

Pearson BTEC Level 3 Nationals Extended Diploma

Set Task Release Date: Monday 29 April 2019

Time: 3 hours

Paper Reference **20076K**

Construction and the Built Environment

Unit 2: Construction Design

Part A

You do not need any other materials.

Instructions

- **Part A** contains material for the completion of the preparatory work for the set task.
- **Part A** is given to learners **2 weeks** before Part B is scheduled. Learners are advised to spend no more than **3** hours on Part A.
- **Part A** must be given to learners on the specified date so that learners can prepare in the way directed.
- **Part A** is specific to each series and this material must only be issued to learners who have been entered to take the task in the relevant series.
- **Part B** materials must be issued to learners during the period of 2 weeks specified by Pearson.

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Instructions to Teachers/Tutors

This set task has a preparatory period. Part A sets out how learners should prepare for the completion of the task under supervised conditions.

Part A should be issued to learners two weeks before taking Part B of the assessment.

Learners should undertake independent research on the case study given in this **Part A** booklet.

Learners are expected to spend up to 3 hours in undertaking Part A.

Centres must issue this booklet at the appropriate time and advise learners of the timetabled sessions during which they can prepare. It is expected that scheduled lessons or other timetable slots will be used for some or all of the preparation.

Learners may prepare summary notes on the case study. Learners may take notes (up to 2 sides of A4) into the supervised assessment (Part B booklet). Other content is not permitted.

Learners will complete all activities in the task book, apart from Activity 5 for which learners will require access to a computer with appropriate CAD software loaded.

The supervised assessment will take place on a timetabled period specified by Pearson.

Centres should schedule all learners at the same time or supervise cohorts to ensure there is no opportunity for collusion.

The set task is a formal external assessment and must be conducted with reference to the instructions in this task booklet and the Instructions for Conducting External Assessments (ICEA) document to ensure that the preparatory period is conducted correctly so that learners have completed their preparation validly and independently.

Teachers/Tutors should note that:

- learners should not be given any direct guidance or prepared materials
- learners should not be given any support in writing or editing notes
- all work must be completed independently by the learner
- learner notes will be retained securely by the centre after Part B and may be requested by Pearson if there is suspected malpractice
- learner notes should not contain any tables, graphs, and images such as sketches, or other drawings or photographs.

Instructions for Learners

Read the set task information carefully.

In Part B, you will be asked to carry out specific activities using the information in this Part A booklet and your own research on this topic.

In your preparation for Part B, using this Part A booklet, you may prepare short notes to refer to when completing the set task, e.g. to give specific details, data or cases. Your notes may be up to 2 sides of A4 and may be handwritten or typed. Your notes:

- must be completed independently
- will be retained securely by the centre after Part B and may be requested by Pearson if there is suspected malpractice
- must not contain any tables, graphs, images such as design sketches, or other drawings or photographs.

You will complete Part B under supervised conditions.

You must work independently and should not share your work with other learners.

Your teacher may give guidance on when you can complete the preparation.

Your teacher cannot give you feedback during the preparation period.

Part A set task brief

Scenario

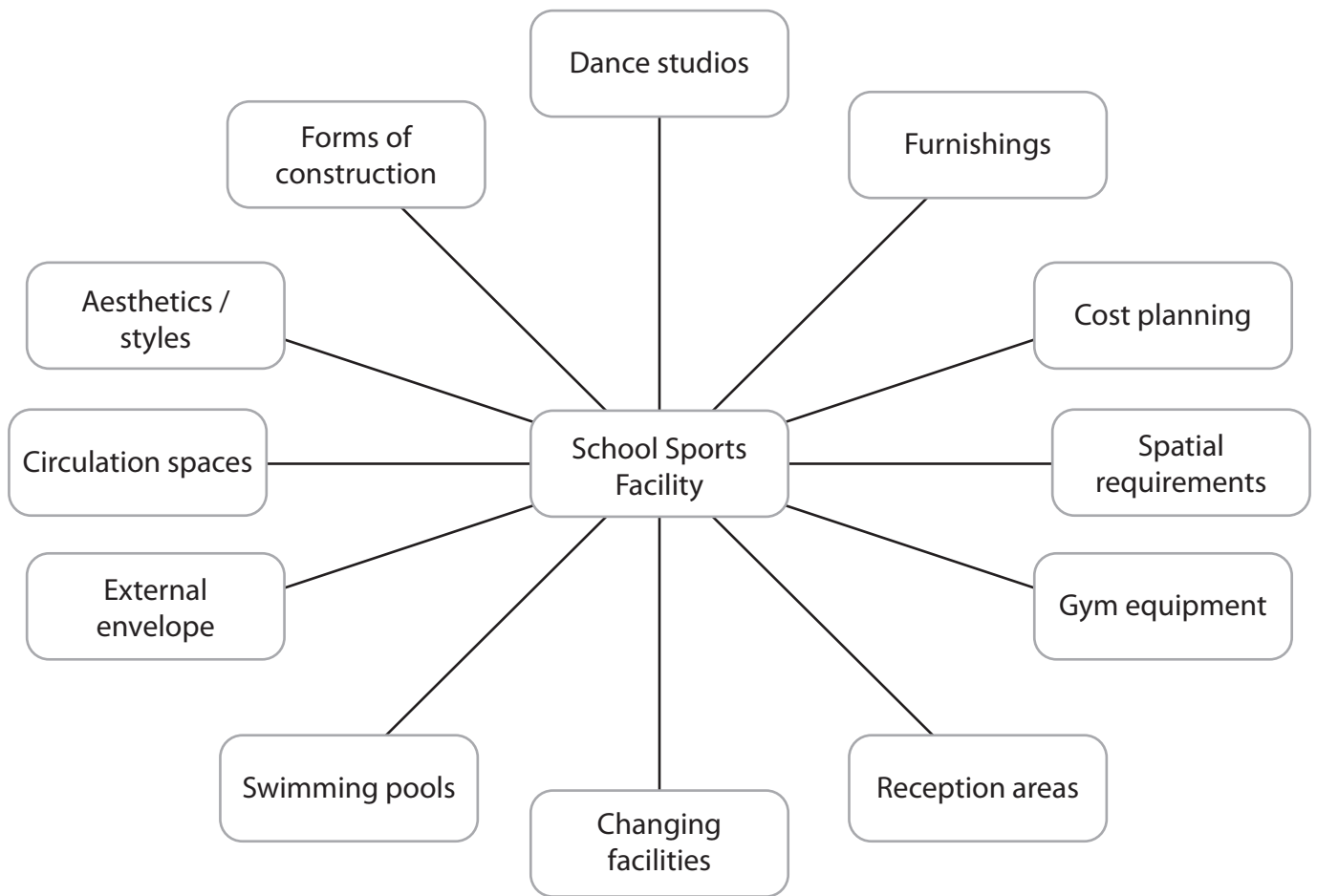
You are working as an assistant to the Design Manager of a medium-sized, regional construction organisation. The organisation has been awarded a contract to design and build a school sports facility.

Part A set task information

The client is a school that wants to provide a sports facility to meet the various needs of the school. The school wants to create a safe and secure environment with enough changing room space for the girls, boys and staff. The facility should include a swimming pool, a gym, a dance studio and teaching rooms. The school wants to impress the pupils and their parents by providing a spacious, bright, well-equipped sports facility that is finished to a high specification.

You should research the design of buildings used for school sports facilities.

You are advised to research at least the following topics.



Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Learner Registration Number

Pearson BTEC
Level 3 Nationals
Extended Diploma

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Window for supervised period
Monday 13 May 2019 – Friday 24 May 2019

Supervised hours: 12 hours

Paper Reference **20076K**

**Construction and the Built
Environment**
Unit 2: Construction Design

Part B

You must have: Black ink or ball point pen, HB or B pencil,
ruler, eraser, a non-programmable calculator and access to
computer-aided design (CAD) facilities and printing facilities

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** activities.
- Answer the activities in the spaces provided
– *there may be more space than you need.*
- **Part A** will need to have been used in preparation for completion of Part B.
- **Part B** contains material for the completion of the set task under supervised conditions.
- **Part B** should be undertaken in 12 hours during the assessment period of two weeks timetabled by Pearson.
- **Part B** is specific to each series and this material must be issued only to learners who have been entered to undertake the task in the relevant series.
- **Part B** should be kept securely until the start of the 12-hour supervised assessment period.

Information

- The total mark for this paper is 63.
- The marks for **each** activity are shown in brackets
– *use this as a guide as to how much time to spend on each activity.*

Advice

- Read each activity carefully before you start to answer it.
- Try to answer every activity.
- Check your answers if you have time at the end.

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Instructions to Teachers/Tutors

Part B must be taken under supervision in a number of scheduled sessions over a supervised assessment period of two weeks. All learners can be given access to computer resources. Centres should schedule all learners in the same sessions if possible and should release **Part B** to individual learners only for their scheduled sessions.

Part B set task requires learners to apply understanding gained through familiarisation with the case study. Learners should bring in notes as defined in **Part A**. The teacher/ invigilator needs to ensure that notes comply with the requirements.

Learners must complete the set task using this task and answer booklet. Activity 5 must be completed using a computer which has appropriate CAD software. Learners must save their work regularly and ensure that all materials can be identified as their work.

Materials allowed in the supervised assessment:

- a pen, a ruler, eraser and HB or 2B pencil to sketch
- a non-programmable calculator.

The set task is a formal external assessment and must be conducted with reference to the instructions in this task booklet and the Instructions for Conducting External Assessments (ICEA) document to ensure that the supervised assessment is conducted correctly and that learners submit evidence that is their own work.

Learners must not bring anything into the supervised environment or take anything out without your approval.

Centres are responsible for putting in place appropriate checks to ensure that only permitted material is introduced into the supervised environment.

Maintaining security

- During supervised assessment sessions, the assessment areas must only be accessible to the individual learner and to named members of staff.
- Learners can only access their work under supervision.
- Any work learners produce under supervision must be kept secure.
- Only permitted materials for the set task can be brought into the supervised environment.
- During any permitted break and at the end of the session, materials must be kept securely and no items removed from the supervised environment.
- Learners are not permitted to have access to the internet or other resources during the supervised assessment period.
- Learner notes related to Part A must be checked to ensure length and/or contents meet limitations.
- Learner notes will be retained securely by the centre after Part B and may be requested by Pearson if there is suspected malpractice.
- Learners' work produced using computer-aided design (CAD) must be regularly backed up.

After the session, the teacher/tutor or invigilator will confirm that all learner work had been completed independently as part of the authentication submitted to Pearson.

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Outcomes for submission

The completed task booklet will need to be submitted by each learner, together with the following items secured to the booklet with a treasury tag.

- One A4, scaled-to-fit, colour printout of the external envelope.
- One A4, scaled-to-fit, colour printout of the internal space as specified in the scenario.

A fully completed authentication sheet must be submitted by each learner.

The prepared notes from **Part A** must not be submitted with the final outcomes to Pearson.

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Instructions for Learners

Read the set task information carefully.

You have a number of sessions to complete the set task provided by your centre. Plan your time carefully and allow time to produce your outcomes for submission.

You will need to refer to any preparatory work from **Part A** to complete the set task in **Part B**. Your research notes must not contain any tables, graphs, images such as sketches, or other drawings or photographs.

You will complete this set task under supervision and your work will be kept securely during any breaks taken.

You are not permitted internet access during the supervised assessment period.

You must work independently throughout the supervised assessment period and must not share your work with other learners.

In this task booklet, you will be given information that must be used to complete your activities.

You are advised to spend 15 minutes reading the task information about the activities you need to complete. You may make notes and/or highlight information to use in the completion of your activities.

You are allowed the following materials in the supervised assessment:

- a pen, a ruler, eraser and HB or 2B pencil to sketch
- a non-programmable calculator.

You will have access to CAD and printing facilities for completion of Activity 5.

Outcomes for submission

You should submit the task and answer booklet, and the following:

- One A4, scaled-to-fit, colour printout of the external envelope as specified in the scenario.
- One A4, scaled-to-fit, colour printout of the internal space as specified in the scenario.

The A4 printouts must be secured to task and answer booklet using a treasury tag.

You must complete a declaration **that the work you submit is your own.**

The prepared notes must not be submitted with the final outcomes to Pearson, however these must be handed back to the examination invigilator before leaving the examination room.

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PART B SET TASK INFORMATION BEGINS ON THE NEXT PAGE.



Part B set task information

Scenario

You are working as an assistant to the Design Manager of a medium-sized, regional construction organisation. The organisation has been awarded a contract to design and build a school sports facility.

The client's vision

The client is a school that wants to provide a sports facility to meet the various needs of the school. The school wants to create a safe and secure environment with enough changing room space for the girls, boys and staff. The facility should include a swimming pool, a gym, a dance studio and teaching rooms. The school wants to impress the pupils and their parents by providing a spacious, bright, well-equipped sports facility that is finished to a high specification.

Site details

- The site is approximately 90 m by 45 m.
- There is a 700mm difference in ground level – rising from the north west (26.600m) to the south east (27.300m) on the site.
- The site plan is shown in **Figure 1**.
- Sub-soil ground conditions are shown in **Figure 2**.
- Red brick and white rendered science block to the east shown in **Figure 4**.
- Site delivery is restricted during the school day in term time.

General project information

- The total budget for the project is £5 million.
- Nine-month construction programme to make sure the project is complete for the new school year.
- Awarded on a design and build contract basis.
- Site is currently part of the school playing field.
- The site will need to be cleared of vegetation and topsoil ready for reduced level and foundation excavation, see **Figure 3**.

Aesthetic requirements

- The design should be sympathetic to the surrounding architecture, but it should also be modern and sustainable so the building has an architectural impact on the school site.
- Sustainable landscaping solutions should be incorporated to enhance and improve the character of the site.

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Spatial requirements

- A single storey building, no higher than 8m.
- A sports hall measuring 40m by 22m and a 25m swimming pool.
- A reception area and changing facilities for the girls, boys and staff.
- Two classrooms big enough for classes of 30 students should be provided.
- A gym and dance studio should be provided.
- Storage space for sports equipment should be provided.
- A condition of planning consent states that the building footprint must not occupy more than 70% of the total site area.
- External hard surface pedestrian access and parking for 10 vehicles.

Service requirements

- Access to the plant room for the swimming pool must be restricted.
- Air conditioning must be installed in the swimming pool area.
- All changing rooms must include shower facilities.

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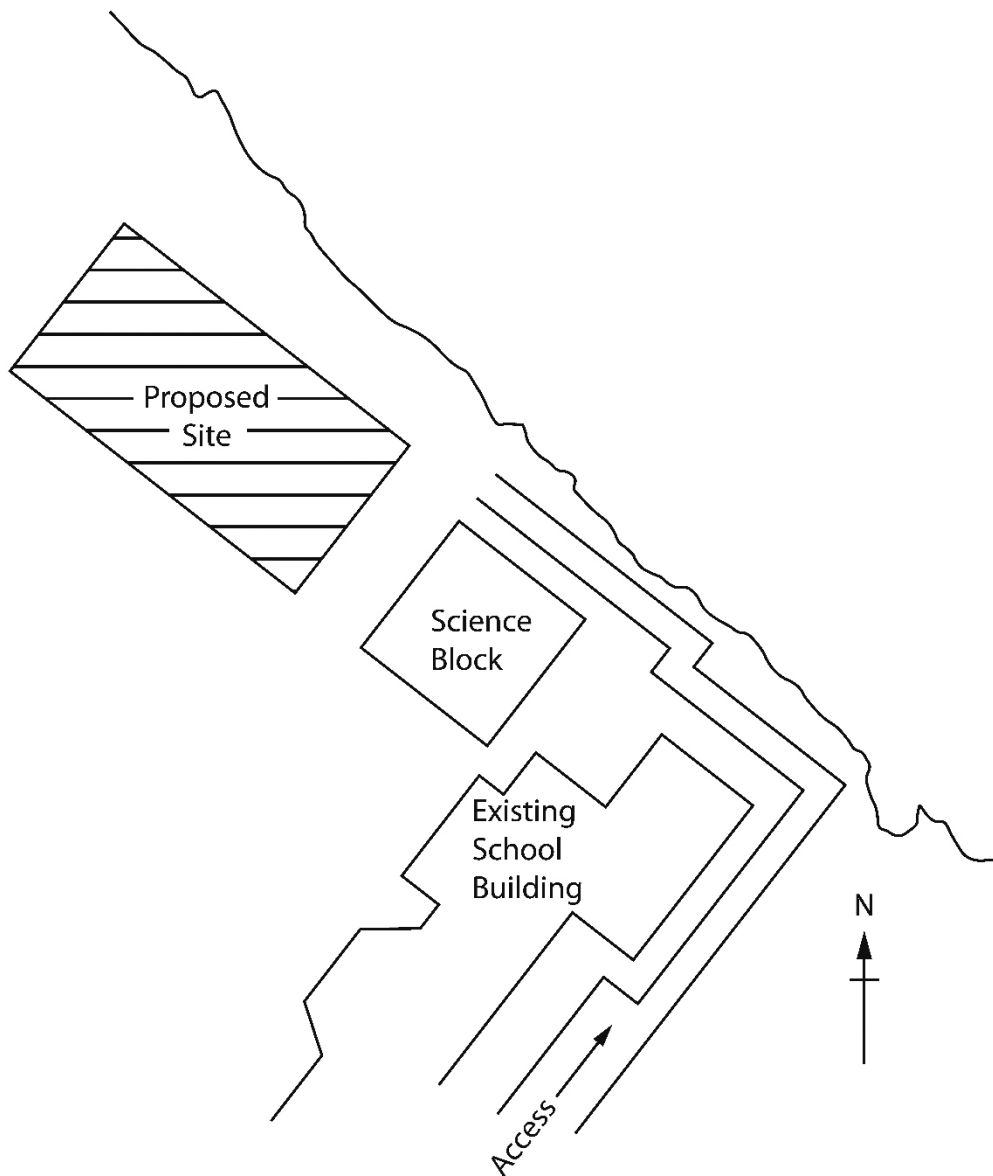


Figure 1
Site plan (not to scale)

Height (m)	Description
26.600	Ground level
26.600 – 26.400	Topsoil
26.400 – 26.200	Medium dense sand
24.300	Groundwater table
26.200 – 22.300	Stiff brown boulder clay

Figure 2
Extract from project borehole report

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Figure 3

View looking north across the proposed site



Figure 4

View looking east showing existing science block



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Set Task

You will need to refer to the task information and your notes completed in **Part A**.

You must complete ALL activities.

You need to produce documentation for the client to support the design and approvals process.

Activity 1 – Design factors and constraints

Communicate the following to the client:

- the design factors and constraints of the project and site
- the likely impact and influence of the design factors and constraints on the design and specification of this project.

You are advised to spend 1 hour and 15 minutes on this activity.

(Total for Activity 1 = 9 marks)

Activity 2 – Initial project brief

Your manager has asked you to produce an initial project brief, to include:

- spatial requirements
- desired project outcomes
- site information
- budget requirements.

You are advised to spend 1 hour and 15 minutes on this activity.

(Total for Activity 2 = 9 marks)

Activity 3 – Building size, form and type of construction

You have been asked to recommend and justify an outline solution to the client that meets their vision and requirements, considering the:

- possible size of the building
- form and type of construction.

You are advised to spend 1 hour and 15 minutes on this activity.

(Total for Activity 3 = 9 marks)

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Activity 4 - Sketches

The Design Manager has asked you to produce annotated sketches of your initial idea, to include:

- a 3D external view of the whole building
- a plan view of one of the changing rooms
- an internal view showing a 3D pictorial representation of one of the changing rooms.

Your annotations must include dimensions, key features of the design, the operation of the building and how the design meets the needs of the client.

You are advised to spend 2 hours and 30 minutes on this activity.

(Total for Activity 4 = 12 marks)

Activity 5 – Virtual modelling of the design

You have been asked to use CAD software to develop a 3D virtual model of your design for the:

- external envelope
- interior of one of the changing rooms.

Print out your rendered 3D image, scaled to fit one A4 sheet, for each of the following:

1. external envelope
2. interior of one of the changing rooms.

Attach these to your task booklet using a treasury tag. Write your name, registration number and centre number on both sheets.

You are advised to spend 5 hours and 30 minutes on this activity.

(Total for Activity 5 = 24 marks)

TOTAL FOR PAPER = 63 MARKS



Activity 1: Design factors and constraints

Communicate the following to the client.

- The design factors and constraints of the project and site.
- The likely impact and influence of the design factors and constraints on the design and specification of this project.

You are advised to spend 1 hour and 15 minutes on this activity.

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(Total for Activity 1 = 9 marks)



INITIAL PROJECT BRIEF

Desired project outcomes

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INITIAL PROJECT BRIEF

Site information

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Activity 3: Building size, form and type of construction

You have been asked to recommend and justify an outline solution to the client that meets their vision and requirements, considering the:

- possible size of the building
- form and type of construction.

You are advised to spend 1 hour and 15 minutes on this activity.

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(Total for Activity 3 = 9 marks)



Activity 4: Sketches

The Design Manager has asked you to produce annotated sketches of your initial idea, to include:

- a 3D external view of the whole building
- a plan view of one of the changing rooms
- an internal view showing a 3D pictorial representation of one of the changing rooms.

Your annotations must include dimensions, key features of the design, the operation of the building and how the design meets the needs of the client.

You are advised to spend 2 hours and 30 minutes on this activity.

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3D external view of the whole building



Plan view of one of the changing rooms

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Internal view showing a 3D pictorial representation of one of the changing rooms

(Total for Activity 4 = 12 marks)



Activity 5: Virtual modelling of the design

You have been asked to use CAD software to develop a 3D virtual model of your design for the:

- external envelope
- interior of one of the changing rooms.

Print out your rendered 3D image, scaled to fit one A4 sheet, for each of the following:

- 1 external envelope
- 2 interior of one of the changing rooms.

Attach these to your task booklet using a treasury tag. Write your name, learner registration number and centre number on both sheets.

You are advised to spend 5 hours and 30 minutes on this activity.

(Total for Activity 5 = 24 marks)

TOTAL FOR PAPER = 63 MARKS

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