

OUTSTANDING TEACHING, LEARNING AND ASSESSMENT TECHNICAL SKILLS NATIONAL PROGRAMME

Output 4: Extended PBL Task for Construction & Built Environment

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Candidate's Name:

Course Title	Level 3 BTEC National in Construction and the Built Environment	Unit Codes	R/600/0212 - J/600/0451 T/600/0221 - D/600/0309
Units	Unit 2, Unit 3, Unit 4, Unit 6	QCF Unit Credit Value	10 each
Title	Pre design - Initial assessments of project site.	Assessment No	1
Issue Date Week Commencing	01 st Oct 18	Hand in Dates	Digital submission: Sat 20th Oct 2018 Presentation: Wed 24 th Oct 2018
Course/Programme Co-ordinator	Will Lambert	Assessor (S) Name	Majd Khador, Will Lambert, Andrei Naghi & Neil Smith
Internal Verifier	Craig Tansley	IV'd & Approved Date	

Outcomes:
U2 - 1 Know the important features of the natural environment that need to be protected

U3 - 2 Be able to select and apply mathematical techniques correctly to solve practical construction problems involving perimeters, areas and volumes

U4 - 1 Know the basic factors that affect human comfort

U4 - 2 Understand how forces act on structures

U6 - 2 Understand foundation design and construction

U6 - 4 Understand the implications of issues and constraints on building construction

Assessment Criteria		Outcomes	Functional Skills
U2 - P1	describe six different features of the natural environment that must be considered at the planning stage of a construction project	U2 - 1	[IE3, SM2, SM3]
U2 - M1	assess the potential environmental impact of a proposed construction project on the local natural environment	U2 - 1	
U3 - P4	use mathematical techniques to solve construction problems associated with simple perimeters, areas and volumes	U3 - 2	[IE1, IE2, IE4, IE6, CT1, RL3, RL4, SM3]
U4 - P1	describe the basic factors in simple scientific terms that influence human comfort in the internal environment	U4 - 1	[IE1, IE2, IE4, IE6, CT1, RL3, RL4, SM3]
U4 - P4	interpret underpinning concepts relating to structures under load	U4 - 2	[IE1, IE2, IE4, IE6, CT1, RL3, RL4, TW1, TW6, SM3]
U4 - M1	produce clearly worked, accurate answers for three different calculations relating to human comfort in the internal environment	U4 - 1	
U4 - D1	analyse, in both qualitative and quantitative terms, the basic factors that affect human comfort	U4 - 1	
U6 - P2	explain how the procedures used in subsoil investigation provide information for the design of substructures	U6 - 2	[IE2, IE4, CT2, RL2, RL4, SM3]
U6 - P7	explain the implications of environmental issues and legislative constraints on building construction	U6 - 4	[IE2, IE4, CT2, RL2, RL3, RL4, SM3]

Note: There is one deadline for handing in your work. If you miss the deadline your work may be referred.

When you Hand in Your Assignment:

- Please ensure you retain a copy of your assignment
- Please ensure your assignment has your full name on it (every page)
- Please ensure you include a completed front sheet and assignment brief with your work

Declaration:

a) I confirm that I have read and understood the above information

b) I certify that the work submitted for assessment is entirely my own.

Students Signature:
Date:

Scenario

You are working as part of a team of 'environmental consultants' looking at a possible development for a new wildlife centre on Pride Park in Derby.

See location behind football stadium and the Derby arena (velodrome) adjacent to the River- <https://goo.gl/maps/SwmjxBQ36No>

The local conservation group are wishing to develop the land on the opposite side of the river (where we can see a body of water on the google map link above), which needs to include the wildlife centre situated within the lake (on-top of causeway – developed by the Civil Engineering students).

The initial assessment (phase 1) looks at the existing land in respect to:

- A) Initial calculations/estimation on Area and volume of the area under consideration
- B) Current ecology and habitat and possible features that could be encouraged.
- C) Environmental and legislation that could impact on the design (to be done later)
- D) Soil type and possible sub structure work that may be required
- E) Requirements for Human comfort in the new building

You have been asked to individually produce an initial assessment report (using the below tasks), with a group presentation of 10 minutes summarising your findings.

Submission of this assignment is in two parts, as follows:

1. Individual Digital submission via 'Turnitin' portal on Moodle
2. Group 10 minute presentations on 24th October.

The presentation **must be** at minimum 8 minute and no longer than 15.

NOTES:

Access to the actual theoretical project site is not possible, so assume that the same ecology/habitat from the adjacent Sanctuary and Bird reserve is on the opposite side of the river and use the information provided by the reserve as initial guidance. **The project itself is NOT on the sanctuary and bird reserve!**

Assessment Tasks	Grading Criteria	Lecturers Notes
<p>1. Identify and describe a broad range of six different features that could be affected by this construction project. Either current present features, or features that could also be encouraged to come into the project area.</p> <p>Note: for this task you can consider present features within a 1 mile radius.</p>	<p>U2 P1</p>	<p>The six features should be differentiated from each other clearly and must not be different aspects of the same thing.</p>
<p>2. In respect of the scenario above, assess the 'potential' environmental impact of the proposed development on the local natural environment during the following phases:</p> <ul style="list-style-type: none"> • Pre-construction • Construction • Post-construction 	<p>U2 M1</p>	<p>Non-specific responses that refer to construction projects in general are not acceptable. There is no requirement for a detailed scientific treatment of how the natural environment may be harmed.</p>
<p>3. Following task 2, explain the implications of environmental issues and legislative constraints, including health and safety issues and CDM Regulations for building construction.</p>	<p>U6 P7</p>	
<p>4. Using the handouts provided for guidance, use appropriate mathematical techniques to solve and determine simple estimated perimeters, areas and volumes of various aspects of the construction project site</p>	<p>U3 P4</p>	
<p>5. Considering the site location in the scenario and the proposed building, describe the factors – in simple scientific terms - that will influence the human comfort of the future visitors and staff to the wildlife centre.</p> <p>Note: Learners must be able to describe a minimum of four of the factors that influence an individual's overall perception of comfort in the internal environment. These should include factors from the thermal, acoustic and visual environment. Learners are expected to know how these factors affect the individual's perception of comfort but they are not, at this stage, required to demonstrate a detailed understanding of the mechanisms by which an individual interacts with the internal environment.</p>	<p>U4 P1</p>	

<p>6. Produce calculations in relation to Human comfort within the wildlife centre:</p> <p>Learners must produce clear and accurate answers for three different calculations associated with the factors of the internal environment that affect human comfort. The calculations should refer to thermal and air quality, sound and illumination respectively and could deal with topics such as mean radiant temperature, relative humidity, dew point temperatures, the relationship between decibel, sound intensities and sound pressures, the relationship between the candela, the lumen and the lux and so on.</p> <p>See lecturer handout for calculations on the following:</p> <ul style="list-style-type: none"> A. Heat Loss B. Sound Attenuation C. Basic Lighting 	<p>U4 M1</p>	
<p>7. Considering the calculated values in task 5 (above), Analyse the results in both quantitative and qualitative terms.</p> <p>This should include a basic discussion of how the thermoregulatory system is affected by air temperature, mean radiant temperature, relative humidity, air speed, rates of air change, activity and clothing level to create the perception of thermal comfort; how specific values for the factors that affect the visual environment interact with the vision system to allow us to perform tasks, and how specific values of the aural environment interact with hearing systems to allow us to concentrate and make the space fit for purpose. The analysis should include comment on the acceptability of comfort parameters for given locations. This may be either an analysis of the suitability of given parameters for various locations or by recommending and justifying values for the various parameters for given locations.</p> <p>Definitions <u>quantitatively</u> Relating to, measuring, or measured by the quantity of something rather than its quality. <u>Qualitative</u> <i>adjective</i> Relating to, measuring, or measured by the quality of something rather than its quantity.</p>	<p>U4 D1</p>	
<p>8. In respect of the scenario above, classify 5 possible types of soil. Assume the worst scenario (e.g. Cohesive soils) and explain how the procedures involved in subsoil investigation are used to provide information for the design of substructure.</p> <p>Each procedure should be identified and explained followed by a discussion of how the data obtained is used to design the most appropriate substructure. An explanation of how subsoil conditions influence the choice of substructure and an insight into the techniques used in substructure construction must be included.</p>	<p>U6 P2</p>	

9. Learners must be able to interpret the important concepts associated with forces acting on structural members. Learners do not need to quantify wind loads but they must be aware of the difference between dead loads, imposed loads and wind loads and know what is implied by each of these terms. Similarly, learners should understand what is meant by the terms concurrent, non-concurrent and coplanar forces, and point and uniformly-distributed loads. Learners must be able to differentiate between compressive, tensile, shear and bending stresses, and must demonstrate an awareness of how stresses always alter the shape of loaded members and how excessive stresses may lead to failure

U4
P4