Higher National Unit Specification

General information for centres

Unit title: Low Environmental Impact Construction

Unit code: F782 35

Unit purpose: This Unit is concerned with the construction phase of a project and the need for contractors to ensure that site practices do not harm or otherwise negatively impact the local environment and its community. It will allow candidates to consider issues such as site working time, noise, roads use and damage, obtrusive floodlighting, prevention of dust, fires and other air pollution and pollution to local adjacent land and water courses. Of importance, there will be consideration of methods for collecting and separating waste from construction site activities, for re-use or re-cycling.

On completion of the Unit the candidate should be able to:

1 Explain the management of sustainable construction projects.
2 Evaluate the procedures for minimising negative impacts upon local ecology during construction site work.
3 Assess the impacts upon the local community during construction site work.

Credit points and level: 1 HN credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Prior knowledge or skills are not essential for this Unit. However, it would be beneficial if candidates possessed an awareness of construction project management principles.

Core Skills: There are opportunities to develop the Core Skills of *Numeracy, Communication* and *Problem Solving* all at SCQF level 6 in this Unit. However, there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: The assessment of this Unit can reflect the teaching approach taken by a particular centre. Outcome 1 may be assessed by means of a staged report submission. Outcomes 2 and 3 may be jointly assessed using an assignment based upon a sustainable construction project case study.

Higher National Unit specification: statement of standards

Unit title: Low Environmental Impact Construction

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the management of sustainable construction projects

Knowledge and/or Skills

- Environmental Impact Assessment
- Sustainable construction contract options
- Time, cost and quality objective evaluation in building projects
- Construction project resources

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- explain the application of mandatory and voluntary Environmental Impact Assessments
- describe two types of construction contract suited to a sustainable building project
- explain three means of measuring the construction success of a sustainable building project
- evaluate the contribution to building project progress of four major production resources

Assessment Guidelines

This Outcome could be assessed as part of a staged report submission meeting the requirements of Outcome 1. The report may involve a candidate examining, given appropriate case study information, the detail of the staged work of a sustainable construction development project, hence staged candidate submissions.

Higher National Unit specification: statement of standards (cont)

Unit title: Low Environmental Impact Construction

Outcome 2

Evaluate the procedures for minimising negative impacts upon local ecology during construction site work

Knowledge and/or Skills

- Avoiding water course interruption, alteration and pollution
- Minimising air pollution
- Protecting biodiversity
- Managing floodlighting

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- explain two ways in which watercourses adjacent to a building site can be protected from negative environmental impact
- describe two causes of air pollution that may be attributable to construction work and corresponding mitigation strategies
- evaluate the potential extent of damage to biodiversity on or adjacent to a construction site, from two causes and discuss appropriate strategies that can help to avoid such damage
- evaluate one example of ecological impact from using floodlighting in construction work and a suitable management strategy that can minimise such impact

Assessment Guidelines

Outcome 2 can be assessed as part of a combined submission with Outcome 3. The combined assessment is an assignment report of approximately 1,500 words, supported by graphical material, in which an analysis of the environmental impact of a construction site is undertaken and mitigation measures are detailed.

Higher National Unit specification: statement of standards (cont)

Unit title: Low Environmental Impact Construction

Outcome 3

Assess the impacts upon the local community during construction site work

Knowledge and/or Skills

- Site working times
- Plant and machinery noise
- Traffic management

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- assess the effectiveness of two ways in which a local community, adjacent to a building site, can be protected from inconvenience caused by site working hours
- measure the noise level from two items of construction plant or machinery and explain a method for assessing site noise levels
- describe two potential negative effects upon road traffic, caused by construction site work and evaluate two corresponding management strategies that can mitigate these effects

Assessment Guidelines

Outcome 3 is to be assessed as part of a combined submission with Outcome 2. The combined assessment is an assignment report of approximately 1,500 words, supported by graphical material, in which an analysis of the environmental impact of a construction site is undertaken and mitigation measures are detailed. It is recommended that the assessment should be based upon a previously-considered construction site study.

Administrative Information

Unit code: F782 35

Unit title: Low Environmental Impact Construction

Superclass category: TA

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Low Environmental Impact Construction

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

The content and context of this Unit specifically focus on the methodology of construction site practice that aims to cause minimal disruption to the local environment. That is, the workings of the site to build the designed features. Of course architects and engineers can, and do, have a great influence on what happens on site by their decisions on the type of building that is to be created and the materials that are to be used. But, this Unit has been written to encourage candidates to consider the requirements of a low environmental impact project, no matter what has emerged from the drawing board.

Outcome 1 is principally concerned with the processes and practices of sustainable building project management. Hence, the application of management principles in order to plan and organise the workforce and other resources, essentially materials, tools and mechanisation, in pursuit of a specific or one-time goal such as in any built environment project, measuring success against the three principal criteria of timescale, cost and quality. Major areas of study, in Outcome 1, will be critical path analysis, Gantt charts, histograms, milestones, project management software applications, risk assessment, budget management and types of contracts. The Outcome also ensures that candidates are aware of the importance of Environmental Impact Assessments at the planning stage.

Outcome 2 considers the ways in which a building site can have negative impacts upon the ecology that surrounds it. Hence much of the work leading up to the assessment of this Outcome can be founded upon a study of natural watercourses, green space and woodland as habitats. Developing knowledge and understanding of the ways in which watercourses adjacent to a building site may be adversely affected by the works will be important. Potential site pollution sources are construction materials, for example concrete and mortar, and mechanical plant fuels and lubricants, for example petrol, diesel and oil. Soil erosion from a site and consequent build up in natural watercourses can restrict sunlight filtration and badly affect aquatic life. The causes of local air pollution are important considerations in Outcome 2 and may include exhaust fumes from mechanical plant, dust and other airborne debris from demolition work and site materials burning, which can also be a danger to adjacent woodland along with the obvious effects of excessive tree removal work. The final aspect of Outcome 2 that candidates will debate is the potential impact from site floodlighting upon natural habitats as light pollution, adversely affecting natural behaviours, and as a cause of energy waste. Matters of interest include glare from inappropriate beam angles (70^{o} from vertical is the maximum angle), types of lamps and lighting time control.

Finally, Outcome 3 considers the effect of construction sites upon an adjacent community. Since building sites remain, by necessity, an industrial process *in situ*, a population local to such work is going to be affected. This must be managed accordingly by the construction teams. These negative effects include a few that are also relevant to Outcome 2, namely intrusive site lighting and local water and air pollution. Also of importance are noise levels from site activities, un-sociable working hours (early morning, late evening and weekends), traffic flow interruption and local road surface deterioration. Minimising these effects could be based upon effective site management of working time, setting up a safe and efficient temporary road management system, minimising site construction time by using the most efficient methods of construction, eg mechanical plant, off-site component manufacture / on-site assembly, efficient use of the site space for mixing concrete and mortars, limiting lorry transport deliveries to and from site, using noise reduction kits on tools and equipment.

Guidance on the delivery and assessment of this Unit

The delivery of this Unit is expected to be by a range of teaching methods, including formal lectures, tutorial discussions, workshop experimental exercises, built environment design strategy discussions and construction practicals. In addition, visits to building project or other relevant sites or visits from industry practitioners are encouraged. Details on the approaches to assessment are written into the Evidence Requirements and Assessment Guidelines in the Statement of Standards section, which should be read carefully in advance of candidate assessment. Appropriate assessment methods are assignment reports, oral reports and closed-book examination short-answer questions, all based upon a case study. It may be appropriate in the assessment for Outcome 1 to be innovative in the approaches taken to generate evidence of competence. An assessment method that may be effective is an assignment report done in a short period of time, for example 2 days. In such an assessment context, there is a simulation of the importance of building project tasks timescale. A further initiative that may be appropriate is peer assessment of work. With guidance from academic staff, a candidate's written work, or oral report, could be assessed by the student body.

Opportunities for developing Core Skills

There are ample opportunities to develop the Core Skill of *Problem Solving* in this Unit, and to a lesser extent opportunities also exist to *Numeracy* and *Communication* all at SCQF level 6.

The project planning activities associated with Outcome 1 which will entail the use of various written and graphical presentation techniques will provide candidates with an opportunity to develop the Core Skills of *Communication* and in particular the Using Graphical Information component of *Numeracy*.

In considering and responding to Environmental Impact Assessments in Outcome 1 and planning to minimise site impact, Outcome 2, there will also be the opportunities to develop the Planning and Organising component of the Core Skill *Problem Solving*. By synthesizing solutions to building site issues and the need for environmental protection will provide ample opportunity to develop the Critical Thinking component of the Core Skill *Problem Solving.*

In planning to mitigate the effects on the local community during construction, Outcome 3, there will again be opportunities to develop the Critical Thinking and the Planning and Organising components of the Core Skill *Problem Solving*.

The assessed work for all Outcomes will also provide opportunities for developing Written Communication.

Additionally, further problem solving exercises may be used to aid the understanding and resolving capacity of the candidates when examining low impact construction site strategies. By working in groups, exploring design and construction issues and developing potential solutions to project constraints, further opportunities may be created to advance *Communication* and *Problem Solving* skills.

Open learning

This Unit could be delivered by distance or flexible learning. Although it would be beneficial for the candidate to attend the centre for supervised assessment, this could be done in off-centre locations with appropriate arrangement.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Low Environmental Impact Construction

This Unit has been written to provide you, the candidate, with an understanding of the factors that influence the environmental impact of a construction site. The main learning topics may include sustainable construction contract options, project management of time, cost and quality, construction project resources, minimising water course pollution, minimising air pollution, protecting growing environments and biodiversity, managing floodlighting appropriately, working time management, plant and machinery noise, large vehicle site traffic, road damage. The Unit is intended for candidates targeting a career in, or associated with, the built environment sector.

On successfully completing the Unit you should be able to:

1 Explain the management of sustainable construction projects.
2 Evaluate the procedures for minimising negative impacts upon local ecology during construction site work.
3 Assess the impacts upon the local community during construction site work.

The Unit is likely to be delivered using lectures, site visits, practicals, group work, investigation, including the use of technical journals and a range or other written and electronic media, and building project case studies.

The formal assessment for this Unit could consist of a single assignment project, or of separate pieces of work to become evidence of competence on your part. The assessments will be conducted under controlled conditions of timescale and other aspects of education quality. You should expect to have to submit work at the end of relevant Outcome teaching or at the end of the Unit teaching as a whole.

There may be opportunities for the development of the Core Skills of *Numeracy, Communication* and *Problem Solving*. For example the assessed work for Outcome 1 may require the production of report of the examination of a construction project over an extended period. Through this both written and graphical communication may be developed. Similarly the Outcomes 2 and 3 provide the opportunity to identify environmental impact problems of construction sites and to rationalise solutions. This may enable development of both *Numerical* and *Problem Solving* skills. However, the Core Skills are not assessed or certificated in this Unit.