

Examiners' Report/ Lead Examiner Feedback

January 2015

NQF BTEC Level 1/Level 2 Firsts in
Construction

Unit 11: Sustainability in Construction
(21635E)

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Introduction

This report has been written by the Lead Examiner for BTEC Construction and the Built Environment Unit 11 – Sustainability in Construction. It is designed to help you understand how learners performed overall in the exam. For each question there is a brief analysis of learner responses. You will also find some examples of learner responses at Level 2 Pass, Merit and Distinction. We hope that you will find that this will help you to prepare your learners for future examination series.

General Comments on Exam

This was the second examination for this unit, and overall the paper produced a reasonable range of responses.

It is noticeable that a number of learners did not attempt a number of the questions. However, learners did appear to manage their time effectively and appeared to be able to complete the paper in the allotted time. There did not appear to be evidence of rushed work towards the end of the paper.

The more demanding questions provided learners with an opportunity to apply their knowledge in response to sustainability issues related to a range of construction scenarios. Learners may have some prior learning in respect of environmental and sustainability issues, but it is important that learners are taught sustainability in the context of construction covering the lifecycle of a development. Questions in the paper were drawn from across the whole of the unit specification, and this should be taught to learners attempting the examination.

Learners would, however, benefit from being taught examination skills and techniques as often they did not appear to have read the question properly. This resulted in questions not being answered using an appropriate methodology. Where questions required students to 'identify' many provided extended responses where only naming is required. Learners should be familiar with the command verbs to be able to effectively answer questions that require them to 'describe', 'explain' or 'discuss'. Learners should be encouraged to carefully read the questions as in some instances it appears that learners had misunderstood the question and provided an inappropriate response. This was particularly the case in Section B of the paper where questions are related to the scenarios. Learners should also be reminded that marks will not be awarded for repeating part of the question in their response.

Section A

Question 1

This question required the identification of ways of reducing construction site-related light pollution.

Targeted Specification Area: Learning Aim A2.4

Q1: Many learners were able to identify 'light shading' and 'lower wattage lighting'.

Question 2

This question required identifying aspects of the environment that may be damaged through the use of land for construction purposes.

Targeted Specification Area: Learning Aim A2.2

Q2: Many learners were able to identify at least one aspect of the environment that may be damaged through the use of land for construction purposes. A range of responses were given and included, 'wildlife', 'soil contamination', 'loss of green space' and 'air pollution'. A number of learners gave the response 'trees' which was included within the question as 'woodland' and therefore no marks could be awarded. Other common incorrect responses were 'pollution' without any qualification of what was polluted, and 'views'. Views are changed, but only as parts of the environment are damaged.

Question 3

This question required the identification of facilities that need to be considered to meet the social needs of the community when planning a development.

Targeted Specification Area: Learning Aim A3

Q3: Many learners were able to identify at least one of the two facilities, 'retail' or 'health'. A number of learners initially selected 'retail' and subsequently changed this for an incorrect option.

Question 4

This question required the identification of the name of the scheme that contractors can be a part of to minimise the effect of a project on the local community.

Targeted Specification Area: Learning Aim A3.2

Q4: A very small number of learners were able to identify the scheme name 'Considerate Contractors/Constructors Scheme'. The question asked for a name of a scheme. However, many learners incorrectly described ways that the contractor could liaise with the community. The correct response to this question is given within the specification, thus the response is direct recall.

Question 5

This question assessed the understanding of how deliveries to a construction site can be organised to reduce the impact on the local community.

Targeted Specification Area: Learning Aim A3.2

Q5: Many learners were able to describe a way in which deliveries can be organised to reduce the impact on the local community. A range of correct responses were given. Some learners identified a way, but did not go on to describe how this would reduce the impact on the community. A number of incorrect responses related the impact on the natural environment and not the local community.

2 mark example:

- 5 Describe **one** way in which deliveries to a construction site can be organised to reduce the impact on the local community.

Deliveries can be planned ahead with road side notifications predicting delays so the locals can change route. Deliveries can bring more than one part at a time to lower air pollution.

Question 6

This question required the identification of natural insulation products.

Targeted Specification Area: Learning Aim B.2

Q6: Many learners were able to identify at least one of the two natural insulation products 'flax' and 'hemp'.

Question 7

This question required the identification of two advantages to a community of development on a brownfield site.

Targeted Specification Area: Learning Aim A3.1

Q7: A number of learners were able to identify at least one advantage to a community of development on a brownfield site. Common responses were 'preventing the loss of greenfield', 'improving the aesthetics of the area' and 'increase employment opportunities'. Some learners gave incorrect responses that provided a potential advantage to the contractor/developer such as costs.

2 marks example:

7 One advantage to a community of development on a brownfield site is the regeneration of an area.

Identify two other advantages to a community of development on a brownfield site.

1. the area will look much nicer

2. it will provide jobs for the locals.

Question 8

This question assessed the understanding of passive stack ventilation in a building.

Targeted Specification Area: Learning Aim B1

Q8: Few learners were able to both identify a disadvantage and provide a linked explanation. It is likely that a large number of learners had little or no understanding of passive stack ventilation as the incorrect response 'expensive to operate' was often given.

2 mark example:

8 Explain one disadvantage of using passive stack ventilation in a building.

Passive stack ventilation lets in a draft of air through the opening. This means the building is no longer draft proof. There would be more energy required to heat up the building as most of it would escape as well.

Question 9

This question required the identification of the characteristics of photovoltaic panels (question 9a), and demonstrate an understanding of the use of photovoltaic panels on an existing building (question 9b).

Targeted Specification Area: Learning Aim B.3

Q9a: Many learners were able to identify at least one characteristic of photovoltaic panels. Common responses were 'convert sunlight into electricity', 'blue/black in colour', 'placed on roofs' and 'orientated south/towards the sun'.

2 mark example:

9 Photovoltaic panels are often used on domestic buildings and are an example of an alternative energy source.

(a) Identify **two** characteristics of photovoltaic panels.

- 1 Create electricity from the sun. (2)
- 2 They are normally blue

Q9b: Many learners were able to identify a disadvantage of photovoltaic panels and provide a linked explanation. A range of responses were given, and a common response was 'unreliable sources of power as do not produce power at night', but a range of responses were provided.

2 mark example:

(b) Explain **one** other disadvantage of using photovoltaic panels on an existing building.

(2)

Another disadvantage would be that they are not suitable, this could be because of the weight is too great for a roof, or they are not properly situated, their could be blocked from the sun by other buildings.

Question 10

This question required the identification of a characteristic of a grey water recycling system.

Targeted Specification Area: Learning Aim B.4

Q10: Many learners appeared to confuse grey water systems with rainwater harvesting and included collecting rainwater in their response. A number of learners who correctly identified an aspect of a grey water recycling system were able to identify 'collection of water from baths', 'filter/clean the water' and 'use for toilets' amongst other correct responses, see mark scheme.

2 mark example:

10 Identify two characteristics of a grey water recycling system.

1. They recycle water used from baths and showers and give back clean water.
2. They can save a home owner money on their water bill.

Question 11

This question required the identification of a way of protecting trees during the construction phase of a project.

Targeted Specification Area: Learning Aim B.5

Q11: The majority of learners were able to identify 'fencing or barriers'. Other learners incorrectly responded with planting replacement trees.

Question 12

This question assessed the understanding of sustainable urban drainage system (SUDS) as an appropriate way for the developer to limit adverse effects of flooding.

Targeted Specification Area: Learning Aim A.2/B.4

Q12: Few learners were able to state a way that SUDS is an appropriate way for the developer to limit adverse effects of flooding, and to provide a linked explanation. The learners who correctly identified an aspect of SUDS provided a response such as 'porous surfaces', 'storage of surface water with limited discharge' and 'delay the discharge to the downstream system', and in some cases were able to provide a linked explanation to gain the distinction mark. Many learners repeated parts of the question, possibly because they did not have an understanding of SUDS.

2 mark example:

12 A developer is looking to build in an area where there is a history of flooding.

Explain one reason why a sustainable urban drainage system (SUDS) is an appropriate way for the developer to limit the adverse effects of flooding.

Sustainable Urban drainage systems have ~~different~~ different routes for water to be passed through. They're used so not all the water goes to the main drainage system. They're stored and used for housing needs.

Question 13

This question assessed the understanding of the features of a building that allow for the use of ground source heat recovery.

Targeted Specification Area: Learning Aim B3

Q13: Few learners were able to identify and provide a linked explanation of the features of a building that allow for the use of ground source heat recovery. Correct identification included 'underfloor heating', however few learners were able to gain the higher mark by providing a linked explanation. Learners also identified 'a large plot' and were able to provide the linked response of 'space to lay the pipes required' for the higher marks. Many learners identified general features of a building, such as insulation or double glazing, and not those features that were incorporated to allow the use of ground source heat recovery.

4 mark example:

13 Explain how **two** features of a building allow for the use of ground source heat recovery.

1 The building must have a pretty large garden/outside space for all the pipes to be laid

2 The building must ~~not~~ not sit on solid rock as the pipes need to be submerged beneath the surface to work effectively.

Question 14

This question required the identification of ways to reduce plant and equipment exhaust emissions on a construction site.

Targeted Specification Area: Learning Aim B.1

Q14: Many learners were able to identify at least one way to reduce plant and equipment exhaust emissions on a construction site, 'filters', 'servicing' or 'use of modern energy efficient engines'.

Section B

Question 15

This question was scenario-based and required an identification of economic benefits to the local community of the development in Building 2.

Targeted Specification Area: Learning Aim A4

Q15: Many learners were able to identify at least one economic benefit to the local community of the development in Building 2. A range of responses were given and included 'employment', 'trade for local suppliers' or 'stimulating the local economy'. A number of learners made reference to the previous building and recycling which did not provide a material that could be awarded marks. Learners should be encouraged to carefully read the question and the scenario material. The scenario states that the previous buildings had been demolished and all material removed. The economic benefits required are those when the houses are being built and during the use of the houses.

2 mark example:

15 New housing developments can bring economic benefits to local communities when they are being built and during use.

Identify two economic benefits to the local community of the development in Building 2.

1 There are more local jobs for the construction

2 The new houses will bring more people which results in more economics in the area

Question 16

This question was scenario-based and required a reason why weather-stripping is used to seal the doors and windows in Building 2.

**Targeted Specification Area: Learning Aim
A2.4/A3.2**

Q16: The majority of learners provided a correct response to this question. Common responses were 'to keep out draughts', 'keep warmth in and cold out' or 'to keep out rain'.

Question 17

This question was scenario-based and required learners to identify two low embodied energy materials used in the construction of Building 1 (question 17a) and to show an understanding of what is meant by low embodied energy (question 17b).

Targeted Specification Area: Learning Aim A2.4

Q17a: A number of learners were able to identify at least one of the low embodied materials used in the construction of Building 1, 'timber' and 'slate'.

Q17b: A number of learners demonstrated a good understanding of what is meant by low embodied energy, for example 'the energy that is required to produce the material and to transport it to the site where it is to be used'.

1 mark example:

(b) State what is meant by embodied energy. (1)

The energy that is put in to a material
e.g. mining it, processing it, transportation.

Question 18

This question was scenario-based and required learners to show an understanding of sustainable site practices that the contractor for Building 2 could have used to recycle waste construction materials.

Targeted Specification Area: Learning Aim A3.2 & B5

Q18: A number of learners identified the use of 'separate skips' and provided a linked explanation that these enable the 'segregation of materials' for recycling. Many learners incorrectly referred to the previous building and demolition materials that had already been removed from the site before the construction of Building 2 or that the contractor has won an award.

2 mark example:

18 Describe one sustainable site practice that the contractor for Building 2 could have used to recycle waste construction materials.

He could have used separate skips for different materials so things could be recycled easier and quicker.

Question 19

This question was scenario-based and required an understanding of the benefits to the local community of having green space in the area near Building 1.

Targeted Specification Area: Learning Aim A1.2

Q19: The majority of learners were able to identify at least one benefit to the local community of the green space. Responses covered a range of benefits as shown in the mark scheme. However, few learners were able to access the higher marks by identifying two benefits together with linked explanations of how the green space will benefit the community. A number of learners provided responses such as taking in carbon dioxide and producing oxygen. This will have some benefit to the wider community, but cannot be considered to be a direct benefit to the local community, thus no marks could be awarded for this response.

4 mark example:

19 The local community appreciate the park near Building 1 as it adds aesthetic value.

Explain two other benefits to the local community of having green space in the area.

1. it produces a area where people can socialize with each other and make a better community.
 2. it produces an area where people can exercise and be more healthy. This ~~is~~ also creates a place where people can relax and make the area more popular due to the park. (Total for Question 19 = 4 marks)
- and as its in a built up area with a large population.

Question 20

This question was scenario-based and required a discussion of how the sustainability of Building 1 could be improved. Note that this question is marked using the level descriptors in the mark bands found at the end of the mark scheme.

Targeted Specification Area: Learning Aim B1

Q20: The majority of learners provided a response to this question. However, there was a wide variance in the marks awarded.

For the lower mark band learners provided a list of improvements with little or no discussion, and demonstrated a limited knowledge of sustainability.

For the mid mark band some or further discussion of the points was provided, and the response demonstrated some good knowledge of sustainability.

For the higher mark band detailed discussion of the points was provided that demonstrated a developed understanding of sustainability. The discussion was also in most parts related to the scenario.

Within responses at each mark band a range of methods of improving the sustainability of Building 1 were identified with double / triple glazing, energy efficient boiler, roof/loft insulation being frequently stated. Other methods such as wind turbines, photovoltaic panels and rain water harvesting were identified, but often with little or no discussion of their relevance to the scenario. There was evidence of learners using material from the scenario, but learners had not always sifted the information so had used it in an incorrect way, such as referring to replacing the existing skirtings or ceiling roses to improve the sustainability of Building 1. A number of learners identified brick and block cavity walls with cavity wall insulation. This could not be considered as an appropriate improvement to Building 1 as this would effectively require the demolition and the rebuilding of the building. Learners who showed a developed understanding of sustainability identified that insulation could be applied to the external or internal faces of the existing walls.

Middle of the mark band 1 example (2 marks):

20 Discuss how the sustainability of Building 1 could be improved.

2 Q20

the sustainability of building 1 could be increased by having the walls ^{and} floors insulated, having doubled or triple glazed windows. using central heating instead of an open fire or even installing solar ^{thermal} panels ~~for~~ to heat there water, and photovoltaic panels for electricity, from natural light.

try ~~to~~ decrease the amount of fossil fuels being used in the building so its more environmental friendly, eg less carbon emissions from the building.

Lower end of mark band 2 example (4 marks):

20 Discuss how the sustainability of Building 1 could be improved.

Improvements can be made to building one by first of all installing double glazed windows to reduce the amount of heat loss. Secondly installing a boiler instead of having nothing but an open fire. Another thing that can be improved is installing loft space insulation to improve the amount of heat kept in. A boiler can be installed in the center of the property.

Changing the timber windows to plastic with weather stripping will also improve the sustainability. The open fire is a very big problem because it uses a lot of fuel to use it. Moreover a lot of carbon dioxide is being released.

Mark band 3 example (7 marks):

20 Discuss how the sustainability of Building 1 could be improved.

There is no provision made for off-street parking so the only place they can park is on the road these are the needs to be either a carpark fitted or a drive so the cars are off the road. Timber is used for many parts of this ~~timber~~ building however it doesn't state that it is cedar wood therefore it could be a wood which is less sustainable so using cedar ~~wood~~ timber would be the most sustainable material/timber to use. The window frames are made from timber ~~so even though~~ which is sustainable as timber is a renewable material however to keep it weather resistant it would need regular maintenance which would involve a cost also the windows U-value would be below regulations which isn't efficient so the window frames would need to be UPVC which makes them weather resistant and let less heat in which would meet U-value regulations. The windows are also only single glazed which means they have poor sound and heat insulation so they would have to be changed to either ~~single or double~~ double or triple glazed which will increase sound and heat insulation. Weather stripping or sealant is not stated therefore there is no weather resistant materials used. There is only heating provided in the living and bed rooms so ~~or~~

20 Discuss how the sustainability of Building 1 could be improved.

~~This~~ central heating should be installed so the heating which is already installed can go all around the house, leading to heat up the whole house. No insulation is stated in any part of the house whether that's in the floor, roof or walls so ~~insulation~~ should be fitted to make the house more sound insulated and heat insulated, the insulation that should be used should be hemp or flax which are ~~sustainable~~ plants used for insulation. The building is not stated to meet any of the current building regulations so ~~they~~ it will have to meet these to become more sustainable.

Grade Boundaries

External assessment

The suite of 'next generation' NQF BTECs include an element of external assessment. This external assessment may be through a timetabled paper-based examination, an onscreen, on demand test or a set-task conducted under controlled conditions.

What is a grade boundary?

A grade boundary is where we 'set' the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade (Distinction, Merit, Pass and Level 1 fallback).

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries - this means that they decide what the lowest possible mark should be for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries ensures that a learner who receives a 'Distinction' grade next year, will have similar ability to a learner who has received a 'Distinction' grade this year. Awarding grade boundaries is conducted to make sure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in externally assessed question papers

Each exam we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries year on year because then it wouldn't take into account that a paper may be slightly easier or more difficult than the year before.

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

Grade	Unclassified	Level 1 Pass	Level 2 Pass	Level 2 Merit	Level 2 Distinction
Boundary Mark	0	12	21	30	40

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