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Edexcel Diplomas

Units

Level 2 Principal Learning in Construction

Draft accredited units

October 2007

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Unit 1: Design the built environment: The design process

Principal Learning unit

Level 2

Guided learning hours 60

(45 hours learning time with approx. 15 hours for assessment) **Internally assessed**

About this Unit

The design of the built environment impacts upon communities and society in many ways. Good design should be sustainable and in being so, needs to match the demand and needs of the local community. There is however, a need, to plan and control development to ensure that all parties benefit from the built environment in which they live and work.

In this unit you will gain knowledge and understanding of the factors influencing the design process, identify planning requirements and their impact on design, examine the nature and use of utilities in the design of the built environment and learn to apply a range of technical information available to design the built environment.

Learning outcomes

1.1. Know about factors that influence the design process

1.2. Understand how the nature and availability of utilities impact the design process

1.3. Be able to understand and apply technical information.

What you need to cover

1.1 Know about factors that influence the design process

In this unit you will investigate the many factors that influence the design process. You will pay particular attention to community consultations in order to recognise the needs and concerns of local communities. You will also consider the social impact of construction projects and the effect that the project has on the local economy, in doing so you will consider the means of funding and proposed lifespan of a building or structure.

Sustainability is now an essential consideration on all projects and now has a major influence on design decisions. You will consider good sustainable design practice in terms of sustainable communities, carbon footprint and the 'embodied' or 'embedded' energy within a project. You will gain an understanding of the impact that the building or structural designer has upon the environment and the many examples of good design practice that minimise the environmental impact of the building or structure.

Infrastructure availability and capacity has a major effect on development and design decisions. You will consider how the current and planned infrastructure impinges upon current and future development/design decisions. You will become aware of the need to check the capacity of the infrastructure and the effect that the development will have on the community and properties in the locality.

You will investigate the reason for legislation that influences both development and the design process including; building regulations, the town and country planning act and the construction (design management) regulations (CDM). You will also consider the concept of green belt and planning policy guidance (PPG) in terms of how they contribute to the overall decision making process.

You will consider the impact of planning decisions and how design often have to be modified or changed before final approval is obtained. You will consider the concept of 'planning gain' and the statutory ways by which the local communities can now benefit from this 'gain'.

By analysing the RIBA 'Plan of Work' you will gain an understanding of the design process within the construction and the built environment.

1.2 Understand how the nature and availability of utilities impact the design process

In a changing world where fossil fuels are being consumed at an alarming rate and heading towards scarcity, with new types of energy under development, designers will have to think very carefully about the future energy needs of their designs. You will consider the environmental impact of utilities provision.

Utilities include; water, gas, electricity, telephone and cable TV, but can be expanded to include; district heating schemes and warden call services. You will consider how these utilities are supplied and distributed to construction projects. You will investigate the depth and colour coding of service ducts and pipes so that they can be readily identified.

You will investigate how utility services are provided via main distribution networks, how they are distributed at a local level and how they are scaled down to meet the needs of the individual consumer. In doing so you will also consider the access, that is designed into utility provision, to allow effective future maintenance to be taken into consideration.

1.3	Be able to understand and apply technical information	You will investigate construction specifications and by doing so will realise the importance of British Standards (BS) and BS Codes of Practice in the development and production of a quality product. You will consider how product libraries such as the Barbour Index and also direct liaison with product suppliers, are used by the design team in the development of the final design solution. The specification requirements for a structure, differs with the prevailing climate and expected extremes of weather. You will consider how design specifications need to be related to the climate and how climate change may require an alternative specification. You will realise that local authorities may have specification guidelines that can be considered 'robust' within a local context.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
1.1	**Know about factors that influence the design process**	▪ Describe a range of local factors and legislation that influence the design process. ▪ Describe a range of appropriate sustainable design features.
1.2	**Understand how the nature and availability of utilities impact the design process**	▪ Describe a range of environmental impacts caused by utilities distribution. ▪ Describe key features of services distribution within a project.
1.3	**Be able to understand and apply technical information**	▪ Extract and use straightforward technical information (IE 4). ▪ Produce a specification (CT 1)that identifies some of the requirements of the external envelope of a building. ▪ Produce evidence (IE 6) that the specification is suitable for local climatic conditions.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore you will be assessed by your tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed usung 5th generation, or equivalent, web browsers.

Your tutor will provide you with details of a proposed local construction project, including a brief description of the proposals, plans and elevations and a site layout drawing showing the position of mains utilities and the required service entry points.

You will be in the role of an advisor working for a local planning consultancy and will produce a technical report about the project which focusses on the following areas:

1 consideration of factors that influence the design process and planning decisions

2 the impact of local utilities provision and how they will be incorporated into the project

3 by accessing technical information you will produce a specification for the external envelope of the building or structure that takes into account local climatic conditions

In each of the above areas you should address sustainability issues and the impact of the project on the community and the environment.

Your report must be a word processed A4 document and be included in your portfolio. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and attention to detail and quality, with clear description and explanation or justification, as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
1.1 Know about factors that influence the design process	Briefly describes a range of local factors and legislation that influence the design process; briefly describes appropriate sustainable design features. **(0-8)**	Describes a range of local factors and legislation that influence the design process; describes a range of appropriate sustainable design features. **(9-15)**	Describes clearly a wide range of local factors and legislation that influence the design process; describes clearly and justifies a wide range of appropriate sustainable design features. **(16-20)**	**20**
1.2 Understand how the nature and availability of utilities impact the design process	Briefly describes a range of environmental impacts caused by utilities distribution; briefly describes key features of services distribution within the project. **(0-8)**	Describes a range of environmental impacts caused by utilities distribution, and links them to the project scenario; describes the key features of services distribution within the project. **(9-15)**	Describes clearly wide range of environmental impacts caused by utilities distribution, including their impact within the project scenario; describes and justifies the key features of services distribution within the project. **(16-20)**	**20**
1.3 Be able to understand and apply technical information	Evaluates information and produces a specification that briefly describes some of the requirements of the external building envelope; provides evidence that some of this specification is suitable for local climatic conditions. **(0-8)**	Evaluates information and produces a report that describes most of the requirements of the external building envelope; provides evidence that most of this specification is suitable for local climatic conditions. **(9-15)**	Evaluates information and produces a report that describes clearly and justifies all of the requirements of the external building envelope; provides evidence that all of this specification is suitable for local climatic conditions. **(16-20)**	**20**
			Total marks	**60**

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained in the technical report. The report should address assessment foci 1 to 3 within the report. Photographic evidence and/or drawings where appropriate should be included in the report itself.

There are a number of assessment tasks detailed above and it should be noted that there is no requirement for candidates to undertake any design work. It is the centre's responsibility to provide appropriate drawings and details that allow the candidate to complete the report.

The technical report is the vehicle of assessment for the whole of this unit and should address each of the three assessment foci. Where group activities are used, eg conducting research by visiting sites and interviewing people from industry or the local planning department, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects

examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: brief description for some elements, and basic use, at mark band 1; and clear description with explanation or justification for a wide range of elements , and autonomous/ consistent use at mark band 3. Learner additional support and guidance at band 1 may be significant, but at band 3 should be minimal.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level. Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of … and explain the impact they have on …' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate

explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

Assessment focus 1 refers to key features of services distribution and the learner is expected to demonstrate knowledge and understanding of the colour coding and depth of services and the need for access to facilitate maintenance and repair.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represent their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised investigations, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Most students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and where possible, on permanent display within the classroom to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus students on construction and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. This support could provide the introduction to a task or investigation, act as an ongoing resource or in an evaluative role at the end of the activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The use of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies and establish what help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation and health & safety documentation.
- Assistance with the development of links with other sources of help including, material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits.
- Access to product libraries and other technical information.
- Access to visiting speakers who will put students' learning into industrial context. Specific content level and expected outcomes will have to be discussed in advance.

Site/Office Visits

Whilst design office visits will aid the students' general awareness and perceptions of construction design activities, it is nevertheless essential that all visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Activities could include:

- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials intended for use on the project and their incorporation within the main elements of substructure, superstructure, external works and drainage.
- The intended use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal, including the impact of decisions made at the design stage.
- An investigation into how suitable specifications can minimise waste on site.
- An investigation into the architectural detailing of installed construction components.

- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable design practice and use of sustainable materials.
- An investigation into the provision and incorporation of utilities within the design phase of construction projects.
- Observation and use of product libraries and databases.
- An investigation or research into the planning process and the impact of legislation on the design team.
- Interviews with members of the design team to consider their approach to sustainability within design practice.
- Research into construction details and specifications that are considered robust within a local context.
- An investigation into the local planning processes.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas including site and management practice, built structure design and characteristics and natural and environmental issues. Sustainability is a very important issue in the modern world of construction and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of this requirement are detailed in the above sections.

ConstructionSkills

ConstructionSkills is a resource to be used within schools, employing trained schools liaison officers in all regions. They publish a list of activities and organise competitions and events to stimulate and encourage students to become interested and involved in construction.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will benefit all students and will allow them to view modern construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all activities, and risk assessments must be undertaken prior to site

visits or associated activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	Where learners are
Independent enquirers	Explore issues, events or problems from different perspectives
Creative thinkers	Generate ideas for the external envelope of a building.
	Ask questions to extend their thinking, and to apply technical information
Reflective learners	Producing a report on the design process and the use of technical information
	Reviewing own development
Team workers	
Self managers	Producing a report on the design process and the use of technical information
	Planning and organising own work, including research analysis
Effective participators	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the

learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes. Assembling and managing their e-portfolio
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes. Assembling and managing their e-portfolio
Follow and understand the need for safety and security practices	Conducting research and managing notes. Assembling and managing their e-portfolio
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting research into a building utilities project for their assignment task
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into a building utilities project for their assignment task
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports and drawings. Assembling and managing their e-portfolio
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling and managing their research. Assembling and managing their e-portfolio
Present information in ways that are fit for purpose and audience	Producing and managing ICT work. Assembling and managing their e-portfolio
Evaluate the selection and use of ICT tools and facilities used to present information	Producing and managing ICT work. Assembling and managing their e-portfolio

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others
Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	
Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their assignment brief and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing and revising notes and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical,

social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

This unit can be taught within a traditional classroom environment. Access to construction documentation including exemplar drawings and specifications will be required linked to the sites visited and investigations carried out.

Reference materials

Brett P - *A Building Craft Foundation 2nd edition* (Nelson Thornes 2002) ISBN 0 7487 6531 X

Osbourn D and Greeno R – *Mitchell's Building Series – Introduction to Building 3rd edition* (Pearson Prentice Hall 2002) ISBN 0 582 47303 9

Millward D – *Construction and the Built Environment* (Longman 2003) ISBN 0582 41883 6

Chudley R and Greeno R – *Construction Technology 4th edition* (Pearson Prentice Hall 2005) ISBN 0 13 128642 0

Chudley R and Greeno R – *Building Construction Handbook 5th edition* (Elsevier Butterworth Heinemann 2004) ISBN 0 7506 6196 8

Building Regulations 2000 (HMSO Statutory Instrument No 2531) + amendments

Tricker R and Algar R – *Building Regulations in Brief 4th edition* (Butterworth Heinemann 2006) – ISBN 0 7506 8058 X
Graham P – *Building Ecology* (Blackwell 2003) ISBN 0 632 06413 7

Randall T – *Environmental Design 2nd Edition* (Spon Press 1999) ISBN 0 419 23760 7

Allinson K – *London's Contemporary Architecture 4th edition* (Architectural Press 2006) ISBN 0 7506 6874

Mawhinney M – *Sustainable Development* (Blackwell 2002) ISBN 0 632 06459 5

Roaf S – *Ecohouse 2 - A Design Guide 2nd edition* (Architectural Press 2003) ISBN 0 7506 5734 0

The Egan Review – *Skills for Sustainable Communities* (HMSO 2004) ISBN 1 85946 142 5

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Ching F D K – *Architectural Graphics 4th edition* (John Willey and Sons 2003) ISBN 0 471 20906 6

Cattermole P – *Buildings For Tomorrow* ISBN 9780500342282

Unit 2: Design the built environment: Materials and structures

Principal Learning unit

Level 2

Guided learning hours

(45 hours learning time with approx. 15 hours for assessment).**Internally assessed**

About this Unit

Members of the design team need to have a sound knowledge of the varied and different materials available for use within the construction industry. They apply this knowledge in order to specify materials that are suitable for the projects that they design, whilst also considering sustainability issues which are of increasing importance in the modern world in which we live.

In this unit you will investigate the use and properties of materials used in the construction of the built environment (including how the use of sustainable materials can influence the design process) and explore a range of common structural forms and building elements used in the design process.

Learning outcomes

2.1 Know about materials and their function within structures

2.2 Understand how to use materials in a sustainable way

2.3 Be able to evaluate and use different structural forms.

What you need to cover

2.1 Know about materials and their function within structures

In this unit you will investigate materials and how they are used and incorporated into construction projects. This investigation will consider the various functions that the material performs, including; structure, shelter, insulation, fire protection and aesthetics.

You will also, within your investigations, consider how materials are combined to provide composite solutions that cover many of the above functions within one building element. In addition you will reflect on the different processes and methods of construction which are appropriate to different materials.

Within your investigations you will acquire knowledge about the location, manufacture and preparation of some of the main construction materials in common use.

You will consider some standard construction details and analyse how the various materials combine to address the needs of the user of the building or structure.

2.2 Understand how to use materials in a sustainable way

Within your investigations you will pay considerable attention to sustainability issues thereby gaining an understanding the principles involved in making best use of materials which protect and sustain the built environment. You will consider:

- Reclaimed and recycled materials
- Use of timber from managed forests
- Local sourcing of materials
- Designing to minimise waste
- Use of insulation
- Use of specialist glazing systems
- Eco-friendly materials

Whilst considering the above materials you will investigate how the materials are processed from their raw state to make them suitable for use within sustainable construction.

You will consider how these sustainable materials are incorporated into buildings and how their structural properties influence the design process.

2.3	Be able to evaluate and use different structural forms	As part of your investigations you will review the various forms of structure in common use within modern construction. You will consider: ▪ Framed structures ▪ Shell structures ▪ Cross wall ▪ Cellular You will consider the benefits and drawbacks of the different structural forms and how they impact upon design outcomes. In addition you will investigate the materials used and methods of construction most appropriate to the each of the structures and consider the degree of prefabrication that can be utilised. You will also consider the structural forms most suited to traditional on-site construction processes. In completing the above you will gain knowledge of many components in common use within the construction of a variety of building and structure types.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
2.1	Know about materials and their function within structures	▪ Identify key materials forming the major structural elements and external envelope of a building or structure. ▪ Describe the function(s) that the identified materials perform. ▪ Examine construction elements in detail and describe how different materials work together to perform functions.
2.2	Understand how to use materials in a sustainable way	▪ Identify sustainable materials in use on a construction project. ▪ Describe in sustainability terms the benefits and drawbacks of the materials specified for a construction project.
2.3	Be able to evaluate **and use** different structural forms	▪ Describe and evaluate (IE 4) the structural form of a construction project. ▪ Describe a suitable alternative structural form (CT 5) that could have been used for a project scenario. ▪ Describe a selected construction detail.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and will be assessed by you tutor

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed usung 5th generation, or equivalent, web browsers.

You are to act in the role of a junior partner in a design consultancy and your particular specialism is sustainable design practice.

You have been appointed by a client who has recently commisioned the design of a new building. The client has asked you to carry out an investigation into the design and specification of the new building to ensure that it is appropriately designed and detailed. In addition the client wishes to ensure that all materials specified by the design team are from sustainable sources and/or have minimum impact on the environment.

Your tutor will provide you with details, including specifications and drawings, of a proposed local construction project

You will write a technical report about the project which must address the following areas:

Activity A how materials are incorporated into the project and their function within the overall design solution

Activity B an analysis of sustainability issues including the benefits and drawbacks of the materials specified and/or used on the project

Activity C an investigation of the structural form adopted by the design, alternative types of structure that could be considered and analysis of the design detailing

Your report must be a word processed A4 document and be included in your portfolio. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.** The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and attention to detail and quality, with clear description and explanation or justification, as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
2.1 Know about materials and their function within structures	Identifies key materials forming the major structural elements and external envelope. Identifies the function(s) that the identified materials perform. Examines a construction element in detail and briefly describes how different materials work together to perform a function. **(0-8)**	Describes most of the key materials forming the major structural elements and external envelope. Describes the function(s) that the identified materials perform. Examines a range of construction elements in detail and describes how different materials work together to perform different functions. **(9-15)**	Describes clearly and justifies the use of all of the key materials forming the major structural elements and external envelope. Identifies and evaluates the function(s) that the identified materials perform. Examines a wide range of construction elements in detail and evaluates how different materials work together to perform different functions. **(16-20)**	**20**
2.2 Understand how to use materials in a sustainable way	Identifies sustainable materials in use on the project. Briefly describes in sustainability terms the benefits and drawbacks of key materials specified for the project. **(0-8)**	Describes a range of sustainable materials in use on the project. Describes in sustainability terms the benefits and drawbacks of most of the key materials specified for the project. **(9-15)**	Describes clearly and justifies the use of a range of sustainable materials in use on the project. Analyses in sustainability terms the benefits and drawbacks of all of the key materials used on the project, including consideration of their effects on the environment. **(16-20)**	**20**
2.3 Be able to evaluate and use different structural forms	Identifies the structural form of the project. Briefly describes a suitable alternative structural form that could have been used for the project scenario. Selects and briefly describes a construction detail.	Describes the structural form of the project. Describes a range of suitable alternative structural forms that could have been used for the project scenario. Selects and describes a range of construction details.	Describes clearly and evaluates the structural form of the project. Describes clearly a range of suitable alternative structural forms that could have been used for the project scenario, including consideration of the advantages and disadvantages of each form. Selects, describes clearly	

	(0-8)	**(9-15)**	and analyses a range of construction details. **(16-20)**	**20**
			Total marks	**60**

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained in the technical report. The report should address assessment foci 1 to 3 within the report. Photographic evidence and/or drawings where appropriate should be included in the report itself.

There are a number of assessment tasks detailed above and it should be noted that there is no requirement for candidates to undertake any design work. It is the centre's responsibility to provide appropriate drawings and details that allow the candidate to complete the report.

The technical report is the vehicle of assessment for the whole of this unit and should address each of the three assessment foci. Where group activities are used, eg conducting research by visiting sites and interviewing people from industry or the local planning department, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects

examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: brief description for some elements, and basic use, at mark band 1; and clear description with explanation or justification for a wide range of elements , and autonomous/ consistent use at mark band 3. Learner additional support and guidance at band 1 may be significant, but at band 3 should be minimal.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of … and explain the impact they have on …' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate

range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised practicals, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Most students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site visits will aid the students' general awareness and perceptions of on site construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:

- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials intended for use on the project and their incorporation within the main elements of substructure, superstructure, external works and drainage.
- The intended use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal, including the impact of decisions made at the design stage.
- An investigation into how suitable specifications can minimise waste on site.

- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable design practice and use of sustainable materials.
- An investigation into the provision and incorporation of utilities within the design phase of construction projects.
- Observation and use of product libraries and databases.
- An investigation or research into the planning process and the impact of legislation on the design team.
- Interviews with members of the design team to consider their approach to sustainability within design practice.
- Research into construction details and specifications that are considered robust within a local context.
- An investigation into the local Planning processes.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

Construction Skills is a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will be of benefit to all students, and will allow them to view modern construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be

undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of these specifications.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	Where learners are
Independent enquirers	Explore issues, events or problems from different perspectives
	Plan and carry out research
	Describe a construction detail
	Analyse and evaluate information, judging its relevance and value
	Support conclusions
Creative thinkers	Justify the use of structural forms
Reflective learners	Reviewing own development
Team workers	
Self managers	Planning and organising own work, including research analysis
Effective participators	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes. Assembling and managing their e-portfolio
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes. Assembling and managing their e-portfolio
Follow and understand the need for safety and security practices	Conducting research and managing notes. Assembling and managing their e-portfolio
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting research into structural forms and use of materials for their assignment task
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into structural forms and use of materials for their assignment task
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports and drawings. Assembling and managing their e-portfolio
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling and managing their research. Assembling and managing their e-portfolio
Present information in ways that are fit for purpose and audience	Producing and managing ICT work. Assembling and managing their e-portfolio
Evaluate the selection and use of ICT tools and facilities used to	Producing and managing ICT work. Assembling and managing their e-portfolio

present information	
Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others
Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	
Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their assignment brief and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing and revising notes and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

Reference materials

Brett P - *A Building Craft Foundation 2nd edition* (Nelson Thornes 2002) ISBN 0 7487 6531 X

Osbourn D and Greeno R – *Mitchell's Building Series – Introduction to Building 3rd edition* (Pearson Prentice Hall 2002) ISBN 0 582 47303 9

Millward D – *Construction and the Built Environment* (Longman 2003) ISBN 0582 41883 6

Chudley R and Greeno R – *Construction Technology 4th edition* (Pearson Prentice Hall 2005) ISBN 0 13 128642 0

Chudley R and Greeno R – *Building Construction Handbook 5th edition* (Elsevier Butterworth Heinemann 2004) ISBN 0 7506 6196 8

Building Regulations 2000 (HMSO Statutory Instrument No 2531) + amendments

Tricker R and Algar R – *Building Regulations in Brief 4th edition* (Butterworth Heinemann 2006) – ISBN 0 7506 8058 X
Graham P – *Building Ecology* (Blackwell 2003) ISBN 0 632 06413 7

Randall T – *Environmental Design 2nd Edition* (Spon Press 1999) ISBN 0 419 23760 7

Allinson K – *London's Contemporary Architecture 4th edition* (Architectural Press 2006) ISBN 0 7506 6874

Mawhinney M – *Sustainable Development* (Blackwell 2002) ISBN 0 632 06459 5

Roaf S – *Ecohouse 2 - A Design Guide 2nd edition* (Architectural Press 2003) ISBN 0 7506 5734 0

The Egan Review – *Skills for Sustainable Communities* (HMSO 2004) ISBN 1 85946 142 5

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Ching F D K – *Architectural Graphics 4th edition* (John Willey and Sons 2003)
ISBN 0 471 20906 6

Cattermole P – *Buildings For Tomorrow* ISBN 9780500342282

Unit 3: Design the built environment: Applying design principles

Principal Learning unit

Level 2

Guided learning hours 60

(45 hours learning time with approx. 15 hours for assessment).**Internally assessed**

About this Unit

Being a member of the design team is an exciting and rewarding occupation. By using their expertise and knowledge architects and designers transform people's needs, desires and wishes into workable design solutions.

In this unit you will apply design principles through the design and consideration of a typical modern structure structure. In so doing, you will examine the career pathways available to those involved in the design of the built environment.

Learning outcomes

3.1 Understand job roles and occupational structures, and the importance of teamwork, in construction design and related activities

3.2 Be able to create from a brief and evaluate a realistic design solution for a typical modern building or structure.

What you need to cover

3.1 Understand job roles and occupational structures, and the importance of teamwork, in construction design and related activities

You will conduct a thorough and in depth analysis of a design professional working within the construction and the built environment sector and explore the progression opportunities and qualification requirements. You will demonstrate an understanding of the relationships and teamwork interdependencies of the various design professionals including; architects, architectural technologists, structural engineers, civil engineers, landscape architects, building services engineers and interior designers. In doing so you will realise that the construction designer continues to play a very important role within the team all through the construction period, and is not merely involved in the design stage prior to work commencing on site.

You will also realise that other professionals contribute to the work of the design team and you will gain an understanding of the contribution made by: clients, quantity surveyors, planning consultants, facilities managers and property professionals.

You will also consider the role of the Professional Institutions within construction and the built environment and how they support and regulate their members.

3.2 Be able to create from a brief and evaluate a realistic design solution for a typical modern building or structure

By applying your knowledge of the design process, materials and structures, you will create a realistic design solution for a typical modern structure. You will analyse a client brief and establish the function of the structure in order to explore alternative design solutions. In doing so you will consider the different materials that may be suitable for use within your designs.

You will select and use either traditional drafting techniques and/or computer aided design (CAD) systems, as appropriate to complete your design work.

When evaluating your designs you will also consider the 'buildability' (whether it can be built) of your design and you will identify the skills needed to implement the design.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
3.1	Understand job roles and occupational structures, and the importance of teamwork, in construction design and related activities	▪ Understand the job roles, including teamwork aspects, and progression paths within design of the built environment. ▪ Identify the relevant professional institutions for these roles.
3.2	Be able to create from a brief and evaluate a realistic design solution for a typical modern building or structure	▪ Extract relevant information from the client brief (IE 4). ▪ Produce a design solution (CT 1) that shows attention to detail ▪ Evaluate the design solution (RL 5) against the client brief.

The references in parenthesis indicate the PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore you will be assessed by your tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed usung 5th generation, or equivalent, web browsers.

You will be required to complete two assessed tasks.

Task One

Your tutor will provide you with a client's design brief for a typical modern building or structure, and you are required to develop a design for this, showing attention to detail. You will provide a portfolio of evidence which will include: an analysis of the client brief; initial sketch proposals; floor plans; elevations; and a cross-section or construction detail. You must also provide an evaulation of your final design against the design brief. Aspects of your work can be evidenced by modelling, if this is preferrred by you or by the centre. For the drawing work you may use either CAD or manual drafting techniques.

Task Two

You are a consultant working in the recruitment sector. Your specialist area is the construction industry with a specific interest in design professionals. You have been approached by a government agency and asked to produce some promotional material to encourage young people to consider a career in the field of /st design. You will therefore be required to reseach jobs and careers within and related to construction design and also to consider the role of the professional institutions. The promotional material could take a variety of different forms including: paper based outcomes such as posters and leaflets, a recording for a radio advertisement, a video recording for a television advertisement or even a web-site.

Within the above you will be required to identify the roles played by the various design professionals and institutions. You will also consider how they relate to and are dependant upon one another to produce a quality design that provides best value for the client.

Your evidence must be included in your portfolio. Written material should be in the form of a word processed A4 document. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.
You should include in your portfolio a copy of any presentation materials, together with copies of any relevant observation records or witness statements.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of

assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and attention to detail and quality, with clear description and explanation or justification, as you move across the mark bands.

Within the design element of this unit you will move across the mark bands by paying greater attention to detail and accuracy and demonstrating increasing levels of skill in using a CAD system or traditional drafting to produce a design outcome.

The portfolio must be a word processed A4 document and any drawings or sketches should be no larger than A3 and should be bound or incorporated into the portfolio. Each page of the portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
3.1 Understand job roles, and the importance of teamwork, and occupational structures in construction design and related activities	Briefly describes key job roles, including teamwork aspects and progression paths, within design of the built environment; identifies the relevant professional institutions. **(0-6)**	Describes most of the key job roles, including teamwork aspects and progression paths, within design of the built environment; identifies links with supervisory roles and describes the role of the relevant professional institutions. **(7-11)**	Describes clearly and discusses all of the key job roles, including teamwork aspects and progression paths, within design of the built environment. Describes interactions with supervisory, technical and professional roles. Explains and justifies the role of the relevant professional institutions. **(12-15)**	**15**
3.2 Be able to create from a brief and evaluate a realistic design solution for a typical modern building or structure	Briefly describes and illustrates features that will meet some of the client's needs; produces a solution and portfolio of design work that shows generally acceptable attention to detail; briefly evaluates the final design against some of the requirements in the brief. **(0-18)**	Describes and illustrates features that will meet most of the client's needs; produces a solution and portfolio of good quality design work that shows good attention to detail; evaluates the final design against most of the requirements in the brief. **(19-32)**	Describes clearly, illustrates and justifies features that will meet all of the client's needs; produces a solution and portfolio of high quality design work that shows consistently precise attention to detail; evaluates the final design in detail against all of the requirements in the brief. **(33-45)**	**45**
			Total marks	**60**

Assessment Guidance

Approaches to Assessment

The assessment in this unit is covered by two activities. Assessment focus one relates to jobs and careers within the design sector and a number of alternative ways of providing evidence are outlined above. When evidence is a recorded outcome eg radio advertisement or TV advertisement, or an ICT based outcome eg website then a candidate's work will have to be submitted for moderation on either a CD or DVD.

Evidence for assessment focus two will be contained within a portfolio of design work. The portfolio should include photographic evidence of any modelling work if this has been the chosen medium. Centres are required to ensure that sufficient high resolution photographs are provided to confirm the quality of a candidate's work. The analysis of the client brief and the evaluation of the outcome will be required to be a word processed document.

Where group activities are used, eg conducting research by visiting sites and interviewing people from industry or the local planning department, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration

describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: brief description for some elements, and basic use, at mark band 1; and clear description with explanation or justification for a wide range of elements , and autonomous/ consistent use at mark band 3. Learner additional support and guidance at band 1 may be significant, but at band 3 should be minimal.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of … and explain the impact they have on …' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then

marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised practicals, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Design Activities

It is anticipated that for this unit some centres may need to work in partnership with an external provider of training to allow learners to access expertise and training in use of either CAD systems and/or traditional drafting. It should however be noted that this unit is essentially an element of a taster qualification that is designed to provide a broad appreciation of construction and the built environment, and in the limited time available students will not be expected to develop skills that are comparable to occupational competencies or commercially acceptable standards.

Classroom Activities

Most students will not have visited a construction site or organisation before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies and many design practices are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such organisations, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Access to product libraries.
- Loan of or assistance with specialist drawing equipment.
- Use of CAD facilities.
- Access to specifications, construction drawings, quality control documentation and health & safety documentation.
- Assistance with the development of links with other sources of help, including; local FE and HE institutions, design practices, visiting speakers etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed office visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into a construction context with a focus on design of the built environment. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site visits will aid the students' general awareness and perceptions of on site construction activities, it is nevertheless essential that all site or office visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company or practice well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:

- An investigation of design detailing in use on the site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the design process.
- Investigations using product libraries.
- Research into the type of CAD and drafting systems in use.
- Evaluation of how the company or practice interprets and uses the client brief.
- Observation of sustainable design practice.

It may be that within one site visit different groups will investigate different aspects of design work or construction operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic construction context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills is a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will be of benefit to all students, and will allow them to view modern building/construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	**Where learners are**
Independent enquirers	Plan and carry out research, appreciating the consequences of decisions
Creative thinkers	Generating a design solution
	Try out alternative or new design solutions and follow ideas through
Reflective learners	Evaluating a design solution for a typical modern building
	Reviewing own development
Team workers	Describing job roles and their interactions
Self managers	Implementing change and seeking advice on a design solution
	Planning and organising own work, including research analysis
Effective participators	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes. Assembling and managing their e-portfolio
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes. Assembling and managing their e-portfolio
Follow and understand the need for safety and security practices	Conducting research and managing notes. Assembling and managing their e-portfolio
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting research into the design of a typical modern structure, and into the production of job-role promotional materials, for their assignment task
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into the design of a typical modern structure, and into the production of job-role promotional materials, for their assignment task
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports and drawings. Producing job-role promotional materials. Assembling and managing their e-portfolio
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling and managing their research. Assembling and managing their e-portfolio
Present information in ways that are fit for purpose and audience	Producing and managing ICT work. Assembling and managing their e-portfolio
Evaluate the selection and use of ICT tools and facilities used to	Producing and managing ICT work. Assembling and managing their e-portfolio

present information	
Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others
Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	
Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their assignment brief and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing and revising notes and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

General classroom facilities with traditional drawing boards and instruments and/or ICT suite with Architectural CAD software

Reference materials

Brett P - *A Building Craft Foundation 2nd edition* (Nelson Thornes 2002) ISBN 0 7487 6531 X

Osbourn D and Greeno R – *Mitchell's Building Series – Introduction to Building 3rd edition* (Pearson Prentice Hall 2002) ISBN 0 582 47303 9

Millward D – *Construction and the Built Environment* (Longman 2003) ISBN 0582 41883 6

Chudley R and Greeno R – *Construction Technology 4th edition* (Pearson Prentice Hall 2005) ISBN 0 13 128642 0

Chudley R and Greeno R – *Building Construction Handbook 5th edition* (Elsevier Butterworth Heinemann 2004) ISBN 0 7506 6196 8

Building Regulations 2000 (HMSO Statutory Instrument No 2531) + amendments

Tricker R and Algar R – *Building Regulations in Brief 4th edition* (Butterworth Heinemann 2006) – ISBN 0 7506 8058 X
Graham P – *Building Ecology* (Blackwell 2003) ISBN 0 632 06413 7

Randall T – *Environmental Design 2nd Edition* (Spon Press 1999) ISBN 0 419 23760 7

Allinson K – *London's Contemporary Architecture 4th edition* (Architectural Press 2006) ISBN 0 7506 6874

Mawhinney M – *Sustainable Development* (Blackwell 2002) ISBN 0 632 06459 5

Roaf S – *Ecohouse 2 - A Design Guide 2nd edition* (Architectural Press 2003) ISBN 0 7506 5734 0

The Egan Review – *Skills for Sustainable Communities* (HMSO 2004) ISBN 1 85946 142 5

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Ching F D K – *Architectural Graphics 4th edition* (John Willey and Sons 2003) ISBN 0 471 20906 6

Cattermole P – *Buildings For Tomorrow* ISBN 9780500342282

Unit 4: Create the built environment: Structures

Principal Learning unit

Level 2

Guided learning hours 60

Externally assessed

About this Unit

Construction projects are varied and diverse, and may adopt many different structural forms requiring very different approaches to their construction. This requires the construction team to be able to adapt or adopt working practices to safely and efficiently complete a variety of project types.

In this unit you will identify and use a range of technical information that is commonly used in the construction of the built environment. You will have the opportunity to investigate a range of methods, techniques, plant and tools used in the construction of groundworks, substructure, superstructure and external works.

Learning outcomes

4.1. Know about the methods used in the construction of the main structural elements of a new building or structure

4.2. Understand how buildings and structures can be built entirely in-situ or be part fabricated off site

4.3. Be able to explore different formats of graphical and written communications relating to the construction of the built environment.

What you need to cover

4.1 Know about the methods used in the construction of the main structural elements of a new building or structure

You will investigate the different foundation types in use within modern construction including; concrete strip, trench fill, raft, cellular raft, pad, basement, piled and ground beams. You will consider the methods used in the construction of these foundations including; setting out, excavations, earthwork support, surface treatments, piling operations, hardcore beds and fill, formwork, reinforcement, concreting and surface finishes. In doing so you will become aware of the various types of construction plant used in: handling and distribution of materials, excavation and earthworks, building and construction operations and access provision.

You will develop knowledge of the different forms of structure in common use within modern construction including; framed, shell, crosswall and cellular. You will consider how these structures transfer loads to the foundations.

You will investigate a modern steel framed building or structure and examine the methods of construction including; how it is connected to the foundations, the methods of erection and the detailing of external envelope.

Sustainability is a very important consideration when considering site based activities. You will therefore investigate site practises that minimise the impact of the project on stakeholders, the wider community and both the surrounding built and natural environment. You will also consider the impact of construction activities on the environment as a whole including issues surrounding climate change and global warming.

4.2	**Understand how buildings and structures can be built entirely in-situ or be part fabricated off site**	In modern construction time has become a very important commodity. Construction projects can be completed using entirely site based 'in-situ' construction methods. You will investigate how off site fabrication can be used to speed up the overall construction process and improve quality control, ranging from the use of trussed rafters, timber frame construction, structural steel frames through to complete solutions for buildings and structures, with all services and finishes completed at the factory. In doing so you will realise the benefits of these techniques in reducing the impact of site works, in sustainability terms, on the key stakeholders and wider community. You will also consider the erection and site fixing techniques used for the various levels of pre-fabrication.
4.3	**Be able to explore different formats of graphical and written communications relating to the construction of the built environment**	You will be able to use and interpret a wide range of construction documentation. You will become familiar with the range of working drawings in use within the construction industry including; plans, sections, elevations, details and schedules. You will learn to identify materials and components by reference to standard fill patterns and symbols as required by BS1192. You will investigate both standard and industry specific ICT applications that are used to assist with project management and planning. You will be able to interpret construction planning documents in the form of Gantt charts and identify the time allocations to elements of the project. You will become familiar with the layout and format of construction specifications and understand the difference between a performance specification and a materials and workmanship specification. You will explore the format and use of bills of quantities and develop an understanding of the need for standardisation of measurement techniques.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
4.1	Know about the methods used in the construction of the main structural elements of a new building or structure	• Identify and compare different foundation types in common use within UK construction. • Identify the processes and plant used in the construction of such foundations. • Identify and evaluate different forms of structure in common use within modern construction including; framed, shell, crosswall and cellular. • Demonstrate an understanding of how structures transfer loads to the foundations. • Identify and compare methods of erection and the detailing of external envelope. Identify key stages or processes involved in the construction of the built environment and how they fit into the construction programme. • Identify and evaluate impacts of construction upon the community and local environment.
4.2	Understand how buildings and structures can be built entirely in-situ or be part fabricated off site	• Demonstrate an understanding of the advantages and disadvantages of off site prefabrication. • Identify improvements in quality control brought about by the use of prefabrication. • Identify erection and site fixing techniques used for the various levels of pre-fabrication. • Identify benefits of prefabrication in reducing the impact of site works, in sustainability terms, on the key stakeholders and wider community.

4.3	Be able to explore different formats of graphical and written communications relating to the construction of the built environment	• Identify and compare the various types of construction documentation. • Identify materials and components by referring to standard drawing conventions. • Use and interpret gantt charts and other construction planning • Identify and evaluate the format and use of bills of quantities.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to, and therefore you will be assessed by, external examination.

Guidance for Teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised investigations, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities. Whilst the focus of this unit is independent investigative work tutors will need to provide a focus to guide learners and ensure adequate coverage of the requirements of the specification in order for the learner to maximise his/her potential in the external assessment.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Most students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and where possible, on permanent display within the classroom to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus students on construction and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. This support could provide the introduction to a task or investigation, act as an ongoing resource or in an evaluative role at the end of the activity. Where group work is used, tutors must ensure that individual learners are provided with equal experiential opportunities.

Industry Links

The use of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the

recruitment of trainees and future graduates. Centres should actively seek links with such companies and establish what help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation and health & safety documentation.
- Assistance with the development of links with other sources of help including, material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits.
- Access to visiting speakers who will put students' learning into industrial context. Specific content level and expected outcomes will have to be discussed in advance.

Site/Office Visits

Whilst site visits will aid the students' general awareness and perceptions of on site construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Activities could include:

- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive possible conclusions and may require you to be guided by their health & safety officer).
- Carry out an observation on the safe use of tools, plant and equipment.
- Presentation from health & safety officer about construction site induction procedures.
- An investigation into the architectural detailing of installed construction components.
- An investigation into setting out and dimensional tolerance of on practical activities.
- How accurate batching of mortar is achieved during on site mixing.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- The extent and use of prefabrication and the impact on the on-site construction period.

- Observation of sustainable site practice.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Students, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas including site and management practice, built structure design and characteristics and natural and environmental issues. Sustainability is a very important issue in the modern world of construction and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of this requirement are detailed in the above sections.

ConstructionSkills

ConstructionSkills is a resource to be used within schools, employing trained schools liaison officers in all regions. They publish a list of activities and organise competitions and events to stimulate and encourage students to become interested and involved in construction.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will benefit all students and will allow them to view modern construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are

provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	Where learners are
Independent enquirers	Carrying out investigations - planning and carrying out research, analysing and evaluating information, explaining/evaluating structural forms
Creative thinkers	considering how structures can be built Using and producing different forms of graphical communication, including Gantt charts
Reflective learners	Reviewing own development
Team workers	
Self managers	Planning and organising own work, including research analysis
Effective participators	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes
Follow and understand the need for safety and security practices	Conducting research and managing notes
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting and assimilating research into construction elements and pre-fabrication techniques.
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into different formats for graphical and written communication
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports and drawings
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling, assimilating and managing their research
Present information in ways that are fit for purpose and audience	Producing and managing ICT work
Evaluate the selection and use of ICT tools and facilities used to	Producing and managing ICT work

present information	
Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Exchanging information with their tutor, peers and others
Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	
Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their learning briefs and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

This unit can be taught within a traditional classroom environment. Access to construction documentation including exemplar drawings and specifications will be required linked to the sites visited and investigations carried out.

Reference materials

Brett P - *A Building Craft Foundation 2nd edition* (Nelson Thornes 2002) ISBN 0 7487 6531 X

Brett P – *Carpentry and Joinery for the Building Craft Student 1* – (Nelson Thornes 1990) ISBN 0748702873

Chudley R and Greeno R – *Construction Technology 4th edition* (Pearson Prentice Hall 2005) ISBN 0 13 128642 0

Chudley R and Greeno R – *Building Construction Handbook 5th edition* (Elsevier Butterworth Heinemann 2004) ISBN 0 7506 6196 8

CITB – *Safety at Work* (CITB 2002) – ISBN 1 85751 018 6

Coventry S and Woolveridge C – *Environmental Good Practice on Site* (CIRIA 2000)

Foster G – *Construction Site Studies Production, Administration and Personnel* (Longman 2000) ISBN 0 582 019710

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Millward D – *Construction and the Built Environment* (Longman 2003) ISBN 0582 41883 6

Osbourn D and Greeno R – *Mitchell's Building Series – Introduction to Building 3rd edition* (Pearson Prentice Hall 2002) ISBN 0 582 47303 9

Unit 5: Create the built environment: Using tools

Principal Learning unit

Level 2

Guided learning hours 60

(45 hours learning time with approx. 15 hours for assessment).**Internally assessed**

About this Unit

Construction work on site is a very rewarding activity. Working closely with site managers and technicians the craftsperson uses tools and equipment to create the built environment, turning dreams into reality. Everyone relies upon the construction craftsperson to provide the quality environment in which we live, work and relax.

In this unit you will apply good practice in safe working techniques by appropriate selection and use of a range of tools, materials and personal protective equipment to perform construction activities. In doing so you will develop an understanding of the job roles and career pathways in the construction industry. You will have the chance to complete some practical work in one of four craft areas; brickwork, carpentry and joinery, building services and painting and decorating. You will also develop an understanding of the hazards and risks commonly encountered in the construction of the built environment and show how they can be minimised

You will complete an assessed practical activity in the craft area of your choice, selected from the tasks/activities detailed within this unit. In addition you will participate in a presentation covering job roles in the construction industry.

Learning outcomes

On completion of this unit a learner should:

5.1. Know about, use and be able to extend own implementation of health and safety practices in a construction craft environment

5.2. Understand the working characteristics and safe use of materials

5.3. Be able to use tools safely and effectively to produce a practical outcome

5.4. Understand the job roles, progression routes, occupational structures and importance of teamwork in the crafts and related activities.

What you need to cover

5.1 Know about, use and be able to extend own implementation of health and safety practices in a construction craft environment

In order to successfully complete this unit you will:

- Follow the requirements of your centres' risk assessment and identify any potential hazards that could occur while you are doing your practical activities. You will decide on appropriate precautions to minimise the risk and ensure safe working practices, and will learn to continually extend your awareness and implementation of health and safety good practice.
- Select and use the appropriate correct personal protective equipment (PPE) which may include; a hard hat, safety boots, hand protection, ear defenders, gloves, eye protection, barrier cream, dust masks, a high visibility jacket or other task specific PPE. It is also your responsibility to maintain your equipment and report any problems to your teacher/tutor.
- Be aware of the Control of Substances Hazardous to Health (COSHH) regulations and identify the particular requirements relating to the materials you will be using for your practical activities.
- Observe and follow safe working practices when lifting and manually handling building materials and will stack materials safely ready for use in practical activities.
- Maintain a clean and tidy work area at all times and you will clean your work area upon completion.
- Take responsibility for your own health and safety and not to endanger the health and safety of others.
- Become aware of the need for adequate ventilation or extraction of fumes or dust appropriate to the practical task.
- Consider the health and safety issues relevant to the practical task that would be encountered within a site environment, including; working in confined spaces, below ground level, at height and using equipment covered by legislation.

5.2 Understand the working characteristics and safe use of materials

You will develop an understanding of the effects of extremes of temperature on construction operations. Including, precautions and good site practice in order to avoid defects arising from work being carried out in extremes of temperature.
When undertaking practical activities you will develop a knowledge and understanding of on site practices that promote quality outcomes and will learn about the visual and aesthetic appearance of quality work.
You will develop an understanding of the inherent hazards associated with the material area covered by your practical activity.

5.3 Be able to use tools safely and effectively to produce a practical outcome

In undertaking practical activities you will learn to read and use a variety of construction drawings including plans, sections, elevation and detail.
You will become familiar with the common scales used for construction drawings (1:100, 1:50 & 1:20 for setting out and 1:5 & 1:10 for detail)
You will also identify the different materials and components within your work by reference to standard drawing conventions and construction notes.
When completing practical activities you will:

- Measure mark and set out your work accurately.
- Select and use the correct tools and equipment for the practical activities that you undertake.
- Learn to demonstrate the safe and correct use of the tools appropriate to the task.
- Maintain a tidy working area.

		• Handle tools with appropriate care and clean after use. On completion of your work you will check your work for performance, dimensional tolerance, level, fall, plumb, surface deviation, square or fit as is appropriate to the practical task in hand. You will consider appropriate quality issues subjectively and objectively and the aesthetic appearance of your work. On completion of practical activities you will pay due regard to security issues and ensure all tools are securely locked away at the end of practical activities. You will minimise the amount of wastage produced in your practical work by calculating the quantity of materials needed. You will investigate the correct disposal methods for the different types of waste that accumulates as a result of construction related activities.
5.4	Understand the job roles, progression routes, occupational structures and importance of teamwork in the crafts and related activities	You will investigate the job roles, qualifications and responsibilities at craft, technical, supervisory and management levels, including the teamwork aspects, and explore the progression opportunities, qualification requirements and the role of the Professional Institutions within construction and the built environment.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
5.1	Know about, use and be able to extend own implementation of health and safety practices in a construction craft environment	▪ Identify hazards and potential risks associated with a practical craft task including materials ▪ Identify people at risk ▪ Evaluate own experience (RL 5) to self-manage improvements (SM 2) in own knowledge and use of safe working procedures, observance of COSHH regulations and use of PPE.
5.2	Understand the working characteristics and safe use of materials	▪ Identify appropriate materials and site procedures that promote safe and quality practical outcomes, for a straightforward task.
5.3	Be able to use tools safely and effectively to produce a practical outcome	▪ Use appropriate skills to produce a practical outcome that shows attention to detail, for a straightforward task ▪ Produce quality-control records for a straightforward practical task
5.4	Understand the job roles, progression routes, occupational structures and importance of teamwork in the crafts and related activities	▪ Collaborate with others (TW 1) to describe and discuss (EP 1, TW 5) major job roles, including teamwork aspects, within the craft sector. ▪ Identify relevant progression pathways and professional institutions.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

Task 1

This unit is suited to activity based assessment and therefore you will be assessed by your tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed usung 5th generation, or equivalent, web browsers.

1. You will complete one of the following assessement activities from your chosen material area; brickwork, carpentry and joinery, building services or painting and decorating. You will also participate in a presentation, including the production of a powerpoint, about job roles and progression within the construction crafts:

Brickwork

A half brick wall in stretcher bond with a tooled 'bucket handle' joint to one side. The wall must have a minimum area of 1m² and may incorporate a decorative feature created by using different coloured bricks.

Carpentry and Joinery

A wooden planter of framed construction built from pre-prepared treated timber and suitable fixings. The planter should have an open top with a minimum area of 0.2m² and a height of 300mm. The planter may be either square or rectangular and sides should be of solid construction and not of the open lattice type. The base of the planter should be raised off the floor by no more than 75mm to allow for drainage. The base, and all the corners and legs must be connected using suitable wood joining methods.

OR

A framed, ledged and braced V jointed matchboard door constructed using pre-prepared treated timber. The door can be either full size for example 838mm x 1981mm or may be scaled down to a minimum of 419mm x 991mm (half scale). The door must be constructed using appropriate jointing methods and should be fitted with a mortise deadlock and appropriate escutcheon plates.

Building Services

Within a workshop environment utilising an appropriate unmarked board for mounting wiring and components. Complete the wiring from a consumer unit which includes; a ring main feeding 5 socket outlets with an additional 2 spurred socket outlets and a lighting circuit that includes a minimum of 2no 1-way switched lights and 1no 2-way switched lights.

AND

Task 2

Within a workshop environment utilising an appropriate unmarked board for mounting pipes and components. Complete a 15mm copper pipework water system that incorporates; a stop tap or isolating valve, a bib tap, 1 manipulative compression tee, 1 non-manipulative compression tee, 1 soldiered tee, a minimum of 3 soldered elbow joints, 2 cap ends and a minimum of 2300mm pipework connecting the fittings. The system will be water tested upon completion.

Painting and Decorating

Completed decoration of an area or 'bay' that includes the following;

A section of wall with all surfaces properly prepared and painted with emulsion paint, to include cutting in to ceilings, skirting boards, electrical switches and sockets and a window and/or door frame.

AND

A section of wall with all surfaces properly prepared and decorated using wallpaper, to include trimming to ceilings, skirting boards, electrical switches and sockets , and a window and/or door frame.

Describes how ongoing experience and reflection is used to self manage improvements in their knowledge and skills in this area.

AND

Either a flush door, a panelled door or a casement window, properly prepared and painted in the correct sequence to a gloss finish.

2. For your chosen craft area craft area you will also be required to produce a word processed technical report that provides evidence of:

a. Knowledge of health and safety procedures in a construction craft environment
b. An understanding of the working characteristics and safe use of materials
c. An ability to use tools safely and effectively to produce a practical outcome with appropriate quality control records.
d. How you use ongoing personal reflection to self-manage improvements in your knowledge and use of Health and Safety good practice.

3. Presentation on Job Roles and Occupational Structures

In addition to the above, you will be required to contribute to and participate in a team presentation and discussion on the key job roles, qualifications and responsibilities at craft and sector-related technical, supervisory and management levels. Overall, this should describe each role in detail, including:

- the title and purpose of the role
- the nature of the work
- interactions with others, including teamwork aspects
- the skills and experience required
- the relevant qualifications requirements
- the progression opportunities
- the role of the relevant Professional Institutions, and their entry requirements

Working as a member of a presentation team, you should contribute fully to the planning of the presentation and discussion, the preparation of the presentation materials (including powerpoint slides) and during the presentation and discussion itself. In agreement with your team, you should take responsibility for two different job roles. Your tutor will observe you and the other members of your group while you do all of this.

Your evidence must be included in your portfolio. Written material should be in the form of a word processed A4 document. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.
You should include in your portfolio a copy of your presentation materials, together with copies of any relevant planning notes, observation records or witness statements.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and attention to detail and quality, with clear description and explanation or justification, as you move across the mark bands.

Within the practical element of this unit you will move across the mark bands by paying greater attention to detail and accuracy and demonstrating increasing levels of skill in manipulating tools to produce a practical outcome.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
5.1 Know about, use and be able to extend own implementation of health and safety practices in a construction craft environment	Briefly describes some of the hazards and potential risks associated with the practical task, including materials used, and identifies people at risk; demonstrates safe working procedures, use of PPE and observance of COSHH regulations; briefly describes how ongoing experience and reflection is used to self-manage improvements in their knowledge and skills in this area. **(0-5)**	Describes most of the hazards and potential risks associated with the practical task, including materials used, and identifies most of the people at risk; consistently demonstrates safe working procedures and use of PPE; observes and demonstrates a broad understanding of the COSHH regulations; describes how ongoing experience and reflection is used to self manage improvements in their knowledge and skills in this area. **(6-10)**	Describes clearly all of the hazards and potential risks associated with the practical task, including materials used, and identifies all of the people at risk; autonomously and consistently demonstrates safe working procedures and use of PPE; observes and justifies the COSHH regulations; describes clearly how ongoing experience and reflection is used to self manage improvements in their knowledge and skills in this area. **(11-13)**	**13**
5.2 Understand the working characteristics and safe use of materials	Briefly describes materials to be used; briefly describes site procedures for their use that promote safe and quality practical outcomes. **(0-5)**	Describes most of the materials to be used and why they are suitable for use; describes a range of site procedures for their use that promote safe and quality practical outcomes. **(6-9)**	Describes clearly and justifies the use of all the materials to be used, and discusses the advantages or disadvantages of alternatives; describes clearly and evaluates a range of site procedures for their use that promote safe and quality practical outcomes. **(10-12)**	**12**

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
5.3 Be able to use tools safely and effectively to produce a practical outcome	Demonstrates reasonable skills to produce a practical outcome that shows acceptable attention to detail; produces basic-level quality-control records of the practical outcome. **(0-8)**	Demonstrates a good level of skills to produce a practical outcome that shows good attention to detail; produces good-level quality-control records of the practical outcome. **(9-15)**	Demonstrates a high level of skills to produce a practical outcome that shows consistently precise attention to detail; produces detailed and evaluative quality-control records of the practical outcome. **(16-20)**	**20**
5.4 Understand the job roles, progression routes, occupational structures and importance of teamwork in the crafts and related activities	In a group presentation and discussion, briefly describes two different job roles and their progression routes within the craft sector, including the teamwork aspects; briefly describes the roles of relevant professional institutions. **(0-6)**	In a group presentation and discussion, describes two different job roles and their progression routes within the craft sector, including the teamwork aspects and links with supervisory roles; describes the role of some of the relevant professional institutions. **(7-11)**	In a group presentation and discussion, describes clearly and justifies two different job roles and their progression routes within the craft sector, including teamwork aspects and links and interactions with supervisory, technical and professional roles; describes and justifies the role of most of the relevant professional institutions. **(12-15)**	**15**
			Total marks	**60**

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained within a technical report. The report should include photographic evidence of work in progress and the completed outcome. Where work is 'hidden' or not evident in the completed outcome, for example prepared joints prior to assembly, then photographs showing the work at that preliminary stage should be provided. Centres are required to ensure that sufficient high resolution photographs are provided to confirm the quality of a candidate's work.

There are a number of assessment tasks detailed above and it should be noted that there is no requirement for candidates to undertake any design work. It is the centre's responsibility to provide appropriate working drawings and details that allow the candidate to complete a focused practical task.

Some assessment elements, such as quality control records and checks, or adoption of safe working practices, can be assessed directly by the tutor during practical activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website.

The assessment in this unit is covered by two activities. Assessment Focus 1,2 and 3 relate to the practical assessment activity from your chosen material area and assessment focus 4 covers a presentation about job roles and occupational structures. The technical report, together with accompanying photographs, is the vehicle of assessment for Assessment Focus 1,2 and 3 whilst the presentation will be assessed via a copy of the powerpoint and accompanying narrative, together with witness statements to verify the organisation, quality, timing and delivery of the spoken element of this section. Where group activities are used, eg for the presentation on job roles, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the

	breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: brief description for some elements, and basic use, at mark band 1; and clear description with explanation or justification for a wide range of elements , and autonomous/ consistent use at mark band 3. Learner additional support and guidance at band 1 may be significant, but at band 3 should be minimal.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of … and explain the impact they have on …' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised practicals, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Practical Activities

It is anticipated that most centres will need to work in partnership with an external provider of training to enable learners to practice and apply the vocational skills needed to complete the practical task. Some centres may have a suitable external or covered area and will be able to import craft trainers for specific lessons, whilst others will find it necessary to use the facilities of their local FE provider. It should however be noted that this unit is essentially an element of a taster qualification that is designed to provide a broad appreciation of construction and the built environment, and in the limited time available students will not be expected to develop skills that are comparable to occupational competencies or commercially acceptable standards.

Classroom Activities

Most students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation and health & safety documentation.

- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site visits will aid the students' general awareness and perceptions of on site construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:

- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive possible conclusions and may require you to be guided by their health & safety officer).
- Carry out an observation on the safe use of tools, plant and equipment.
- Presentation from H&S Officer about construction site induction procedures.
- An investigation into the architectural detailing of installed construction components.
- An investigation into setting out and dimensional tolerance of on practical activities.
- How accurate batching of mortar is achieved during on site mixing.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- The extent and use of prefabrication and the impact on the on-site construction period.
- Observation of sustainable site practice.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be

identified in many areas, including site and management practice, and built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills is a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will be of benefit to all students, and will allow them to view modern building or construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	Where learners are
Independent enquirers	Identifying hazards and potential risks
	Understanding the characteristics and use of materials
	Reading and interpreting construction drawings
	Investigating job roles within the construction industry
Creative thinkers	Generating ideas for presentation styles
Reflective learners	Developing awareness and observance of H&S, and related, requirements
	Justifying the use of materials and procedure
	Carrying out subjective and objective quality control and improvement of own practical skills
	Reviewing own development
Team workers	Considering job roles and their interactions
	Participating in a team presentation
Self managers	Planning and organising own work, including skill improvement and research analysis
Effective participators	Participating in a team presentation

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes. Assembling and managing their e-portfolio
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes. Assembling and managing their e-portfolio
Follow and understand the need for safety and security practices	Conducting research and managing notes. Assembling and managing their e-portfolio
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting research into job roles and occupational structures for their assignment task
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into job roles and occupational structures for their assignment task
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports and drawings. Assembling and managing their powerpoint presentation elements and e-portfolio
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling and managing their research. Contributing to a powerpoint presentation. Assembling and managing their e-portfolio
Present information in ways that are fit for purpose and audience	Producing and managing ICT work. Contributing to a powerpoint presentation. Assembling and managing their e-portfolio
Evaluate the selection and use of	Producing and managing ICT work. Assembling and managing their e-portfolio

ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others

Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	Planning a craft activity involving layout and calculation
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	

Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations. Contributing to a powerpoint presentation on job roles and occupational structures.
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their assignment brief and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing a powerpoint presentation. Preparing and revising notes and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

This unit will require specialist workshop facilities appropriate to the selected practical task.

Reference materials

Brett P - *A Building Craft Foundation 2nd edition* (Nelson Thornes 2002) ISBN 0 7487 6531 X

Brett P – *Carpentry and Joinery for the Building Craft Student 1* – (Nelson Thornes 1990) ISBN 0748702873

Osbourn D and Greeno R – *Mitchell's Building Series – Introduction to Building 3rd edition* (Pearson Prentice Hall 2002) ISBN 0 582 47303 9

Foster G – *Construction Site Studies Production, Administration and Personnel* (Longman 2000) ISBN 0 582 019710

Millward D – *Construction and the Built Environment* (Longman 2003) ISBN 0582 41883 6

Chudley R and Greeno R – *Construction Technology 4th edition* (Pearson Prentice Hall 2005) ISBN 0 13 128642 0

Chudley R and Greeno R – *Building Construction Handbook 5th edition* (Elsevier Butterworth Heinemann 2004) ISBN 0 7506 6196 8

CITB – *Safety at Work* (CITB 2002) – ISBN 1 85751 018 6

Nash W G – *Bricklaying* (Nelson Thornes 1991) ISBN 0 7487 1292 5

Heineman – *Brickwork* (Heineman 2006) ISBN 9780435430870

Heineman – *Carpentry and Joinery* (Heineman 2006) ISBN 9780435325701

Heineman – *Painting and Decorating* (Heineman 2006) ISBN 9780435463594

Treloar R – *Plumbing, Heating and Gas Installation* (Blackwell 2003) ISBN 1405106131

Blower G J – *Plumbing Mechanical Services Book 1* (Pearson 1995) ISBN 0582236592

Lindsey T – *Basic Electrical Installation Work* (Butterworth Heinemann 1998) ISBN 0340705744

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Coventry S and Woolveridge C – *Environmental Good Practice on Site* (CIRIA 2000)

Unit 6: Value and use of the built environment: Communities

Principal Learning unit

Level 2

Guided learning hours 60

(45 hours learning time with approx. 15 hours for assessment).**Internally assessed**

About this Unit

We are all users of the built environment. Without the built environment we would not have access to the comfortable lifestyle that we all know and enjoy. The built environment touches every aspect of our lives, providing; somewhere to live, learn, work, rest and play, it is essential to our wellbeing, yet the effect of the built environment upon the natural environment and sustainability should not be ignored.

In this unit you will gain knowledge and understanding of the contribution that the built environment makes to the physical, spiritual and emotional wellbeing and economic prosperity of individuals and sustainable communities and the way in which individuals and communities can contribute to sustainability. You will also understand the contribution of property services and housing to the development of the built environment and the wider community. In doing so, you will examine key career pathways within this area of construction and the built environment.

Learning outcomes

6.1 Know how sustainability impacts upon the built environment

6.2 Be able to evaluate the contribution of the built environment to society and communities

6.3 Understand how the built environment can be improved to benefit individuals and communities

6.4 Understand the job roles, progression routes, occupational structures and the importance of teamwork relating to building maintenance and facilities management.

What you need to cover

6.1 Know how sustainability impacts upon the built environment

In this unit you will investigate sustainability within construction and the built environment and, in particular, how planned and routine maintenance activities are dependent upon decisions made at the design stage. In doing so you will focus on the following areas:

- Social and community issues
- Environmental influences
- Economic impacts
- Lifecycle issues

You will consider the short and long term benefits of sustainable practices including:

- How sustainable materials and processes are used.
- Use of locally sourced materials and services to reduce emissions and pollution.
- Sustainable site practice
- Sustainable maintenance

In doing so you will consider the role of local infrastructure and transport services in influencing the local environment and the development of communities.

6.2 Be able to evaluate the contribution of the built environment to society and communities

You will investigate the role of public and private housing and the contribution made to social policy and the well being of communities. In doing so you will consider the range and type of accommodation available and the need to ensure access to the property market for young people and first time buyers. This will make you aware of the effect that location and land prices have upon the type of property being constructed.

By examining the residential, industrial and commercial property market and considering how it contributes to personal and organisational wealth (including the sale and purchase of assets) you will review how the use of built assets makes a direct contribution to local economies and communities. In doing so you will become aware of property trends and the effect of external influences, such as demographic changes and interest rates, on property values.

6.3	Understand how the built environment can be improved to benefit individuals and communities	You will gain an understanding of how the built environment can be improved to enhance the safety and health of individuals and communities by providing secure, comfortable, clean accommodation in which to work, rest and play. In doing so you will realise the benefits of designing for future expansion and sustainability. You will also investigate the contribution that the built environment makes to the physical spiritual and emotional wellbeing and economic prosperity of individuals and communities. In doing so you will consider the factors influencing the development and creation of sustainable communities.
6.4	Understand the job roles, progression routes, occupational structures and the importance of teamwork relating to building maintenance and facilities management	You will investigate the job roles, teamwork aspects, qualifications and responsibilities at craft, technical, supervisory and management levels and explore the progression opportunities, qualification requirements and the role of the Professional Institutions within building maintenance, property services and facilities management.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
6.1	Know how sustainability impacts upon the built environment	▪ Describe a range of sustainable practices for a straightforward construction activity ▪ Describe benefits attributed to their use.
6.2	Be able to evaluate the contribution of the built environment to society and communities	▪ Describe factors in the local property market that lead to the development of sustainable communities ▪ Describe ways in which construction and the built environment contributes to the creation of wealth.
6.3	Understand how the built environment can be improved to benefit individuals and communities	▪ Explain ways in which the built environment can be improved so as to benefit individuals and communities. ▪ Describe factors influencing the development of sustainable communities
6.4	Understand the job roles, progression routes, occupational structures and the importance of teamwork relating to building maintenance and facilities management	▪ Explain the purpose of job roles, including teamwork aspects, within building maintenance, property services and facilities management ▪ Describe relevant professional institutions.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore you will be assessed by your tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed usung 5th generation, or equivalent, web browsers.

You will be required to complete three assessed tasks.

Task One

Sustainability is a major consideration within all construction activities. You have been appointed as a consultant by a major supermarket chain to report on sustainable practice relating to expansion and maintenance activities.

Your report will consider the implication of decisions made at the design stage and will focus upon:

1. social and community issues
2. environmental influences
3. economic impacts
4. and lifecycle issues.

Your report must be a word processed A4 document and be included in your portfolio. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Task Two

You are a journalist working for a local newspaper and have been asked by your editor to research and write an article about the property market in your local area. In doing so you will consider:

1 An evaluation of the built environment that considers; the balance of property types and prices and the effect of location and land prices upon the type of property being constructed. You will also consider how the use of built assets makes a direct contribution to local economies and communities.

2 How the built environment can be improved to enhance the physical, spirtual and emotional wellbeing and economic prosperity of individuals and communities.

Your article must be a word processed or desk top published A4 document and be included in your portfolio. Should you need to provide any photographs, drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Task Three

You are a consultant working in the recruitment sector. Your specialist area is the construction industry with a specific interest in facilities management, building maintenance and property services. You have been approached by one of the professional institutions and asked to write a report about career options in your specific specialist area and other relevant related fields. You will therefore be required to reseach jobs and careers within, and related

to, facilities management, building maintenance and property services. You will also consider the role of the relevent professional institutions.

Your report must be a word processed A4 document and be included in your portfolio. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. The maximum marks available for each Assessment Focus represent its relative significance within the unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and attention to detail and quality, with clear description and explanation or justification, as you move across the mark bands.

Assessment Grid

(Should include guidance on numbers of marks to be allocated for each task)

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
6.1 Know how sustainability impacts upon the built environment	Briefly describes some sustainable practices that are linked to the overall maintenance of the built environment , and briefly describes the benefits attributed to their use. **(0-6)**	Describes a range of sustainable practices that are linked to the overall maintenance of the built environment, and describes the impact upon current maintenance issues of decisions made by the original design team. **(7-11)**	Describes clearly and justifies a wide range of relevant sustainable practices that are clearly linked to the maintenance of the built environment, and evaluates the impact upon current maintenance issues of decisions made by the original design team. **(12-15)**	**15**
6.2 Be able to evaluate the contribution of the built environment to society and communities	Briefly describes the local property market and identifies factors that lead to the development of sustainable communities; briefly describes ways in which construction and the built environment contribute to the creation of wealth. **(0-6)**	Describes the local property market and considers factors that lead to the development of sustainable communities; describes a range of ways in which construction and the built environment contribute to the creation of wealth. **(7-11)**	Describes clearly and evaluates the local property market together with the factors that lead to the development of sustainable communities; evaluates a range of ways in which the built environment contributes to the creation of wealth. **(12-15)**	**15**

6.3 Understand how the built environment can be improved to benefit individuals and communities	Briefly describes ways by which the built environment can be improved, and states the benefits of designing for future expansion; briefly describes key factors influencing the development of sustainable communities **(0-6)**	Describes a range of ways by which the built environment can be improved and describes the benefits of designing for future expansion; describes a range of key factors influencing the development of sustainable communities **(7-11)**	Describes clearly and evaluates a broad range of ways by which the built environment can be improved and justifies the benefits of designing for future expansion; discusses a range of key factors influencing the development of sustainable communities **(12-15)**	**15**
6.4 Understand the job roles, progression routes, occupational structures and the importance of teamwork relating to building maintenance and facilities management.	Briefly describes key job roles, including teamwork aspects and progression paths, within building maintenance, property services and facilities management; briefly describes the role of relevant professional institutions. **(0-6)**	Describes most of the key job roles, including teamwork aspects and progression paths, within building maintenance, property services and facilities management; identifies links with supervisory, technical and professional roles; describes the role of the main relevant professional institutions. **(7-11)**	Describes clearly and discusses all of the key job roles, including teamwork aspects and progression paths, within building maintenance, property services and facilities management. Describes interactions with supervisory, technical and professional roles; explains and justifies the role of the main relevant professional institutions. **(12-15)**	**15**
			Total marks	**60**

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained in the above technical reports and newspaper article.

Where group activities are used, eg conducting research by visiting sites and premises and interviewing people from industry or within facilities management, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria

analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: brief description for some elements, and basic use, at mark band 1; and clear description with explanation or justification for a wide range of elements , and autonomous/ consistent use at mark band 3. Learner additional support and guidance at band 1 may be significant, but at band 3 should be minimal.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of … and explain the impact they have on …' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised investigations, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Most students will not have visited a building/construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and where possible, on permanent display within the classroom to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus students on construction and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. This support could provide the introduction to a task or investigation, act as an ongoing resource or in an evaluative role at the end of the activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The use of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies and establish what help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, maintenance schedules, dilapidations and health & safety documentation.
- Assistance with the development of links with other sources of help including, material suppliers, architects, clerk of works consultancies, facilities management companies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site or premises visits.
- Access to product libraries and other technical information.
- Access to visiting speakers who will put students' learning into appropriate context focussing on value and use of the built environment. Specific content level and expected outcomes will have to be discussed in advance.

Site/Office Visits

Whilst design office visits will aid the students' general awareness and perceptions of construction design activities, it is nevertheless essential that all visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Activities could include:

- An investigation of maintenance procedures in use on site.
- An investigation into the different types of materials used on the project and their incorporation within the main elements of substructure and superstructure with a focus on the impact of design team decisions on future maintenance issues.
- The use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation into how suitable specifications can minimise the need for maintenance.
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable maintenance practices.
- Observation and use of product libraries and databases.
- An investigation or research into the planning process and the impact of legislation on the design team and future maintenance issues.
- Interviews with members of the facilities management/property services team to consider their approach to sustainability within construction activities.
- Research into construction details and specifications that are considered robust within a local context.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of this requirement are detailed in the above sections.

Construction Skills

ConstructionSkills is a resource to be used within schools, employing trained schools liaison officers in all regions. They publish a list of activities and organise competitions and events to stimulate and encourage students to become interested and involved in construction.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will benefit all students and will allow them to view modern construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all activities, and risk assessments must be undertaken prior to site visits or associated activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	Where learners are
Independent enquirers	Analysing and evaluate information on sustainable practices, communities, the property market and job roles, judging its relevance and value
Creative thinkers	Considering ways in which the built environment benefits community wealth and sustainability
Reflective learners	Producing a sustainability report
	Reviewing own development
Team workers	Describing job roles and their interactions
Self managers	Producing a sustainability report
	Planning and organising own work, including research analysis
Effective participators	Making a presentation on job roles in construction

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes. Assembling and managing their e-portfolio
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes. Assembling and managing their e-portfolio
Follow and understand the need for safety and security practices	Conducting research and managing notes. Assembling and managing their e-portfolio
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting research into sustainable practice and the local property market, for their assignment task
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into sustainable practice and the local property market, for their assignment task
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports, written articles and drawings. Assembling and managing their e-portfolio
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling and managing their research. Producing a report on sustainable practice, or an article on the local property market. Assembling and managing their e-portfolio
Present information in ways that are fit for purpose and audience	Producing and managing ICT work. Producing a report on sustainable practice, or an article on the local property market. Assembling and managing their e-portfolio
Evaluate the selection and use of ICT tools and facilities used to	Producing and managing ICT work. Assembling and managing their e-portfolio

present information	
Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others
Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	
Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their assignment brief and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor. Producing a report on sustainable practice, or an article on the local property market. Preparing and revising notes and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

This unit can be taught within a traditional classroom environment.

Reference materials

Graham P – *Building Ecology* (Blackwell 2003) ISBN 0 632 06413 7

Randall T – *Environmental Design 2nd Edition* (Spon Press 1999) ISBN 0 419 23760 7

Mawhinney M – *Sustainable Development* (Blackwell 2002) ISBN 0 632 06459 5

Roaf S – *Ecohouse 2 - A Design Guide 2nd edition* (Architectural Press 2003) ISBN 0 7506 5734 0

The Egan Review – *Skills for Sustainable Communities* (HMSO 2004) ISBN 1 85946 142 5

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Cattermole P – *Buildings For Tomorrow* ISBN 9780500342282

Coventry S and Woolveridge C – *Environmental Good Practice on Site* (CIRIA 2000)

Barrett P S – *Facilities Management – Towards Best Practice 2nd edition* (2003) ISBN 9780632064458

Alexander K – *Facilities Management: Theory and Practice* (1996) ISBN 9780419205807

Park A – *Facilities Management – An Explanation* ISBN 9780333737989

Shah S – *Sustainable Practice for the Facilities Manager* (2007) ISBN 9781405135573

RICS – *Building Maintenance Strategy, Planning and Procurement: Guidance Note* (2000) ISBN 9780854069774

Unit 7: Value and use of the built environment: Facilities Management

Principal Learning unit

Level 2

Guided learning hours 60

(45 hours learning time with approx. 15 hours for assessment).**Internally assessed**

About this Unit

The completion of the construction phase signifies the beginning of the useful life of a building or structure. This is a period when it will require the services of other construction professionals to ensure that it continues to function effectively and provide 'best value'. This will involve the provision of management, cleaning, maintenance and renovation services as appropriate and throughout the lifetime of the building or structure.

In this unit you will gain an understanding of the contribution of facilities management and support services to the maintenance, development and economic benefit of the built environment.

Learning outcomes

7.1 Know about maintenance of the built environment

7.2 Understand how services are provided

7.3 Be able to analyse facilities management provision.

What you need to cover

7.1 Know about maintenance of the built environment

You will investigate and describe the main activities and roles involved in maintenance and support service functions. In doing so you will develop an understanding of the processes involved in preserving, maintaining, and managing the built environment and how this contributes to wealth creation and the quality of life.

You will also realise the impact of decisions made at the design stage, including the effect of selecting a low initial cost and low specification solution instead of a higher initial cost high specification solution. This will enable you to consider lifecycle costing and associated sustainability issues.

7.2 Understand how services are provided

You will develop an understanding of the contribution that facilities management and support services make to the maintenance, development and economic benefit of the built environment.

By examining organisational structures and methods you will investigate ways in which a wide range of /structural maintenance and management services are contracted and delivered. In doing so you will gain an understanding of the financial contribution that managed services makes to the economy and the contribution of maintenance and support services to enhancing the lifespan of buildings and structures, and the economic and social benefits this brings. In doing so you will become aware of the alternative approaches available such as direct services or contracted services and understand how planned maintenance can extend the useful life of a building or structure.

7.3 Be able to analyse facilities management provision

You will identify and explore the contribution of property services and housing to the development of the built environment and the wider community. This will include providing feedback to designers on the performance of existing materials, systems, buildings and structures. You will also consider the role that facilities management plays within the client function and the input into client briefs for future developments.

In doing so you will explore the ways in which built structures are operated, managed and protected to ensure effective functioning whilst complying with relevant health and safety legislation. This will include: cleaning and housekeeping services, planned and routine maintenance, security, caretaking, management, health and safety, lettings and general support services.

You will also investigate how a range of building maintenance and support service functions are provided.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
7.1	Know about maintenance of the built environment	▪ Describe the major processes involved in protecting, maintaining and managing a built structure
7.2	Understand how services are provided	▪ Describe ways of organising and delivering managed services. ▪ Identify the impact of such services upon the lifespan of a built structure. ▪ Identify and evaluate economic and social benefits provided by the appropriate use of managed services.
7.3	Be able to analyse facilities management provision	▪ Describe and evaluate the major features of a company's facilities management provision.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore will be assessed by you tutor

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed usung 5th generation, or equivalent, web browsers.

Your tutor will identify a suitable organisation that is involved in facilities management. This may be a large local employer, shopping centre, sports facility etc but must be of sufficient size to utilise full time facilities management services. You have been appointed by the Managing Director to report on their facilities management provision. You will therefore, conduct an investigation and write a report to the Managing Director of the company on the provision of managed services within the company. Your report will focus on three areas:

1 An explanation of the need to maintain the built environment, the processes involved and how decisions made at the design stage impact upon current maintenance.

2 Research and investigation into the various ways that managed services are organised.

3 An analysis of the companies facilities management provision.

Your report must be a word processed A4 document and be included in your portfolio. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and attention to detail and quality, with clear description and explanation or justification, as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
7.1 Know about maintenance of the built environment	Briefly describes some key processes involved in protecting, maintaining and managing a built structure. **(0-8)**	Describes most of the key processes involved in protecting, maintaining and managing a built structure; describes the underlying purposes of these. **(9-15)**	Describes clearly all of the key processes involved in protecting, maintaining and managing a built structure; discuses and justifies the underlying purposes and benefits of these. **(16-20)**	**20**
7.2 Understand how services are provided	Briefly describes ways of organising and delivering managed services, and the impact of such services upon the lifespan of a built structure; briefly describes the economic and social benefits provided by the appropriate use of managed services **(0-8)**	Describes ways of organising and delivering a range of managed services and the impact of such services upon the lifespan of a built structure; describes the economic and social benefits provided by the appropriate use of managed services **(9-15)**	Describes clearly ways of organising and delivering a broad range of managed services and the impact of such services upon the lifespan of a built structure; discuses in detail the economic and social benefits provided by the appropriate use of managed services **(16-20)**	**20**

7.3 Be able to analyse facilities management provision	Briefly describes some of the key features of a company's facilities management provision; briefly describes the benefits of each of these. **(0-8)**	Describes most of the key features of a company's facilities management provision; describes the benefits of each of these. **(9-15)**	Describes clearly the key features of a company's facilities management provision; evaluates the benefits of each of these and considers alternative approaches. **(16-20)**	**20**
			Total marks	**60**

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained in the technical report. The report should address assessment foci 1 to 3 within the report. Photographic evidence and/or drawings where appropriate should be included in the report itself.

There are a number of assessment tasks detailed above and it should be noted that there is no requirement for candidates to undertake any design work. It is the centre's responsibility to provide appropriate drawings and details that allow the candidate to complete the report.

The technical report is the vehicle of assessment for the whole of this unit and should address each of the three assessment foci. Where group activities are used, eg conducting research by visiting sites and interviewing people from industry or the local planning department, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects

examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: brief description for some elements, and basic use, at mark band 1; and clear description with explanation or justification for a wide range of elements , and autonomous/ consistent use at mark band 3. Learner additional support and guidance at band 1 may be significant, but at band 3 should be minimal.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of … and explain the impact they have on …' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate

range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised investigations, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Most students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities.

Sample materials should be available and where possible, on permanent display within the classroom to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus students on construction and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. This support could provide the introduction to a task or investigation, act as an ongoing resource or in an evaluative role at the end of the activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The use of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies and establish what help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the diploma programme.
- Possible sponsorship of the centre's construction programme.

- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, maintenance schedules, dilapidations and health & safety documentation.
- Assistance with the development of links with other sources of help including, material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site or premises visits.
- Access to product libraries and other technical information.
- Access to visiting speakers who will put students' learning into appropriate context focussing on value and use of the built environment. Specific content level and expected outcomes will have to be discussed in advance.

Site/Office Visits

Whilst design office visits will aid the students' general awareness and perceptions of construction design activities, it is nevertheless essential that all visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Activities could include:

- An investigation of maintenance procedures in use on site.
- An investigation into the different types of materials used on the project and their incorporation within the main elements of substructure and superstructure with a focus on the impact of design team decisions on future maintenance issues.
- The use of materials, for example brickwork or timber based products, as a feature or aesthetic element within construction.
- An investigation into how suitable specifications can minimise the need for maintenance.
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable maintenance practices.
- Observation and use of product libraries and databases.
- An investigation or research into the planning process and the impact of legislation on the design team and future maintenance issues.
- Interviews with members of the facilities management team to consider their approach to sustainability within construction activities.
- Research into construction details and specifications that are considered robust within a local context.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas including site and management practice, built structure design and characteristics and natural and environmental issues. Sustainability is a very important issue in the modern world of construction and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of this requirement are detailed in the above sections.

ConstructionSkills

ConstructionSkills is a resource to be used within schools, employing trained schools liaison officers in all regions. They publish a list of activities and organise competitions and events to stimulate and encourage students to become interested and involved in construction.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will benefit all students and will allow them to view modern construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all activities, and risk assessments must be undertaken prior to site visits or associated activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

Skill	Where learners are
Independent enquirers	research, analyse and evaluate the economic benefits of managed services
Creative thinkers	Question and suggest alternatives for facilities management provision
Reflective learners	Reviewing own development
Team workers	
Self managers	Planning and organising own work, including research analysis
Effective participators	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 2 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills – Level 2

Skills	When learners are…
ICT – Use ICT Systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	Conducting research and preparing notes. Assembling and managing their e-portfolio
Evaluate the effectiveness of the ICT system they have used	Reflecting on their learning.
Manage information storage to enable efficient retrieval	Conducting research and managing notes. Assembling and managing their e-portfolio
Follow and understand the need for safety and security practices	Conducting research and managing notes. Assembling and managing their e-portfolio
Troubleshoot	Address practical ICT issues as they arise.
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Conducting research into facilities management for their assignment task
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	Conducting research into facilities management for their assignment task
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose, including:	Producing, assembling and managing their learner notes, reports and drawings. Assembling and managing their e-portfolio
Text and tables	
Images	
Numbers	
Records	
Bring together information to suit content and purpose	Assembling and managing their research. Producing a report on facilities management. Assembling and managing their e-portfolio
Present information in ways that are fit for purpose and audience	Producing and managing ICT work. Producing a report on facilities management. Assembling and managing their e-portfolio
Evaluate the selection and use of ICT tools and facilities used to	Producing and managing ICT work. Assembling and managing their e-portfolio

present information	
Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists	Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others
Skills	When learners are…
Maths	
Recognise that a situation has aspects that can be represented using mathematics	
Make an initial model of a situation using suitable forms of representation	
Decide on the methods, operations and tools, including ICT, to use in a situation	
Select the mathematical information to use	
Skills	
English – Speaking and listening	
Make a range of contributions to discussions and make effective presentations in a wide range of contexts	Taking part in discussions with their tutor and peers, in a range of different learning situations
English – Reading	
Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	Understanding their assignment brief and conducting and assimilating relevant research information from various sources
English - Writing –	
Write documents communicating information, ideas and opinions effectively and persuasively	Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing and revising notes and a WP report on facilities management for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

This unit can be taught within a traditional classroom environment.

Reference materials

Graham P – *Building Ecology* (Blackwell 2003) ISBN 0 632 06413 7

Randall T – *Environmental Design 2nd Edition* (Spon Press 1999) ISBN 0 419 23760 7

Mawhinney M – *Sustainable Development* (Blackwell 2002) ISBN 0 632 06459 5

Roaf S – *Ecohouse 2 - A Design Guide 2nd edition* (Architectural Press 2003) ISBN 0 7506 5734 0

The Egan Review – *Skills for Sustainable Communities* (HMSO 2004) ISBN 1 85946 142 5

Maclean J H and Scott J S – *The Penguin Dictionary of Building 4th edition* (Penguin 1995)

Cattermole P – *Buildings For Tomorrow* ISBN 9780500342282

Coventry S and Woolveridge C – *Environmental Good Practice on Site* (CIRIA 2000)

Barrett P S – *Facilities Management – Towards Best Practice 2nd edition* (2003) ISBN 9780632064458

Alexander K – *Facilities Management: Theory and Practice* (1996) ISBN 9780419205807

Park A – *Facilities Management – An Explanation* ISBN 9780333737989

Shah S – *Sustainable Practice for the Facilities Manager* (2007) ISBN 9781405135573

RICS – *Building Maintenance Strategy, Planning and Procurement: Guidance Note* (2000) ISBN 9780854069774