potential conflict between these environments. The unit also gives learners an understanding of management processes and techniques to be applied for best practice solutions to environmental issues.

## Unit abstract

Many of the challenges with the potential to disturb the delicate balance between the natural and built environments have been dealt with previously using 'predict and supply-led' approaches that have often proved less effective than expected. 'Demand-led' processes are currently evolving in an attempt to maintain a more effective sustainable balance.

The use of whole-life costing techniques and other modelling systems supports and informs the crucial decision-making process in which sustainability and measured environmental impact are key elements in low carbon design strategies.

Low or zero carbon policies and strategies are at the forefront of technological innovation and sensible efforts must be made to harness all the positive opportunities arising from this rapidly evolving situation, in particular those relating to improved employment opportunities and 're-tooling' within the construction industry.

Arising out of these challenges and opportunities is a new professional discipline – building engineering physics. This reinforces the need for management processes and critical decision making to be undertaken using a holistic, multi-disciplinary approach.

## Learning outcomes

### On successful completion of this unit a learner will:

- 1 Understand influences on the management of the natural and built environments
- 2 Be able to measure the environmental impact of a building development, using appropriate techniques
- 3 Understand the impact of environmental issues on the construction sector.

## Unit content

### 1 Understand influences on the management of the natural and built environments

*Agencies that influence management of the natural and built environments:* tackling climate change, e.g. cutting emissions, meeting energy demand, corporate social responsibility, biodiversity; agencies, e.g. Department of Transport (DoT), Department for Environment, Food and Rural Affairs (Defra), Office of Electricity Regulations (OFFER), Water Services Regulation Authority (OFWAT), National Rivers Authority (NRA), interest groups such as Campaign for the Protection of Rural England (CPRE), National Farmers Union (NFU), The Environment Agency, English Heritage; European Commission, United Nations

*Environmental priorities and commercial goals:* infrastructure, e.g. provision, priorities; infrastructure sectors; network operators; changing logic of network operators; new technologies; coalition of interest; marketing strategies; regulatory regimes; beneficial investment; maintaining biodiversity and natural habitat; other considerations, e.g. social, cultural

### 2 Be able to measure the environmental impact of a building development, using appropriate techniques

*Performance:* asset performance; aesthetics; analysis of sustainability techniques used in a building design; use of sustainable materials; balance of high specification/quality of materials used with lower running and maintenance costs; value for money; beneficial investment

*Impact of a building:* environmental impact; location; aesthetics; sustainability issues; extraction and transportation of raw materials; noise, dust, dirt and disturbance during construction; use of hazardous materials

*Life cycle considerations:* reliability; form of structure, e.g. timber frame, pre-fabricated; use may be made of Building Research Establishment's *Green Guide* and *Environmental Profiles Methodology 2008*

*Methods to minimise environmental impact:* sustainable design, e.g. improved energy efficiency; reduced embedded energy; specification of sustainable materials; recycling of materials and components; improved site management, e.g. use of sustainable construction techniques, sharing of good practice, improved waste management

### 3 Understand the impact of environmental issues on the construction sector

*Impact of climate change on operational aspects of buildings:* climate change, e.g. change in average temperatures, average rainfall, flooding, weather patterns; regulations, e.g. local, European, building; passive and active low energy design strategies; systems analysis; software resources, e.g. Computerised Maintenance Management Systems (CMMS); the use of Building Performance Metrics and Headline Indicators

*Carbon reduction strategies:* strategies, e.g. carbon emission targets, carbon offsets, designation of low carbon economic areas, use of renewable construction materials, building insulation, zero carbon homes, carbon neutral buildings

*Impact of carbon reduction strategies on the operational aspects of buildings:* on-site energy generation; energy regulations; use of low embodied energy construction materials; improved waste management techniques; development of low carbon designs

## Learning outcomes and assessment criteria

<b>Learning outcomes</b> On successful completion of this unit a learner will:	<b>Assessment criteria for pass</b> The learner can:
LO1 Understand influences on the management of the natural and built environments	1.1 Evaluate the influence of agencies on the management of the natural and built environments 1.2 Critically analyse the relationship between environmental priorities and commercial goals for a project
LO2 Be able to measure the environmental impact of a building development, using appropriate techniques	2.1 Evaluate the performance of a building in relation to environmental parameters 2.2 Evaluate the immediate impact of a building within its context 2.3 Assess the environmental impact of a building over its life cycle within its context 2.4 Develop a proposal which minimises the environmental impact of a proposed building project within its context
LO3 Understand the impact of environmental issues on the construction sector	3.1 Evaluate the impact of climate change on the operational aspects of buildings 3.2 Evaluate current carbon reduction strategies within the construction sector 3.3 Analyse the impact of carbon reduction strategies on the operational aspects of buildings

## Guidance

### Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

The learning outcomes associated with this unit are closely linked with:

Level 4	Level 5	Level 6
Unit 1: Design Principles and Application for Construction and the Built Environment (D/601/1245) Unit 10: Building Services Design, Installation and Maintenance in Construction (R/601/1260) Unit 13: Environmental Impact of Construction (A/601/1270)	Unit 8: Technology of Complex Buildings (J/601/1255) Unit 19: Building Control Procedures and Legislation (K/601/1278) Unit 20: Construction Methods and Design Solutions (M/601/1279) Unit 47: Energy Utilisation and Efficiency for Building Services Engineering (F/601/1366)	Unit 1: Major Project (Y/503/7221) Unit 2: Innovation in a Sustainable Construction industry (H/504/4334) Unit 4: Construction Design (T/504/4340) Unit 5: Building Services Design (F/504/4342) Unit 6: Civil Engineering Design (D/504/4347) Unit 9: Construction Regulations for a Sustainable Society (M/504/4353) Unit 12: Planning for Sustainable Communities (F/504/4356)

## Essential requirements

Learners need access to copies of the BRE Environmental Assessment Method (BREEAM) and other environmental assessment methods. Other useful sources of material are available from the National Society for Clean Air, Greenpeace and Friends of the Earth.

## Delivery

For learning outcome 1, tutors should introduce the role of agencies that influence the management of the natural and built environments. This can be linked to a suggested series of case studies. Learners can then research, individually or in groups, the roles and influences of these agencies in more detail. The relationship between environmental properties and commercial goals could be delivered using a similar approach.

For learning outcome 2, after an initial tutor introduction to the environmental impact of building developments, learners could consider case studies or complete additional research to develop their understanding of environmental impact within specific contexts. Group presentations of case study analyses could be used to inform other learners and vary the format of delivery.

For learning outcome 3, after an introduction to carbon reduction strategies and their impact on the operational aspects of buildings, learners could review case studies in small groups and present their findings in a suitable format to the whole group. The impact of climate change could be delivered using a similar approach.

Tutors should organise presentations by visiting speakers from contractors, consultants, renewable energy companies and/or research agencies such as the Building Research Establishment (BRE). Tutors should use real-life case studies, based on site visits, when delivering this unit.

## Assessment

For learning outcome 1, learners should investigate a series of case studies. They should produce a written report that focuses on the influence of agencies on the management of the natural and built environments and the relationship between environmental priorities and commercial goals.

For learning outcome 2, learners could analyse a series of case studies, individually or in groups, and prepare a written report on their findings.

Evidence for learning outcome 3 should be in the form of a group-prepared presentation evaluating current carbon reduction strategies, and the impact of these strategies and climate change on the operational aspects of buildings.

Assessments must include opportunities for learners to use analytical tools and this may be better carried out in groups. Learners must produce evidence for each assessment criterion and identify their individual contribution to evidence produced. Evidence for most of the assessment criteria is likely to be in the form of reports, plans and presentations.

## Resources

### Books

Booth C, Hammond F, Lamond J and Proverbs D G – *Solutions to Climate Challenges in the Built Environment* (Wiley-Blackwell, 2012)  
ISBN 978-1405195072

Cotter E, Halewood J and Williams C – *Delivering Sustainable Development in the Built Environment* (BRE Information Paper, 2009) ISBN 978-1848060975

Clark W – *Sustainable Communities Design Handbook: Green Engineering, Architecture and Technology* (Butterworth-Heinemann, 2010)  
ISBN 978-1856178044

Halliday S – *Sustainable Construction* (Butterworth-Heinemann, 2007)  
ISBN 978-0750663946

### Websites

<a href="http://www.acturban.org">www.acturban.org</a>	Acturban (Spanish website) ESRC Global Environmental Change Programme – Briefing : Demand Side Management and Urban Infrastructure Provision – Simon Guy and Simon Marvin, University of Newcastle upon Tyne
<a href="http://www.archive.defra.gov.uk">www.archive.defra.gov.uk</a> ( <a href="http://www.archive.defra.gov.uk/sustainable/government/documents/wellbeing_and_the_Natural_Environment_Report.doc">www.archive.defra.gov.uk/sustainable/government/documents/wellbeing_and_the_Natural_Environment_Report.doc</a> )	Defra Wellbeing and the Natural Environment: A brief overview of the evidence – Dr. Julie Newton, University of Bath/Sustainable Development Unit, 2007
<a href="http://www.proenviro.com">www.proenviro.com</a>	Pro Enviro: Skills for a Low Carbon and Resource Efficient Economy
<a href="http://www.yourdevelopment.org/factsheet/view/id/46">www.yourdevelopment.org/factsheet/view/id/46</a>	Your development: Creating Sustainable Neighbourhoods Whole of life costing – factsheet by Paul Koltun 2008