

BUILDING CONSTRUCTION
Higher

First edition — published March 2006

National Course Specification

COURSE Building Construction (Higher)

COURSE CODE C227 12

COURSE STRUCTURE

This Course has three mandatory Units:

<i>DV3N 12</i>	<i>Building Construction: Site Establishment and Substructure (Higher)</i>	<i>1 credit (40 hours)</i>
<i>DV3R 12</i>	<i>Building Construction: Superstructure (Higher)</i>	<i>1 credit (40 hours)</i>
<i>DV3T 12</i>	<i>Building Construction: Components and Finishes (Higher)</i>	<i>1 credit (40 hours)</i>

All Courses include 40 hours over and above the 120 hours for the Units. This may be used for induction, extending the range of learning and teaching approaches, support, consolidation, integration of learning and preparation for external assessment.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ An Intermediate 2 Course in Product Design, Graphic Communication or Technological Studies, or their Units
- ◆ Two standard Grades at Credit level, one from each of the following groupings:
 - Mathematics, Physics or Technological Studies
 - either Craft and Design or Graphic Communication

Administrative Information

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National Course Specification (cont)

PROGRESSION

This Course or its Units may provide progression to:

- ◆ Study at Higher National level in any one of a number of built environment specialisms:
 - Architectural Technology
 - Building Surveying
 - Civil Engineering
 - Construction
 - Construction Management
 - Facilities Management
 - Quantity Surveying
- ◆ Higher Education
- ◆ Training or employment

CREDIT VALUE

The Higher Building Construction Course is allocated 24 SCQF credit points at SCQF level 6.

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

CORE SKILLS

Achievement of this Course gives automatic certification of the following:

Complete Core Skill	None
Core Skills components	Using Graphical Information at SCQF level 4 Critical Thinking at SCQF level 5

National Course Specification: course details

COURSE Building Construction (Higher)

RATIONALE

The construction industry makes a significant contribution to the economy and is a major employer in Scotland. Construction technicians are likely to be in increasing demand in the future. National Courses in construction subjects therefore have a role in a strategically important area. The skills acquired in the study of this subject area are in demand by employers.

This Course is suitable for candidates who aim for a career in the construction industry as technicians, technologists and other construction professionals. The Course will appeal to candidates who desire a practical or creative career. It should attract those who enjoy working as part of a team and who seek variety in their work.

The Course may be undertaken by both full-time and part-time candidates in Further Education as well as candidates currently at school. Candidates may use this qualification to progress to further study at Higher National level or Degree level.

Candidates are introduced to domestic construction technology — what buildings are made of and how they fit together. Although the Course is set in the context of low-rise housing, the principles learned are transferable to larger-scale and often more complex construction technology found in industrial and commercial projects.

Candidates will gain knowledge of construction materials and how they are put together to form the different elements of a building. The candidate will focus on function and performance, what you want the building, and its different parts, to do, and how they must perform.

Candidates will learn the importance of planning the layout and workings of a building site. They will develop an understanding of the order and sequencing of building operations as well as the benefits of complying with recognised construction industry practice and relevant legislation.

Candidates will gain skills required to understand, interpret and produce construction drawings and sketches. Practical drawing and sketching skills will be developed. Candidates will learn how to interpret technical data from manufacturers' literature and statutory building standards.

This Course contributes significantly to candidates' general education and personal development: it promotes core and transferable skills important for future employment within construction and other industries. The development of competencies in this vocational context will improve generic skills in communication, presentation of technical information, research techniques and working with others.

AIMS

The aims of this Course are to develop:

- ◆ a systematic and logical approach to planning and sequencing of construction operations
- ◆ skills in construction sketching, drawing and detailing
- ◆ an understanding of the concept of function and functional requirements
- ◆ an understanding of the importance of function in the correct specification of components and finishes

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

- ◆ an appreciation of the properties and uses of building components and materials
- ◆ an understanding of how function and performance considerations relate to building regulations and other mandatory standards

Satisfactory completion of this Course will provide candidates with:

- ◆ a sound knowledge of the factors that affect site preparation
- ◆ an appreciation of the importance of dimensions and dimensional co-ordination in construction
- ◆ skills in sketching and drawing details for construction work
- ◆ the knowledge to specify appropriate components and materials
- ◆ the ability to absorb, interpret and transmit technical information in graphical, spoken and written forms
- ◆ skills and knowledge required for further study of construction technology and construction subjects

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

Site Establishment and Substructure — Content	
Substructure construction (cont)	
Excavation and earthworks	◆ excavations and earthwork supports
Foundation trenches and pits	◆ excavations in sloping sites ◆ preparation of the surfaces of excavations ◆ compaction techniques and equipment ◆ health and safety
Foundation types	Strip foundations, pad foundations, raft foundations, short bored piles and ground beams, prefabricated foundations, foundations in sloping sites.
Concrete in substructure	◆ specifications for concrete ◆ current standards for concrete ◆ reinforcement ◆ methods for mixing, transporting, placing, compacting, curing and protecting concrete
The study of substructure must include:	◆ external walls in the underbuilding ◆ dwarf walls to support floors ◆ the specification and positioning of damp-proof courses and damp-proof membranes ◆ provision for incoming services pipes and cables ◆ sub-floor ventilation
Ground floors	Suspended timber floors, in-situ concrete floors, beam and block floors; insulation and damp-proof membranes.
Health and safety	Health and safety must be stressed throughout this aspect of the Course. The focus must be on the ways in which legislation is applied to remove hazards and to protect the operatives on site.

Superstructure

Forms of superstructure

This deals with the two current popular forms of construction in housebuilding in Scotland, namely, traditional masonry cavity wall construction and timber frame. Candidates focus on the functional requirements of buildings and building elements and how traditional construction and timber frame construction satisfy such requirements.

The study of superstructure deals with the building from damp-proof course level up. It includes upper floors but not ground floors (which are dealt with in the *Substructure* Unit).

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

Superstructure— Content	
<p>Superstructure erection</p> <p>Sequencing of the erection process</p> <p>Elements</p> <p>Construction technology details</p> <p>Function and functional requirements of construction sequences and detailing</p>	<p>Current good practice; health and safety considerations.</p> <p>Walls, floors, ceilings, roofs.</p> <p>Junctions of the different elements:</p> <ul style="list-style-type: none"> ◆ wall/upper floor junctions ◆ roof/wall junctions for flat and pitched roofs (both hot roof and cold roof technologies including ventilation details) <p>Resistance to heat loss, wind and watertight, exclusion of rain and snow, strength and stability, dimensional stability, resistance to thermal movement, resistance to fire and the spread of flame, security, resistance to transmittance of impact noise, durability resistance to impact, ease of maintenance, plus others as applicable to the building elements in question.</p>

Components and Finishes

This deal with precisely where and how components are fixed into the building structure. The components dealt with include external doors and windows.

Components and Finishes— Content	
<p>Positioning and fixing of components in buildings</p> <p>Technology of components</p> <p>Fixing of components into the building structure</p>	<p>Including consideration of function and performance of different materials.</p> <p>External doors and windows; detailing at closing of cavities; detailing at lintels and sills etc; permanent fixing mechanisms.</p>
<p>Finishes: Specification of finishes and method of application to the building structure</p> <p>Scope</p>	<ul style="list-style-type: none"> ◆ internal finishes: walls, floor and ceiling finishes ◆ external finishes: wall and roof finishes

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

Components and Finishes— Content	
<p>Finishes: Specification of finishes and method of application to the building structure (cont)</p> <p>Specification of finishes; materials, workmanship and detailing</p> <p>Section of finishes</p>	<ul style="list-style-type: none"> ◆ external walls: smooth cement renders; renders with a dry dash finish; renders with a wet dash finish ◆ internal walls: sand/cement render; premixed plasters; plasterboard; ceramic tiling ◆ ceilings: plasterboard; textured finishes ◆ floors: softwood flooring; hardwood flooring; chipboard flooring; sand/cement screeds; clay quarry tiles; vinyl flooring; linoleum flooring; carpet ◆ pitched roofs: clay quarry tiles; natural slates; manufactured slates ◆ flat roofs: mastic asphalt; built-up felt roofing; single ply membranes <p>Preparation of backgrounds and the method of application of the finish to the structure.</p> <p>Function and performance, justification of selection of internal and external finishes for a given situation.</p>
<p>Stair design and compliance with legislation</p> <p>Identification of the different parts of a stair</p> <p>Compliance (or otherwise) with current building standards and legislation</p>	<p>Riser, tread, newel post, balustrade, handrail, stringer (or string), landings, pitch line, nosing, rise, going and headroom.</p> <ul style="list-style-type: none"> ◆ minimum width of stair ◆ maximum pitch of flight ◆ minimum and maximum number of risers per flight ◆ minimum going of steps ◆ gap between open rise threads and balusters ◆ going of landing ◆ minimum headroom ◆ $(2 \times \text{rise}) + (1 \times \text{going})$ not less than 550 mm and not more than 700 mm <p>Key dimensions and statistics on stairs and flights of stairs. Calculations to establish compliance (or otherwise) with current legislation.</p> <p>Stair design may include both straight flights and winders.</p>

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

Summary	
Site establishment	Access; temporary roads; perimeter fencing; storage facilities; temporary accommodation; temporary services.
Substructure	Ground testing; foundations; sloping sites; underbuilding; solum treatments; ground floors.
Superstructure	External walls; internal walls; upper floors; pitched roof structure; flat roof structure; hot roof and cold roof technologies and ventilation.
Components	Doors and door openings; windows and window openings; stairs.
Finishes	Plaster and plasterboard, roughcast and render; flooring; floor and wall tiles; pitched roof coverings; flat roof coverings.

The content allows candidates to gain understanding of the major features of domestic buildings. Candidates will learn, by the study of each building element, how the materials are constructed into a functioning whole and how the elements interconnect.

Study of the functional requirements of each element in turn will be accompanied by a consideration of the properties and uses of the materials that can be used to meet the function.

On completion of the Course, candidates will have gained additional skills in the presentation of construction drawings and specification information.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

ASSESSMENT

To gain the award of the *Building Construction (Higher)* Course, the candidate must pass the Units and successfully undertake the Course assessment. The Course assessment provides the basis for grading attainment in the Course award.

DETAILS OF UNIT ASSESSMENT

All Units are internally assessed against the requirements of the Outcomes as detailed in the Unit Specifications. Unit Specifications also provide support notes to assist teachers and lecturers in their understanding of Outcomes, Performance Criteria and evidence requirements. *Higher Building Construction* Unit assessments consist of the testing of knowledge, understanding and manual drawing or CAD (Computer-Aided Drawing) skills.

The individual Unit assessments within the Course take the form of closed-book tests and folios of work.

Unit Title	Outcome(s)	Format of assessment
<i>Building Construction: Site Establishment and Substructure</i>	1 and 2	60 minute closed-book test
	3	Folio of work
<i>Building Construction: Superstructure</i>	1 and 2	60 minute closed-book test
	3	Folio of work
<i>Building Construction: Components and Finishes</i>	1 and 2	60 minute closed-book test
	3	Folio of work

The folios of work compiled by candidates mentioned above are to comprise drawings, details and sketches of substructure, superstructure and building components respectively. The folios of work are to be compiled as a natural part of the learning and teaching process. Assessors are to ensure that work compiled for the folios of work are the candidates' own work.

Further details about Unit assessment can be found in the NAB materials and in the Unit Specifications.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

DETAILS OF UNIT ASSESSMENT

The following documents provide details of the Course assessment:

- ◆ Course Arrangements Document
- ◆ Specimen Question Paper
- ◆ Course Assessment Specification
- ◆ Assessment Guidance (issued by SQA every year)

The Higher *Building Construction* Course is externally assessed against the Grade Descriptions as detailed in this Course Specification. The Course assessment will provide the basis for grading attainment in the Higher *Building Construction* Course awards. Course awards will be graded A to D, and will be based on the total score achieved in the Course assessment.

The Course assessment of the Higher *Building Construction* Course will consist of two equally-weighted components:

- ◆ Question Paper 100 marks
- ◆ Project 100 marks

Question Paper

The purpose of the Question Paper is to assess the candidate's ability to retain and integrate knowledge and understanding from across the Course content. It will also allow the candidate to demonstrate higher order cognitive and communication skills across the content of the Course in varied and less familiar contexts.

The Question Paper will be of two hours duration, set and externally marked by the SQA. The Paper will be composed of two sections.

◆ Section A (40 marks)

This section consists of a number of short answer and/or restricted response questions examining the candidate's knowledge and understanding of construction principles, processes and materials across the Course.

◆ Section B (60 marks)

Candidates will be required to answer two questions from this section. This section consists of 3-6 structured and/or extended response questions examining the candidate's knowledge and understanding of building construction and technological processes across the Course.

Further details of the format and structure of the Question Paper are given in the Course Assessment Specification.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

Project

There are 100 marks available for the Project. The Project constitutes 50% of the total Course assessment. The purpose of the Project is to assess the candidate's ability to apply skills, knowledge and understanding to develop a construction technology solution for a given brief. It will draw on knowledge and skills developed across the three Units. In particular, it will test the candidate's ability to communicate, generate and refine potential solutions and to produce a final proposal for a small housing scheme or dwelling. Candidates will acquire practical research skills in research, as well as planning, implementing and reviewing that research and the subsequent report.

The Project task will be devised by the centre, based on SQA Assessment Guidance. The Project will be conducted internally under controlled conditions and externally marked by SQA. The SQA will require submission of the completed projects by a date specified by the SQA in the year of presentation.

Further details about the format and structure of the Building Construction Project are given in the Course Assessment Specification and Assessment Guidance document.

Relationship between Unit and Course Assessments

Unit and Course assessments are designed to compliment each other, but it has to be noted that there is a clear distinction between them in terms of their purpose, focus and requirements. This is achieved by careful targeting of knowledge, understanding and skills at appropriate levels in Unit and Course assessments and thereby avoiding any duplication of tasks, activities or performances.

The knowledge and understanding inherent in the Course content is tested at Unit level in the three Units *Site Establishment and Substructure*; *Superstructure* and *Components and Finishes*.

The *Site Establishment and Substructure* and *Components and Finishes* aspects of the Course will be sampled in the Question Paper. There will particularly be opportunity to demonstrate a greater depth of knowledge and understanding of these aspects in Section 'B' of the Question Paper.

The content of the remaining section of the Course, namely *Superstructure*, will be the subject of the Project.

The Project aspect of the Course assessment provides candidates with opportunity to explore the construction technology of superstructure to a greater depth, researching up-to-date developments in construction methods, materials and detailing. There will be greater integration of knowledge and understanding in the Project task. The Project will also provide candidates with the opportunity to demonstrate skills in presentation of graphics and sketch details.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

The ‘added value’ of the Course

Over and above the Units, candidates will gain significant additional benefit from completing the Course: there are opportunities in the Course to integrate knowledge, understanding and to extend the skills acquired throughout the Units.

Overall, the added value of the Course is in the Course assessment providing opportunities for the candidate to demonstrate:

- ◆ *retention* of a range of knowledge, understanding and skills acquired from across all the Units
- ◆ *integration* of a range of knowledge, understanding and skills acquired from across all the Units
- ◆ the ability to demonstrate the skills of *analysis and evaluation*, in familiar and less familiar contexts, from across the Course content
- ◆ *application* of a range of knowledge, understanding and skills in *more complex* contexts
- ◆ *application* of a range of knowledge, understanding and skills in *less familiar* contexts

It is of particular value that when Units are studied as part of the Course, opportunities exist for candidates to integrate their knowledge more effectively. For example, the Unit on superstructure considers the requirement for the building to be loadbearing. This inevitably ties in with a consideration of the foundations and underbuilding of the structure. Similarly, a consideration of components and finishes must be harmonised with the structures and backgrounds into and onto which the components and finishes are respectively fixed, fitted and applied.

GRADE DESCRIPTIONS AT ‘A’ AND ‘C’

Candidate’s grade will be based on their total score obtained from the two components of the Course assessment, ie the Question Paper and the Project. The descriptions below indicate the nature of achievement required for an award at Grade ‘C’ and Grade ‘A’.

For an award at Grade ‘C’ and ‘A’ respectively candidates must be able to:

GRADE ‘C’	GRADE ‘A’
◆ demonstrate knowledge and understanding of construction technology	◆ demonstrate detailed knowledge and clear understanding of construction technology
◆ use appropriate knowledge and understanding to produce solutions to construction technology problems	◆ use knowledge and understanding of construction technology to produce detailed potential solutions to problems
◆ apply knowledge and understanding to develop ideas	◆ apply a wide range of knowledge and understanding to develop and refine ideas
◆ identify issues which have influenced the design of buildings	◆ identify a wide range of issues and explain how they have influenced the design of buildings
◆ explain why particular processes and materials are used to manufacture domestic structures	◆ appraise why particular processes and materials are used to manufacture domestic structures
◆ communicate using a range of graphic techniques	◆ communication using a range of high quality graphic techniques

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

ESTIMATES AND APPEALS

Estimates

In preparing estimates, evidence of performance will be considered from across the entire content of the Course and must take account of performance in the whole Course.

As part of the examination cycle, centres are required to submit estimate grades for candidates' performance in the Course assessment. Estimates are used as the basis for Appeals and in the consideration of awards for absentee candidates. Estimates must therefore be based on sound and demonstrable evidence. Evidence used to compile estimates and support Appeals must be valid, reliable and:

- ◆ be based on National Standards and take account of the Course Grade Descriptions
- ◆ reflect the scope, nature and equal weighting of the components of the Course assessment (ie the Question Paper and the Project)

Further advice on the preparation of estimates is given in the Course Assessment Specification and the SQA publication *Estimates, Absentees and External Assessment Appeals: guidance on Evidence Requirements*.

Appeals

The principal source of evidence used to support a *Building Construction* (Higher) Appeal is an integrated test (eg a prelim) in respect of the Question Paper component.

The Project, completed internally over a period of time allows candidates the opportunity to develop, reflect upon and revise their work. Consequently, this will probably be the candidate's 'best' work in this area of the Course. **It is therefore unlikely that Appeals evidence will be submitted from this part of the Course.**

Evidence submitted in respect of the Question Paper should therefore come from an integrated test that adequately reflects the Course content and Grade descriptions. An integrated test or prelim should replicate the style, level of demand, mark allocation and weighting of the Specimen Question Paper. Reference should be made to the *Building Construction* (Higher) Course Assessment Specification document.

While it is acceptable for centres to generate their own test materials for prelims by drawing on past SQA Question Papers, such papers **must not** be used in their entirety. Where materials from past papers are used, a judicious selection of items and/or appropriate adaptation is required to make this acceptable evidence to support an Appeal. Items from past SQA papers may also be supplemented or replaced by centre-devised materials.

Whatever approach is taken to create an integrated test, prelim or other such assessment item, centres must be certain that the Paper is not in the public domain and has not been seen previously by the candidates. It is the responsibility of centres to ensure the validity, reliability and security of assessment instruments used for estimates and appeals.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

QUALITY ASSURANCE

All National Courses are subject to external marking and/or moderation. External markers, visiting examiners and moderators are trained by SQA to apply national standards.

The Units of all Courses are subject to internal moderation and may also be chosen for external moderation. This is to ensure that national standards are being applied across all subjects.

Courses may be assessed by a variety of methods. Marking is undertaken by trained markers. Markers meetings and central marking ensure that a consistent standard is applied. The work of all markers is supported throughout and subject to scrutiny by the Principal Assessor.

To assist centres, Principal Assessor and Senior Moderator reports are published on the SQA's website www.sqa.org.uk and can be located on the relevant subject page.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS COURSE

The Units within the Course may be taught sequentially or concurrently since there is scope for integration of learning and teaching.

- ◆ *Sequential* delivery leads the candidate through the site establishment, substructure and superstructure construction of small housing developments; the Units can be taught in the order in which the building elements and components to which they relate are actually built on site.
- ◆ *Concurrent* delivery of Units encourage the integration of knowledge and skills, assisting candidates' development of transferable skills.

Effective planning of the learning and teaching of the Units should permit the Project work for the Course to commence in or around December. This would permit the candidates to plan their project work in good time and ensure that learning and teaching towards the Units is integrated with learning required for the project from an early date.

It is worth noting that the scope of the project could be extended to generate some of the evidence for the Unit assessment. Centres that wish to consider this possibility are advised to plan such an approach effectively and with careful cross-referencing to the evidence requirements for the Units concerned.

Candidates will better understand the Course content if they can apply the principles and techniques of construction to practical situations. It is therefore recommended that site visits, video presentations and visiting lecturers be employed to show how construction works in reality. The study of construction technology should, wherever possible, be based on actual projects or hypothetical (but realistic) case studies. The cases studies should be simplified as required for candidates at this level and candidates should begin by focusing on one aspect of construction technology at a time.

It is recommended that effective use be made of resources such as the following:

- ◆ British Standards and international equivalents
- ◆ Codes of Practice
- ◆ Building Research Establishment (BRE) Digests
- ◆ BRE Information Papers

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

- ◆ BRE Good Practice Guides
- ◆ BRE Defects Action Sheets
- ◆ Current building regulations and legislation in Scotland
- ◆ Website of the Scottish Building Standards Agency
- ◆ National House Building Council (NHBC) Standards
- ◆ Manufacturers' literature
- ◆ Samples of building materials
- ◆ Sets of drawings from real building projects from industry

The use of building drawings is especially helpful to allow candidates to see at a glance how the whole process of construction fits together. Candidates should be encouraged to look for examples of good practice in drawing work and in effective construction detailing in the drawings.

Building companies and materials suppliers may be willing to facilitate properly organised visits from groups of candidates to their building sites and materials storage yards. Joinery manufacturers and plant hire firms are also keen to introduce candidates to the workings of the industry. Visiting speakers from consultancy firms and from the Health and Safety Executive may prove to be useful. Construction Industry exhibitions and seminars are other avenues of learning that are to be recommended for candidates of the *Building Construction* Course. Student membership of the various construction-related institutions is often available free or for a nominal fee. Membership normally permits candidates to access institution libraries. These are specialist resources devoted to the construction industry, or one aspect of it. In addition, the professional institutions have good websites with up-to-date and topical content. These websites often have a dedicated student section and links to other related sites.

Professional institutions that candidates might think of joining as student members include:

- ◆ BIAT (British Institute of Architectural Technologists)
- ◆ CIBSE (Chartered Institution of Building Services Engineers)
- ◆ CIOB (Chartered Institute of Building)
- ◆ I Struct E (Institution of Structural Engineers)
- ◆ ICE (Institution of Civil Engineers)
- ◆ RIAS (Royal Incorporation of Architects in Scotland)
- ◆ RICS (Royal Institution of Chartered Surveyors)

The additional 40 hours assigned to the Course will allow candidates time to develop a folio of work, complete a report, prepare for external assessment, carry out further research and to practice the integration of the skills acquired through study of the individual Units of the Course.

CANDIDATES WITH ADDITIONAL SUPPORT NEEDS

This Course Specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

BUILDING CONSTRUCTION TECHNOLOGY IN A BROADER CONTEXT

A number of national initiatives and programmes promote themes that are important to contemporary society such as citizenship and enterprise. These themes contribute to individual subjects and Courses by making connections beyond the subject boundaries and enrich the learning experience of candidates. Similarly, the specialist knowledge and skills developed through study of a particular subject contributes to the understanding of these themes.

In the construction industry, such national initiatives include programmes on quality, productivity, customer care and sustainability:

- ◆ Constructing Excellence
 - This initiative aims to achieve a step change in construction productivity by tackling the market failures in the sector and promoting the business case for continuous improvement.
- ◆ The Construction Best Practice Programme
 - Raises awareness of the benefits of best practice, financial or otherwise, and provides the industry and its clients with the knowledge and skills to implement change.
- ◆ Best Practice Knowledge
 - This programme supports the main objectives of Constructing Excellence by creating continuous improvement through the exchange of best practice.
- ◆ Key Performance Indicators (KPIs)
 - This initiative is part of the Constructing Excellence programme. It allows construction firms to monitor and assess their progress (benchmarking) against a set of key criteria including productivity, environmental issues and customer satisfaction.
- ◆ Sustainable Construction
 - The Department of Trade and Industry's (DTI's) Sustainable Construction Briefs highlight current issues and background information relating to sustainable development in construction.
- ◆ Rethinking Construction
 - A far-reaching report on the state of the construction industry, focusing on value for money for clients.
- ◆ Accelerating Change
 - A follow-up to Rethinking Construction, this important report looks at practical ways to implement the recommendations of the principal report.
 -
- ◆ Respect for People
 - One of the key drivers in the Rethinking Construction/Accelerating Change initiatives.
- ◆ Promoting Sustainable Construction
 - A DTI initiative, which, as the name suggests, aims at promoting sustainable construction techniques and design.

National Course Specification: course details (cont)

COURSE Building Construction (Higher)

- ◆ Quality Mark
 - This is the only Government sponsored initiative aimed at raising standards in the domestic repair, maintenance and improvement sector.

- ◆ Considerate Contractor Scheme
 - This scheme aims to help contractors to focus on being considerate to ordinary members of the public and passers-by who might be affected by construction operations.

National Unit Specification: general information

UNIT	Building Construction: Site Establishment and Substructure (Higher)
CODE	DV3N 12
COURSE	Building Construction (Higher)

SUMMARY

This Unit is a mandatory Unit of the *Higher Building Construction* Course, but may also be taken as a free-standing Unit.

This Unit introduces the methods and processes of substructure construction for low-rise housing on greenfield sites. The content of the Unit includes site investigation and the site establishment work carried out prior to the commencement of groundworks and excavations. Current methods in the construction of foundations and substructure are covered. Candidates will produce sketches of details of substructure construction.

The Unit is suitable for candidates who aim for a career in the construction industry as technicians, technologists and other construction professionals. The Unit may be undertaken by both full-time and part-time candidates in further education as well as candidates currently at school. Candidates may use this qualification to progress to further study at Higher National or Degree level.

OUTCOMES

- 1 Plan the establishment of a site to enable construction works to commence.
- 2 Explain the processes associated with substructure construction.
- 3 Produce annotated sketches to illustrate the construction of building substructure.

Administrative Information

Superclass:	TK
Publication date:	March 2006
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Version:	01

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Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. The cost for each Unit specification is £2.50. (A handling charge of £1.95 will apply to all orders for priced items.)

National Unit Specification: general information (cont)

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ An Intermediate 2 Course in Product Design, Graphic Communication or Technological Studies or their Units
- ◆ Two Standard Grades at Credit level, one from each of the following groupings:
 - Mathematics, Physics or Technological Studies
 - either Craft and Design or Graphic Communications

No prior knowledge of building technology is required of candidates undertaking this Unit, although building site experience will be of benefit.

CREDIT VALUE

1 credit at Higher (6 SCQF credit points at SCQF level 6*).

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

CORE SKILLS

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill	None
Core Skills components	Using Graphical Information at SCQF level 4 Critical Thinking at SCQF level 5

National Unit Specification: statement of standards

UNIT Building Construction: Site Establishment and Substructure (Higher)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Plan the establishment of a site to enable construction works to commence.

Performance Criteria

- (a) Temporary facilities required to safety, security, welfare and storage for a given site are planned correctly in accordance with current good practice and legislation.
- (b) Temporary works for site establishment of a given site are selected correctly with regard to current good practice and safety.

OUTCOME 2

Explain the processes associated with substructure construction.

Performance Criteria

- (a) The reasons for carrying out a site investigation for a given site are explained correctly in terms of function, economy and safety.
- (b) Techniques of site investigation selected for a given construction project are justified correctly in terms of function, economy and safety.
- (c) Methods of constructing foundations and underbuilding for domestic construction are described correctly in terms of current good practice.
- (d) The sequence of substructure operations for a given construction project is selected correctly in terms of current good practice.
- (e) Health and safety practices associated with excavation and earthworks for substructure are correctly described in terms of current good practice.

OUTCOME 3

Produce annotated sketches to illustrate the construction of building substructure.

Performance Criteria

- (a) Annotated sketches produced contain correct detailing of substructure with respect to current building legislation and good practice.
- (b) Annotated sketches of substructure produced are accurate and well proportioned.
- (c) Annotations produced are correct with respect to the specification of materials and components.
- (d) Annotation and presentation of sketches is in accordance with current industry practice.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

EVIDENCE REQUIREMENTS FOR THIS UNIT

Written/oral and product evidence is required which demonstrates that the candidate has achieved all Outcomes in this Unit and all Performance Criteria within Outcomes. The content for this Unit is detailed in the Appendix.

The assessment for this Unit is a combination of practical and knowledge-based activities. The Outcomes should be assessed with two assessments comprising:

- ◆ a 60 minute closed-book test for Outcomes 1 and 2
- ◆ a folio of work for Outcome 3, produced in open-book conditions as a natural part of the learning and teaching process

The closed-book test will include a series of short answer and/or restricted response questions on planning the establishment of a site and the site layout and explaining the processes associated with substructure construction. Candidates will complete a practical exercise in planning a site layout for a given construction project. This will be carried out in controlled conditions: candidates are not permitted to collaborate in their responses.

The open-book assignment folio of work is a collection of annotated sketches of the construction of building substructure. The production of the folio of work will be carried out in open-book, supervised conditions. Candidates are free to co-operate with colleagues in the researching of technical information and construction technology details. They may also confer with regard to drawing and sketching techniques and presentation. Assessors must, nevertheless, satisfy themselves that candidates' folios contain their own work.

The assessment instruments will sample the content and skills detailed in the Appendix to the Unit. The assessment instruments must, taken together, cover all Outcomes and all Performance Criteria.

Achievement in the closed book test can be decided by the use of a cut-off score. The National Assessment Bank items illustrate the standard that should be applied and also the nature and extent of the sample to be used. If a centre wishes to design its own assessments for this closed book test, they should be of a comparable standard.

Achievement in the folio of work will be decided on an achieved/not achieved basis. The criteria for achievement in the folio of work are the Performance Criteria in Outcome 3.

An exemplar for the folio of work for Outcome 3 can be accessed via the SQA Coordinator for each centre. The exemplar illustrates the standard that should be applied for the folio of work.

For the closed-book test for Outcomes 1 and 2, where candidates fail to reach the agreed threshold score, reassessment should follow using an alternative instrument of assessment.

For the folio of work for Outcome 3, where candidates fail to achieve the required performance, reassessment of one or more sub-tasks may be all that is required to bring the candidate's performance up to an acceptable standard.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

APPENDIX

NB: All the content in this Section should be covered and is liable to sample through Unit and/or Course assessment.

Content to covered (Outcomes 1 and 2)

Candidates will have to be familiar with the establishment of a site, site investigation and the processes associated with substructure construction.

For site establishment an outline drawing of a site plan for a development of 15-20 houses will be given to candidates. Candidates will plan the requirements of the following items for the site and indicate with graphics and/or text:

- ◆ access and egress for vehicles and pedestrians having regard to convenience and safety
- ◆ parking for vehicles
- ◆ location and specification of temporary roads within the boundaries of the site
- ◆ methods of protecting the public during construction operations
- ◆ temporary accommodation (assuming a maximum of 30 persons on site at any one time)
- ◆ location of items of large plant (if required)

In addition, candidates will have to be able to identify the location of and describe the facilities for the following:

- ◆ Temporary services:
 - electricity
 - water
 - telephone
 - foul drainage
- ◆ Storage facilities with respect to protection, safety, security and good site practice related to:
 - cement
 - bricks
 - aggregates
 - trussed rafters
 - plasterboard
 - timber
 - windows
 - doors
 - paint
 - plumbing and heating pipes and fittings
 - sanitary fittings
 - electrical fittings and cables
 - small tools

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

Candidates will also have to be prepared to answer a series of short answer and/or restricted response questions based on the given site plan. These questions will be on the sequencing and processes involved in low-rise housing sub-structure, including:

- ◆ The reasons for site investigation for the given site.
- ◆ Techniques of site investigation: justification of any two appropriate methods.
- ◆ Current health and safety practices associated with excavation and earthworks for substructure.
- ◆ Current methods of constructing foundations and underbuilding including:
 - strip foundations
 - pad foundations
 - raft foundations
 - short bored piles and ground beams
- ◆ The sequencing of operations for the foundation type selected above from initial excavations up to and including substructure walls to damp-proof course (dpc) level and ground floor structure; including methods for mixing, transporting, placing, compacting, curing and protecting concrete and (if required) installation of reinforcement.

Note: The use of prefabricated foundations and underbuildings is increasing in housing construction. Candidates may refer to prefabrication techniques in assessment responses.

Open-book folio of work (Outcome 3)

A folio of work for the assignment will be prepared by each candidate individually. Centres will ensure that work submitted in the folio is the candidate's own work. It is anticipated that the folio of work is produced as a natural part of the learning and teaching process.

The folio of work will include:

Annotated sketches with details of building substructure for a foundation for low-rise housing including a cross-section showing:

- ◆ excavations
- ◆ foundations
- ◆ substructure brickwork and blockwork (if applicable)
- ◆ damp-proof course (dpc)
- ◆ solid concrete floor construction *or* suspended timber floor construction *or* beam and block floor construction (although these should all be covered in learning and teaching)
- ◆ damp-proof membranes (if applicable)
- ◆ insulation
- ◆ solum treatment (if applicable)
- ◆ service entries
- ◆ underfloor ventilation (if applicable)
- ◆ fill

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

The sketches must:

- ◆ contain correct detailing with respect to current building legislation and good practice
- ◆ be accurate and well proportioned
- ◆ be in accordance with current good practice in the construction industry

The annotations must:

- ◆ include correct specifications of materials
- ◆ be in accordance with current good practice in the construction industry

National Unit Specification: support notes

UNIT Building Construction: Site Establishment and Substructure (Higher)

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

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

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit on the subject of substructure construction is set in the context of low-rise domestic buildings or dwelling houses. It shares some subject matter in common with the topics of industrial and commercial substructure technology. However, there are some distinct differences between domestic and other forms of construction. The differences are sometimes quite marked in the area of substructures and foundations. No prior knowledge of building construction is required of candidates undertaking this Unit.

Corresponding to Outcomes 1-3:

- Outcome 1 This Outcome provides candidates with knowledge of the techniques employed in site establishment for housebuilding. It also develops knowledge of the techniques involved in planning the layout of temporary works on the site. This will cover vehicular access and parking, temporary roads, storage of materials, locations for large plant, temporary health and welfare accommodation, site safety, security and temporary services.
- Outcome 2 This Outcome provides the candidate with knowledge of substructure construction, beginning with site investigation and soil testing. The topic then progresses from the commencement of excavations and earthworks through the underbuilding construction to damp-proof course level. It will provide the candidate with a sound knowledge of the types and forms of foundations normally used in low-rise domestic buildings.
- Outcome 3 This Outcome provides the candidate with the skills to produce well proportioned annotated sketches of substructure in low-rise building construction.

Candidates who study this Unit will develop knowledge and understanding of the reasons for a thorough site investigation, especially in the context of the selection of foundations and excavation techniques. The overall discussion of site investigation will include aspects of site planning and layout as well as health and safety issues. Specific legislation could be discussed where appropriate and helpful. The importance of providing health and safety information to contractors at an early stage in the project must be emphasised. It would be appropriate at this stage to give the candidate an appreciation of the purpose of the legislation, but to delve too deeply into specific legislation at this stage in a candidate's learning would be inappropriate.

Site establishment

The focus of this aspect of the Unit is the planning of the site establishment. This includes the selection of a location for the site access, temporary roads, storage of materials and components and temporary accommodation. All of these must be selected in a way that provides for an efficient site.

National Unit Specification: support notes (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

The specification of the temporary road material is part of the subject matter of the Unit. The candidate will study the different solutions commonly adopted to secure the site and protect the public during construction works. The candidate will also study the provision of temporary services such as electricity, water, telephones and foul drainage.

Site investigation

The subject of site investigation will include desk study, walk-over surveys and ground investigations.

Ground investigations will include trial pits and bore holes. It will also include in-situ testing and laboratory testing of soil samples. The subject of in-situ testing could include the Cone Penetration Test (CPT), Standard Penetration Test (SPT) and the field vane test. The subject of laboratory testing could be broken down to cover pH tests as well as sulphate, moisture content and particle size distribution tests. Candidates should be referred to current published standards for site investigation and in-situ tests (although these will not be the subject of specific assessment).

The in-situ and laboratory tests mentioned in the above paragraph are not intended to be a comprehensive list. Neither must a centre feel obliged to cover them all or indeed to demonstrate any of them. Candidates should be given an appreciation of the reasons for and techniques available for testing ground and soil samples. Candidates must learn where and when the different methods of site investigation and soil testing are appropriate.

Substructure construction

Throughout the study of this element of the building, function and functional requirements should be stressed.

Excavation and earthworks should include foundation trenches and pits. Techniques for excavating on sloping sites could be discussed as could the use of stepped foundations. (Sloping sites and stepped foundations are not, however, required to be covered for assessment purposes in this Unit).

Earthwork supports and preparation of the surfaces of excavations to receive concrete or other fill should be included. The importance of maintaining dimensional positioning of the foundations and their reinforcement is to be emphasised.

The subject of earthwork support is important from both a practical and a health and safety perspective. Reference should be made to the specification of fill materials and correct compaction techniques and equipment.

The study of foundations in this Unit incorporates the underbuilding up to damp-proof course level. This will include substructure brickwork and dwarf walls. It also includes the study of solum treatments. Candidates will focus their attention on the details of foundation construction and the perimeter walls in the underbuilding. They will also look at the tying-in of the solum and ground floor construction with the substructure walls.

National Unit Specification: support notes (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

Simple foundation types should be limited to strip foundations, raft foundations, pad foundations, and short bored piles and ground beams. Candidates should consider these in the context of low-rise domestic buildings only. Steel reinforcement of foundations and in-situ concrete floors should be studied. The reasons for using reinforcement should be discussed.

The topic of concrete is an important part of this subject area. The topic of designed concrete and prescribed concrete could be covered. Specifications for concrete should be studied. Reference should be made to current standards for concrete. Methods of mixing, transporting, placing, compacting, curing and protecting concrete must be studied.

The use of prefabricated foundations in housebuilding is increasing. Candidates should be made aware of this development and become familiar with some of the systems commercially available. Candidates may refer to prefabrication techniques, where appropriate, in their responses to assessment tasks.

The study of substructure must include the external walling in the underbuilding. It should also include dwarf walls to support floors. The specification and positioning of damp-proof courses is an important aspect of this subject. Provision for incoming services must be covered; so too must sub-floor ventilation.

The topic of ground floors in this Unit includes suspended timber floors, in-situ concrete floors and beam and block floors. Damp-proof membranes should be included in this Unit on substructure as should ground floor insulation.

Health and safety must be stressed throughout each aspect of the Unit. Focus should be given to the ways in which legislation is applied to remove hazards and protect the operatives on site.

Annotated sketches

Regarding Outcome 3, which requires the sketching of details, the reasons for having standards in drawing layout and symbols should be emphasised.

Sketches should be well proportioned. This requires that each component of the detail being sketched is depicted in sensible proportion to the rest of the sketch. A particular scale is not prescribed for these sketches — the important thing is for the sketches to contain clarity of detail and for all parts of the sketch to be in proportion. This may require candidates to sketch certain details at a larger scale than others.

Candidates may refer to textbooks, technical literature and architectural drawings to gain an appreciation of the detail required for specific sketches. This may guide them as to the approximate scale to be adopted for their own sketches.

National Unit Specification: support notes (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The topic of substructure is logically taught in the order in which the construction of the underbuilding is carried out. This will help candidates to imagine or visualise the work being carried out on a building site. The process of constructing foundations and underbuilding can be made more visual by the use of construction drawings and by the use of traditional whiteboard and coloured whiteboard pens.

Use of electronic whiteboards, projectors, photographic images and computer-aided drawings is increasing in some centres to demonstrate the different stages of building work. Candidates who are remote from their centre will still benefit from these learning materials if they can be sent the files electronically. For those that have no access to such facilities, the use of hard copy resources will be appropriate.

Textbooks and videos on house construction are readily available. Some centres subscribe to electronic libraries that contain a vast wealth of written and pictorial information on house building. Resources also exist from national construction research organisations and trades organisations. Centres could also arrange visits from consultants and contractors who are experts in the field of site investigation.

Field trips to building sites are always of benefit to candidates. On housing sites there are often several plots under development at any one time. In this way candidates can see at a glance the process of substructure construction in its various stages. Note could be taken of the plant and equipment being used in the construction of the foundations. Aspects of health and safety should be carefully noted. After visiting the site, candidates could be encouraged to write down a simple method statement for the construction of the underbuilding. This activity should reinforce their learning from the field trip.

A visit to a building site to study superstructure construction is also an opportunity to examine other aspects of building work which are covered by other Units in the *Higher Building Construction* Course:

- ◆ *Building Construction: Superstructure (Higher)* — candidates should note how superstructures are erected. Particular attention may be given to temporary works, the use of plant and equipment and prefabrication techniques.
- ◆ *Building Construction: Components and Finishes (Higher)* — candidates should examine how these aspects of a building are constructed and fit together. Particular note might be taken of the storage of components and materials as well as the precautions to protect the building's finishes.

Note could also be taken of the site layout and the planning of temporary works and installations such as site huts, concrete mixers, batching plant, temporary screens and materials storage facilities. Note should be taken too of how the existing contours of the site have dictated the layout of the development and the depth of excavations. Insight into these and other aspects of the project may best be provided by the site manager. Building companies are often willing to agree to site visits by groups of students if things are arranged through the proper channels and when groups are escorted round the site by the appropriate site personnel.

National Unit Specification: support notes (cont)

UNIT Building Construction: Site Establishment and Substructure (Higher)

When learning about concrete work, candidates would likely benefit from practical exercises in making concrete cubes and carrying out destructive tests on these where possible.

In drawing and sketching work, emphasis should be given to good drawing practice, neatness, clarity and the layout of the drawings. Examples of good practice can be demonstrated by drawings carried out by professional draughts people and designers. The effective use of annotation can also be demonstrated by these drawings. Local designers and architects are often willing to contribute drawings from actual projects as long as copyright is not infringed by centres.

Techniques in planning the layout of drawings and sketches and the relationship between these and annotations should be discussed. The range of different scales employed in construction drawings can also be demonstrated. The use of graph paper as a template for sketching to approximate scale could be demonstrated.

Relating to Outcome 3, the reasons for standards and accepted good practice in drawing layout and symbols used could be covered, although not forming part of the assessment. Many of the published standards include practical examples of the uses of the symbols in a construction context.

Learning and teaching for Outcomes 2 and 3 may be integrated effectively. Candidates may learn about the sequence and processes involved in substructure construction by sketching details of substructure or by having details shown to them via whiteboard or other pictorial means. Indeed, details are often best explained by sketching or by reference to manufacturers' literature.

Whilst the sketching work that candidates undertake will be well proportioned, they will be made aware of the different scales that are commonly used in instrument-aided building drawings. This may be best demonstrated by displaying a range of drawings from an actual building project. Local designers and architects are as previously stated often happy to contribute drawings as long as copyright is not infringed.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

This Unit gives candidates experience of planning site establishment and detailing substructure construction. Although candidates will develop their knowledge and understanding of the factors and issues involved in planning site establishment, Unit assessment is focused on the application of this knowledge and understanding.

Candidates should achieve a satisfactory mark in the tests for Outcomes 1 and 2. The standard to be applied is detailed in the National Assessment Bank item for the Unit.

Candidates should produce a satisfactory folio of work for Outcome 3. The standard to be applied is exemplified in the exemplar provided. The folio of work will be assessed on an achieved/not achieved basis only.

National Unit Specification: support notes (cont)

UNIT Building Construction: Site Establishment and Substructure
(Higher)

CANDIDATES WITH ADDITIONAL SUPPORT NEEDS

This Unit Specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).

National Unit Specification: general information

UNIT Building Construction: Superstructure (Higher)

CODE DV3R 12

COURSE Building Construction (Higher)

SUMMARY

This Unit is a mandatory Unit of the *Higher Building Construction* Course, but may also be taken as a free-standing Unit.

This Unit introduces the principles and processes of the construction of superstructure for low-rise housing on greenfield sites. The content of the Unit includes a consideration of the functional requirements of the different superstructure elements and the process of constructing building superstructures. Candidates will produce sketches of details of superstructure construction.

The Unit is suitable for candidates who aim for a career in the construction industry as technicians, technologists and other construction professionals. The Unit may be undertaken by both full-time and part-time candidates in further education as well as candidates currently at school. Candidates may use this qualification to progress to further study at Higher National or Degree level.

OUTCOMES

- 1 Select, describe and justify an appropriate form of superstructure construction for a given situation.
- 2 Explain an appropriate construction sequence for the erection of superstructure for a given situation.
- 3 Produce annotated sketches to illustrate the construction of building superstructure.

Administrative Information

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National Unit Specification: general information (cont)

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ An Intermediate 2 Course in Product Design, Graphic Communication or Technological Studies, or their Units
- ◆ Two Standard Grades at Credit level, one from each of the following groupings:
 - Mathematics, Physics or Technological Studies
 - either Craft and Design or Graphic Communications

No prior knowledge of building technology is required of candidates undertaking this Unit, although building site experience will be of benefit.

CREDIT VALUE

1 credit at Higher (6 SCQF credit points at SCQF level 6*).

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

CORE SKILLS

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill	None
Core Skills components	Using Graphical Information at SCQF level 4 Critical Thinking at SCQF level 5

National Unit Specification: statement of standards

UNIT Building Construction: Superstructure (Higher)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Select, describe and justify an appropriate form of superstructure construction for a given situation.

Performance Criteria

- (a) A correct form of superstructure is selected for a given situation.
- (b) The form of construction selected is described correctly and complies with current building legislation.
- (c) The selection of a form of construction is justified in terms of functional requirements and performance.

OUTCOME 2

Explain an appropriate construction sequence for the erection of superstructure for a given situation.

Performance Criteria

- (a) An erection sequence for superstructure is outlined in accordance with current industry practice.
- (b) The detailed erection sequence and method is described in terms of function, efficiency and health and safety.
- (c) The detailed erection sequence is justified in terms of function, efficiency and health and safety.

OUTCOME 3

Produce annotated sketches to illustrate the construction of building superstructure.

Performance Criteria

- (a) Annotated sketches produced contain correct detailing of superstructure with respect of current building legislation and good practice.
- (b) Annotated sketches of superstructure produced are accurate and in proportion.
- (c) Annotations produced are correct with respect to the specification of materials and components.
- (d) Annotation and presentation of sketches is in accordance with current industry practice.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Superstructure (Higher)

EVIDENCE REQUIREMENTS FOR THIS UNIT

Written/oral and product evidence is required which demonstrates that the candidate has achieved all Outcomes in this Unit and all Performance Criteria within Outcomes. The content for this Unit is detailed in the Appendix.

The Outcomes should be assessed with two assessments comprising:

- ◆ a 60 minutes for a closed-book test for Outcomes 1 and 2
- ◆ folio of work for Outcome 3, produced in an open-book environment as a natural part of the learning and teaching process

The closed-book test will include a series of short answer and/or restricted response questions on forms of superstructure construction and the processes associated with the erection of superstructure construction for a given construction project. This will be carried out in controlled conditions: candidates are not permitted to collaborate in their responses.

The folio of work is a collection of annotated sketches of the construction of building superstructure. The form of superstructure selected will be **either** traditional masonry cavity wall **or** timber frame construction. The production of the folio of work will be carried out in open-book, supervised conditions. Candidates are free to co-operate with colleagues in the researching of technical information and construction technology details. They may also confer with regard to drawing and sketching techniques and presentation. Assessors must, nevertheless, satisfy themselves that candidates' folios contain their own work.

The assessment instruments will sample the content and skills, detailed in the Appendix, to the Unit. The assessment instruments must, taken together, cover all Outcomes and all Performance Criteria.

Achievement in the closed-book test can be decided by the use of a cut-off score. The National Assessment Bank items illustrate the standard that should be applied and also the nature and extent of the sample to be used. If a centre wishes to design its own assessments for this Unit, they should be of a comparable standard.

Achievement in the folio of work will be decided on an achieved/not achieved basis. The criteria for achievement in the folio of work are the Performance Criteria in Outcome 3.

An exemplar for the folio of work for Outcome 3 can be accessed via the SQA Coordinator for each centre. The exemplar illustrates the standard that should be applied for the folio of work.

For the closed-book test for Outcomes 1 and 2, where candidates fail to reach the agreed threshold score, reassessment should follow using an alternative instrument of assessment.

For the folio of work for Outcome 3, where candidates fail to achieve the required performance, reassessment of one or more sub-tasks may be all that is required to bring the candidate's performance up to an acceptable standard.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Superstructure (Higher)

APPENDIX

NB: All of the content in this section should be covered and is liable to sample through Unit and/or Course assessment.

Content to be covered (Outcomes 1 and 2)

These Outcomes deal with forms of superstructure construction and the erection process for superstructure in the context of low-rise domestic construction.

Based on a given construction project, candidates will be expected to respond to questions dealing with the sequencing and processes involved in low-rise housing superstructure, including:

- ◆ the selection of a form of superstructure construction (**either** traditional **or** timber frame — although both will be covered in learning and teaching)
- ◆ a description of the form of construction selected
- ◆ a justification of the selection of the form of superstructure construction in terms of function and performance requirements, including empirical evidence where appropriate, for the following building elements:
 - external walls
 - internal walls and partitions
 - timber suspended floors or beam and block floors
 - flat roof structures or pitched roof structures
- ◆ the selection of an erection sequence for the form of superstructure construction
- ◆ a justification of the selected erection sequence in terms of function, efficiency and health and safety

Open-book folio of work (Outcome 3)

A folio of work will be prepared by each candidate individually. It is anticipated that the folio of work is produced as a natural part of the learning and teaching process.

The folio of work will include, for **either** traditional **or** timber frame construction (although both will be covered in learning and teaching):

Annotated sketches showing the details of superstructure construction including the junction of the external wall with:

- ◆ upper floor (suspended timber **or** beam and block floor — although both will be covered in learning and teaching)
- ◆ eaves of roof (pitched **or** flat — although both will be covered in learning and teaching)

The *sketches* must:

- ◆ contain correct detailing with respect to current building legislation and good practice
- ◆ be accurate and in proportion
- ◆ be in accordance with current good practice in the construction industry

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Superstructure (Higher)

The *annotations* must:

- ◆ include correct specifications of materials and components
- ◆ include correct description of the selected form of construction
- ◆ be in accordance with current good practice in the construction industry

National Unit Specification: support notes

UNIT Building Construction: Superstructure (Higher)

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

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

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit on the subject of superstructure construction is set in the context of low-rise domestic buildings or dwelling houses. It shares some subject matter in common with the topics of industrial and commercial construction technology. However, there are some distinct differences between domestic and other forms of construction. No prior knowledge of building construction is required of candidates undertaking this Unit.

Corresponding to Outcomes 1-3:

- Outcome 1 This Outcome provides candidates with knowledge of different forms of low-rise domestic construction. It focuses on the functional requirements of the building and its elements. Candidates learn about the different forms of construction commonly employed in house-building and how these possess strength and stability, fire resistance, resistance to heat loss and other properties.
- Outcome 2 This Outcome covers superstructure processes and detailing. It considers traditional masonry cavity wall construction, timber frame construction, internal walls, timber upper floors, and beam and block upper floors, as well as pitched and flat roofs.
- Outcome 3 This Outcome requires candidates to produce sketches, in proportion, of superstructure in low-rise housing construction, and to annotate these sketches.

Candidates should be made aware of alternative forms of construction to traditional and timber frame, for example concrete and steel framed housing. Nevertheless, the assessment in the Unit will be on the two main forms in use in the housing industry in Scotland.

Candidates will study the processes associated with superstructure construction. Temporary works including scaffolding and trestles, as well as screens and protective sheeting should be discussed.

The functional requirements of external walls, internal walls and roofs will be explored: what you want these parts of the building to do and what properties you require them to possess. For example, the functional requirements of external walls include:

- ◆ strength and stability
- ◆ dimensional stability
- ◆ exclusion of rain and snow
- ◆ resistance to heat loss
- ◆ resistance to transmittance of impact noise
- ◆ durability
- ◆ and others

National Unit Specification: support notes (cont)

UNIT Building Construction: Superstructure (Higher)

Empirical evidence can demonstrate that certain forms of construction fulfil the functional requirements of buildings and their elements. Candidates should become familiar with aspects of this evidence such as ‘U’ values, crushing strengths etc.

Candidates will learn to explain why superstructures are erected in the way they are and in what order. They should look at the materials and details associated with both traditional and timber frame construction. The ventilation of the cavity wall and roof space is a topic that must be given some time and attention.

Candidates will study the properties of superstructure materials. The focus here should be on the functional requirements of superstructure elements and how the properties of commonly used building materials and components have led to their use in domestic construction. Such materials should include: bricks, blocks, timber and timber products including trussed rafters. Empirical evidence of the performance of building materials should be researched.

Candidates will study health and safety practice associated with the erection of superstructure. Specific legislation should be discussed, for example, legislation covering manual handling. The focus for the candidate must be on how such legislation is applied or put into practice. The importance of providing health and safety information to contractors at an early stage in the project must be emphasised. The candidate should understand the hazards associated with superstructure construction.

The study of superstructure in this Unit complements the study of the Unit *Building Construction: Substructure*. This *Superstructure* Unit covers the building above damp-proof course level including internal walls and the roof structure. The *Substructure* Unit deals with the building below damp-proof course level and includes the ground floor construction.

Annotated sketches

Regarding Outcome 3, which requires the sketching of details, the reasons for having standards in drawing layout and symbols should be emphasised.

Sketches should be in proportion. This requires that each component of the detail being sketched is depicted in sensible proportion to the rest of the sketch. A particular scale is not prescribed for these sketches – the important thing is for the sketches to contain clarity of detail. This may require candidates to sketch certain details at a larger ‘scale’ than others.

Candidates may be referred to textbooks, technical literature and architectural drawings to gain an appreciation of the detail required for specific sketches. This may guide them as to the sort of approximate ‘scale’ to be adopted for their own sketches.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The topic of the superstructure of a building is logically taught in the general order in which the construction of the building is carried out. This permits candidates to relate the different elements of the building to one another and to think logically about the process of superstructure construction. Another approach is to discuss the whole topic under the heading of function and functional requirements. Teaching and learning that combines these different approaches may be especially effective.

National Unit Specification: support notes (cont)

UNIT Building Construction: Superstructure (Higher)

The teaching of construction technology can be made visual with the use of construction drawings. Use of electronic whiteboards, projectors, photographic images and computer-aided drawings is increasing in some centres to demonstrate the different stages of building work. Candidates who are remote from their centre will still benefit from these learning materials if they can be sent the files electronically. For those that have no access to such facilities, the use of hard copy resources will be appropriate.

Textbooks and videos on house construction are readily available. Some centres subscribe to electronic libraries that contain a vast wealth of written and pictorial information on house building. Resources also exist from national construction research organisations and trades organisations.

Increasingly manufacturers and suppliers of building materials produce technical literature that highlights how their products comply with current building legislation. Candidates will likely find that such literature is very informative and visual. The current legislation pertaining to building construction in Scotland should be referred to throughout the Unit. The technical guidelines provided by the NHBC (National House Building Council) will be of particular interest and value because they relate purely to house construction.

Furthermore, technical literature often refers the reader to the company's website where even more information and photographs or diagrammatic details are available for inspection.

Field trips to building sites are always of benefit to candidates. On housing sites there are invariably several plots under development at any one time; candidates can often see at one glance the process of construction in its various stages. Note should be taken of all plant and equipment being used in the construction works. Aspects of health and safety should be particularly noted. After visiting the site, candidates could be encouraged to write down a simple method statement for the construction of the superstructure. This activity will reinforce their learning from the field trip.

A visit to a building site to study superstructure construction is also an opportunity to examine other aspects of building work which are covered by other Units in the *Higher Building Construction* Course:

- ◆ *Building Construction: Substructure (Higher)* — site layout and the planning of temporary works and installations such as site huts, concrete mixers and batching plant, temporary screens and materials storage facilities. Also of interest would be underground drainage and incoming services. Candidates can note how these aspects of a building project are carried out on site and in what order.
- ◆ *Building Construction: Components and Finishes (Higher)* — candidates should examine how these aspects of a building are constructed and fit together. Particular note might be taken of the storage of components and materials as well as the precautions to protect the building's finishes.

Building companies may agree to site visits by groups of students if things are arranged through the proper channels and when groups are escorted round the site by the appropriate site personnel.

Candidates should be made aware that methods employed in construction may vary from project to project. The designer does not always dictate to the builder exactly how the building is to be erected. In particular contractors often employ the techniques of prefabrication even when the design does not dictate this. Candidates can be encouraged to look out for examples of prefabrication when they visit sites.

National Unit Specification: support notes (cont)

UNIT Building Construction: Superstructure (Higher)

Candidates may be given a brief introduction to aspects of builders' work associated with building services in this Unit, for example, pipeboxing and built-in meter boxes. Nevertheless, the focus of learning for this Unit is clearly to be the basic superstructure.

Especially for Outcome 3 emphasis must be given to good sketching and drawing practice, neatness, clarity and the layout of sketches and drawings. Examples of good practice can be demonstrated by drawings carried out by professional draughtspeople and designers. Visiting designers may demonstrate how accurate drawing work is often preceded by well-planned sketching.

The effective use of annotation must be emphasised to candidates. Techniques in planning the layout of drawings and the relationship between drawings and annotations must be examined carefully.

Relating to Outcome 3 the reasons for standards and good practice in sketching and drawing layout and symbols should be covered, although not forming part of the assessment. Many of the published standards include practical examples of the uses of the symbols in a construction context.

Whilst the sketching work that candidates undertake will merely be in proportion, they will be made aware of the different prescribed scales that are commonly used in instrument-aided building drawings. This may be best demonstrated by displaying a range of drawings from an actual building project. Local designers and architects may be willing to contribute drawings as long as copyright is not infringed.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

This Unit gives candidates experience of planning superstructure erection and detailing superstructure construction. Although candidates will develop their knowledge and understanding of the factors and issues involved in planning superstructure construction, Unit assessment is focused on the application of this knowledge and understanding.

Candidates should achieve a satisfactory mark in the tests for Outcomes 1 and 2. The standard to be applied is detailed in the National Assessment Bank item for the Unit.

Candidates should gather a folio of work which will provide evidence for Outcome 3. The standard to be applied is exemplified in the exemplar provided. The folio of work will be assessed on an achieved/not achieved basis only.

CANDIDATES WITH ADDITIONAL SUPPORT NEEDS

This Unit Specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).

National Unit Specification: general information

UNIT	Building Construction: Components and Finishes (Higher)
CODE	DV3T 12
COURSE	Building Construction (Higher)

SUMMARY

This Unit is a mandatory Unit of the *Higher Building Construction* Course but may also be taken as a free-standing Unit.

This Unit introduces a range of components and finishes associated with low-rise housing. The content of the Unit includes the technology of doors and windows and the application of internal finishes (such as timber flooring and gypsum plaster) and external finishes (such as roof tiles and roughcast). Stairs are given special attention due to the legislation that dictates their design. The Unit also includes a consideration of the functional requirements of the components studied and the properties of different building finishes.

The Unit is suitable for candidates who aim for a career in the construction industry as technicians, technologists and other construction professionals. The Unit may be undertaken by both full-time and part-time candidates in further education as well as candidates currently at school. Candidates may use this qualification to progress to further study at Higher National or Degree level.

OUTCOMES

- 1 Produce annotated sketches showing the location and fixing of doors and windows in buildings.
- 2 Select and justify appropriate components and finishes for a given situation and describe the methods of application of finishes.
- 3 Identify key parts and critical dimensions of a stair and confirm compliance with current legislation.

Administrative Information

Superclass:	TG
Publication date:	March 2006
Source:	Scottish Qualifications Authority
Version:	01

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National Unit Specification: general information (cont)

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ An Intermediate 2 Course in Product Design, Graphic Communication or Technological Studies, or their Units
- ◆ Two Standard Grades at Credit level, one from each of the following groupings:
 - Mathematics, Physics or Technological Studies
 - Either Craft and Design or Graphic Communication

No prior knowledge of building technology is required of candidates undertaking this Unit.

CREDIT VALUE

1 credit at Higher (6 SCQF credit points at SCQF level 6*).

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

CORE SKILLS

Achievement of this Unit gives automatic certification of the following

Complete Core Skill	None
Core Skills components	Using Graphical Information at SCQF level 4 Critical Thinking at SCQF level 5

National Unit Specification: statement of standards

UNIT Building Construction: Components and Finishes (Higher)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Produce annotated sketches showing the location and fixing of doors and windows in buildings.

Performance Criteria

- (a) Sketches produced are clear and contain correct detailing of the location and fixing of components within structures in accordance with current good practice.
- (b) Details produced by sketches are correct with respect to current building legislation and good practice.
- (c) Sketches produced are accurate and well proportioned.
- (d) Annotations produced are correct with respect to the specification of materials and components.
- (e) Annotation and presentation of sketches is in accordance with current industry practice.

OUTCOME 2

Select and justify appropriate components and finishes for a given situation and describe the methods of application of finishes.

Performance Criteria

- (a) Materials and mixes selected are in accordance with current standards and good practice.
- (b) The selection of components and finishes is clearly justified for a given situation in terms of functional requirements and performance.
- (c) The methods of application of finishes are described correctly in accordance with current good practice.

OUTCOME 3

Identify key parts and critical dimensions of a stair and confirm compliance with current legislation.

Performance Criteria

- (a) Key parts and critical dimensions of a stair are correctly identified from a given stair design.
- (b) Compliance or non-compliance of a given stair with current legislation is correctly confirmed by calculation.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Components and Finishes (Higher)

EVIDENCE REQUIREMENTS FOR THIS UNIT

Written/oral and product evidence is required which demonstrates that the candidate has achieved all Outcomes in this Unit and all Performance Criteria within Outcomes. The content for this Unit is detailed in the Appendix.

The assessment for Outcomes 2 and 3 in this Unit is a 60 minute closed-book test. This covers the selection and justification of components and finishes and the key parts and dimensions of a stair. In addition, candidates will confirm by calculation the compliance (or non-compliance) with current legislation of a given stair design.

The assessment for Outcome 1 in this Unit is a folio of work. This covers annotated sketches of the location and fixing of doors and windows.

The closed book test covering Outcomes 2 and 3 will be carried out in controlled conditions: candidates are not permitted to collaborate in their responses.

The compilation of the folio of work will be an open-book task carried out in supervised conditions. Candidates may co-operate and collaborate in their research and information gathering for this task. They may similarly compare notes on technical details and building standards. Assessors must, nevertheless, be satisfied that the folio of work submitted by each candidate is the candidate's own work.

The assessment instruments will sample the content and skills detailed in the Appendix to the Unit. The assessment instruments must, taken together, cover all Outcomes and all Performance Criteria.

Achievement in Outcomes 2 and 3 can be decided by the use of a cut-off score. The National Assessment Bank (NAB) items illustrate the standard that should be applied and also the nature and extent of the sample to be used. If a centre wishes to design its own assessments for this Unit, they should be of a comparable standard.

Achievement in the folio of work for Outcome 1 will be decided on an achieved/not achieved basis. The criteria for achievement in the folio of work are the Performance Criteria in Outcome 1.

An exemplar for the folio of work for Outcome 1 can be accessed via the SQA Coordinator for each centre. The exemplar illustrates the standard that should be applied for the folio of work.

For the closed-book test for Outcomes 2 and 3, where candidates fail to reach the agreed threshold score, reassessment should follow using an alternative instrument of assessment.

For the folio of work for Outcome 1, where candidates fail to achieve the required performance, reassessment of one or more sub-tasks may be all that is required to bring the candidate's performance up to an acceptable standard.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Components and Finishes (Higher)

APPENDIX

NB: All of the content in this section should be covered and is liable to sample through Unit and/or Course assessment.

In this Unit, candidates will cover both traditional **and** timber framed buildings in learning and teaching, but will only have to deal with **one** of these in the assessment for the Unit. In addition, candidates will consider the location and fixing of both external doors and windows in learning and teaching, but will only have to include one or the other in their folio of work.

Folio of work containing annotated sketches of location and fixing of components (Outcome 1)

The candidate will complete:

- ◆ Annotated sketches showing details of the location and fixing of the component (window **or** external door) in the external wall structure, including:
 - a horizontal section (plan)
 - a vertical section

The external wall structure may be either traditional masonry cavity construction **or** timber frame. Candidates may be given an outline sketch of the external wall structure as a starting point for their work.

The sketches must:

- ◆ be clear and contain correct detailing of the location and fixing of components within the structure
- ◆ be correct with respect to current building legislation and good practice
- ◆ be accurate, well proportioned

The annotations must:

- ◆ include correct specifications of materials and components
- ◆ be in accordance with current good practice

The annotated sketches for Outcome 1 may be compiled either manually or by computer-aided means.

Closed book test covering selection and justification of components and finishes (Outcome 2)

The content to be covered for this Outcome is as follows:

- 1 The selection of materials, mixes, components and finishes in terms of functional requirements and performance for:
 - ◆ type of window **and** external doors
 - ◆ material for selected door **and** window(s)
 - ◆ finishes for:
 - outside face of external wall
 - inside face of external wall
 - faces of internal walls and partitions

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Components and Finishes (Higher)

- floors (finishings and coverings)
 - ceilings
 - roof covering (flat or pitched) including perimeter treatments
- 2 A description of the methods of application of the finishes selected, including:
- ◆ preparations of backgrounds
 - ◆ methods of application of finishes
 - ◆ methods of temporary protection of finishes
- 3 Materials and mixes selected must be in accordance with current standards and good practice.

Closed book test covering stair parts and critical dimensions

The content to be covered for this Outcome (3) is as follows:

- 1 The identification of *stair parts* and associated *critical dimensions* from given drawings:
- ◆ riser
 - ◆ rise
 - ◆ tread
 - ◆ going
 - ◆ nosing
 - ◆ pitch
 - ◆ pitch line
 - ◆ stringer (or string)
 - ◆ headroom
 - ◆ balustrade
 - ◆ handrail
 - ◆ newel post
 - ◆ landings
 - ◆ stair width
- 2 Confirmation of the compliance (or otherwise) with *current building legislation* of the given stair design in respect of:
- ◆ number of risers in a flight
 - ◆ maximum and minimum rise
 - ◆ minimum going
 - ◆ going of landing
 - ◆ combination of (2 x rise) plus (1 x going)
 - ◆ maximum pitch
 - ◆ width of stair
 - ◆ headroom

National Unit Specification: support notes

UNIT Building Construction: Components and Finishes (Higher)

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

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

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit on the subject of construction is set in the context of low-rise domestic buildings or dwelling houses. It shares some subject matter in common with the topics of industrial and commercial construction technology. However, there are some distinct differences between domestic and other forms of construction.

No prior knowledge of building construction is required of candidates undertaking this Unit.

Corresponding to Outcomes 1-3

- Outcome 1 This Outcome requires the candidate to sketch sections through building components, correctly locating the components within the building structure.
- Outcome 2 This Outcome provides the candidate with knowledge and understanding of components and internal and external finishes found in housing construction. Components include doors and windows. Internal finishes include floor, wall and ceiling finishes. External finishes include wall finishes and roof coverings. The Outcome concentrates on the functional requirements and performance of both components and finishes. It also gives attention to the method of application of the finishes to the building structure. Candidates will be able to select and justify components and finishes for a given building.
- Outcome 3 This Outcome requires candidates to identify the key parts and critical dimensions of stairs. Candidates will be able to calculate and confirm compliance (or otherwise) of a given stair design with current legislation.

Candidates who undertake this Unit will develop knowledge and understanding of the various components commonly found in domestic buildings. Doors, windows and stairs will be the focus of attention in this Unit. (Trussed rafters are undoubtedly a major component in a building. Nevertheless, the subject of roof structure is not covered in this Unit but rather in *Building Construction: Superstructure*).

Candidates will also develop knowledge and understanding of the various finishes commonly found in domestic buildings. Timber flooring, plasterboard and plaster are obvious examples. External finishes such as roughcast and render as well as facing brick will also be covered. Roof coverings for both flat and pitched roofs will be considered.

- ◆ For plaster and plasterboard finishes, fixing details and treatment of joints, junctions and edges are important areas of study.
- ◆ For render and roughcast finishes, reference will be made to common mixes and current standards. The treatment of perimeter details and allowance of expansion in the finish should be dealt with.

National Unit Specification: support notes (cont)

UNIT Building Construction: Components and Finishes (Higher)

- ◆ For roof coverings, particular attention will be given to eaves, verge and ridge details. Some time will be spent considering the detail around protruding pipes and the subjects of roof ventilation, insulation and allowance for thermal movement.

A domestic construction project requires the preparation of a range of backgrounds for the application of finishes. Candidates must understand the importance of sound preparation of, for example, brickwork and blockwork backgrounds to receive plaster or roughcast finishes. The following topics could be included:

- ◆ Bonding of materials; surface textures; bonding agents; plaster mixes; render mixes; screed mixes; expansion and contraction; moisture content; the effect of adverse weather.

Candidates should gain an appreciation of British and other international Standards that apply to the specification of building materials and components. Nevertheless, candidates will not be required to memorise BS, ISO or other reference numbers for assessment purposes.

Candidates will gain an appreciation of the functional requirements and properties of components and materials. Components and materials could include:

- ◆ timber doors
- ◆ PVCu, aluminium doors and doorsets
- ◆ timber windows
- ◆ PVCu and metal windows
- ◆ timber stairs

Candidates will understand the properties of finishes. The focus here is on the functional requirements of the finish and the performance of different materials. Finishes should include:

- ◆ renders
- ◆ roughcast
- ◆ plaster and plasterboard
- ◆ timber flooring
- ◆ wall and floor tiles
- ◆ rooftiles: plain, interlocking
- ◆ roof slating
- ◆ flat roof finishes: built-up felt coverings, mastic asphalt, single-ply membranes

The study of components in buildings could include the following areas (although these will not form part of the Unit assessment): relevant health and safety practices and legislation; provision of health and safety information to tradespersons and other operatives; proper storage of materials and components and associated protection.

National Unit Specification: support notes (cont)

UNIT Building Construction: Components and Finishes (Higher)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

By assigning research tasks to candidates, the study of building components and finishes can be candidate-centered and participative. Research could be based on the following sources:

- ◆ manufacturers' technical literature
- ◆ internet websites e.g. the website of a national manufacturer of roofing tiles
- ◆ diagrams and photographs
- ◆ building drawings and details
- ◆ samples of materials
- ◆ wallcharts of building components and their fixings

Use of electronic whiteboards, projectors, photographic images and computer-aided drawings is increasing in some centres to demonstrate the different stages of building work. Candidates who are remote from their centre will still benefit from these learning materials if they can be sent the files electronically. For those that have no access to such facilities, the use of hard copy resources will be appropriate.

Textbooks and videos on house construction are readily available. Some centres subscribe to electronic libraries that contain a vast wealth of written and pictorial information on house building. Resources also exist from national construction research organisations and trades organisations.

Increasingly manufacturers and suppliers of building materials produce technical literature that highlights how their products comply with current building legislation. Candidates will likely find that such literature is very informative and visual. The current legislation pertaining to building construction in Scotland should be referred to throughout the Unit. The technical guidelines provided by the NHBC (National House Building Council) will be of particular value because they relate purely to house construction.

Candidates could be exposed to the BS: EN documents for some of the common materials and for workmanship applicable to these finishes. This will allow them to become familiar with the layout of such technical documentation and allow them to read other such documents with greater confidence. Candidates are not required to remember standards or their references.

Field trips to building sites are always of benefit to candidates. On housing sites there are invariably several plots under development at any one time. Candidates can view the process of applying finishes and installing components at various stages. Note could be taken of all plant and equipment being used in the construction works. Aspects of health and safety should be particularly noted. After visiting the site, candidates could be encouraged to write down a simple method statement for the installation of components, the preparation of backgrounds and the application of finishes.

On site visits attention could be paid to on-site storage requirements for components and finishing materials in terms of space and stacking. Manual handling techniques pertaining to different components are worth noting.

National Unit Specification: support notes (cont)

UNIT Building Construction: Components and Finishes (Higher)

A visit to a building site to study building components and finishes is an opportunity to examine other aspects of building work. Candidates who are also studying the Unit *Building Construction: Superstructure (Higher)*, for example, could make use of the chance to examine how the components are fitted into the building envelope. Particular note might be taken of the detail at the junction of components and the adjacent finishes, for example, a window with the plaster or roughcast finish surrounding it.

When candidates are sketching construction details they could be coached in techniques that result in sketches which have clean lines and are free of repeated correction marks.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

This Unit gives candidates experience of selecting components and finishes. Although candidates will develop their knowledge and understanding of building materials and their properties, Unit assessment is focused on the *application* of this knowledge and understanding.

Candidates should achieve a satisfactory mark in the tests for Outcomes 2 and 3. The standard to be applied is detailed in the National Assessment Bank item for the Unit.

Candidates should produce a satisfactory folio of work for Outcome 1. The standard to be applied is exemplified in the exemplar provided. The folio of work will be assessed on an achieved/not achieved basis only.

CANDIDATES WITH ADDITIONAL SUPPORT NEEDS

This Unit Specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).