

22268VIC Advanced Diploma of Building Design (Architectural)

Reaccreditation Submission

Version 1



For office use only

Accredited by	Victorian Registration and Qualifications Authority
From	30 June 2014
To	31 December 2018
Course Code	22268VIC

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Section A: Copyright and course classification information

1. Copyright owner of the course	Copyright of this course is held by the Department of Education and Early Childhood Development, Victoria © State of Victoria 2014
2. Address	<p>Department of Education and Early Childhood Development (DEECD) Executive Director Training Participation and Facilitation Division GPO Box 4367 MELBOURNE VIC 3001</p> <p>Day-to-day contact</p> <p>Curriculum Maintenance Manager – Building Industries Holmesglen Institute PO Box 42 HOLMESGLEN VIC 3148</p> <p>Telephone: (03) 9564 1987 Facsimile: (03) 9564 1538 Email: edward.rush@holmesglen.edu.au</p>
3. Type of submission	This qualification is submitted for reaccreditation. It replaces and is equivalent to 21953VIC Advanced Diploma of Building Design (Architectural), expiry date 30 June 2014.
4. Copyright acknowledgement	<p>Copyright of this material is reserved to the Crown in the right of the State of Victoria.</p> <p>© State of Victoria (Department of Education and Early Childhood Development) 2014.</p> <p>The following unit/s of competency:</p> <ul style="list-style-type: none"> • BSBPMG407A Apply risk management techniques • BSBSMB404A Undertake small business planning • CPCCOHS1001A Work safely in the construction industry <p>are from the BSB07 Business Services Training Package and the CPC08 Construction, Plumbing and Services Training Package respectively and are administered by the Commonwealth of Australia.</p> <p>© Commonwealth of Australia</p> <p>This work is licensed under a Creative Commons Attribution-NoDerivs 3.0 Australia licence (http://creativecommons.org/licenses/by-nd/3.0/au/).</p> 

Section A: Copyright and course classification information

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<p>6. Course accrediting body</p>	<p>Victorian Registration and Qualifications Authority (VRQA)</p>	
<p>7. AVETMISS information</p>	<p>ANZSCO code (Australian and New Zealand Standard Classification of Occupations)</p>	<p>232000 Architect, Designer, Planners and Surveyors</p>
	<p>ASCED code – 4 digit (Field of Education)</p>	<p>0401 Architecture and Urban Environment</p>
	<p>National course code</p>	<p>22268VIC</p>
<p>8. Period of accreditation</p>	<p>Proposed period of accreditation 30 June 2014 – 31 December 2018</p>	



Section B: Course information

<p>1. Nomenclature</p> <p>1.1 Name of the qualification</p> <p>1.2 Nominal duration of the course</p>	<p>Standard 1 AQTF Standards for Accredited Courses</p> <p>Advanced Diploma of Building Design (Architectural)</p> <p>2,086 hours</p>
<p>2. Vocational or educational outcomes</p> <p>2.1 Purpose of the course</p>	<p>Standard 1 AQTF Standards for Accredited Courses</p> <p>This course will provide graduates with the skills and knowledge required for employment as a building designer. Following an appropriate period of employment, a graduate can apply to the Building Practitioners Board for registration as a draftsman (architectural).</p>
<p>3. Development of the course</p> <p>3.1 Industry/enterprise/ community needs</p>	<p>Standards 1 and 2 AQTF Standards for Accredited Courses</p> <p>Background</p> <p>Building designers design buildings and develop working drawings and documentation for all components in the construction of residential, commercial and industrial buildings. Career opportunities for graduates include working for building design organisations, architects and building contractors in both small and large commercial enterprises or government departments.</p> <p>Niche areas of employment associated with building design include restoration of old buildings, commercial kitchen design and as documentation technicians for specialists, manufacturers and suppliers.</p> <p>At this time this curriculum was developed, a person wishing to register with the Building Practitioners Board as a practitioner in the category of draftsman (architectural) must demonstrate an appropriate level of building industry experience and have attained the Advanced Diploma in Building Design (Architectural). Persons intending to work as a registered building practitioner are advised to avail themselves of continuing professional development.</p>

Student enrolment data

Data provided by the HESG in the table below shows that there were 1,965 students enrolled in the current course in 2012. The numbers have been steadily increasing over the past four years.

Year	Government subsidised enrolments	Fee paying enrolments
2009	648	21
2010	1,424	121
2011	1,721	210
2012	1,766	199

In addition to this, the Victorian Building Authority (as at May 2013) states that there are 2,342 registered building practitioners in the draftsperson category (across all draftsperson categories).

Source: www.pulse.buildingcommission.com.au (accessed 30 July 2013).

Target audience

The proposed target group for this course includes students who have completed the Senior Secondary Certificate of Education (VCE in Victoria) and mature age students seeking employment in building design, both in small and large building design and architect businesses covering domestic and commercial developments. It also includes qualified tradespeople from allied trades in the building and construction industry and existing workers in building design who wish to upgrade their current qualifications or apply for registration to become a registered building practitioner.

Demand for the course

Legislative and license

Currently, the Building Practitioners Board (BPB) of the Victorian Building Authority requires an Advanced Diploma of Building Design (Architectural) as the minimum educational requirement for registration as part of the Building Regulations (2006) of Victoria.

From 2013, the 22268VIC Advanced Diploma of Building Design (Architectural) will be the only Advanced Diploma of Building Design (Architectural) that is available in Australia.

Community

In response to Recommendation 55 of the 2010 Royal Commission into the Victorian Bushfires, two BAL units were developed for the qualification and accredited in 2011. HESG funded two BAL units as well as e-learning resources to support a quality training and assessment implementation of these units.

BAL ratings are a requirement for building approval and planning processes across Victoria and the BAL units in this qualification are currently the only accredited units available within Australia. These BAL units have a broader application in the community, including for the professional development of building surveyors, planners and associated building contractors. Building surveyors and building construction project managers are listed as skills shortages in Victoria.

Sustainability is a major concern and priority for our community and government. Sustainable building design reflected in the National Construction Code and this qualification integrates a number of units, including *Design sustainable buildings* to develop skills and knowledge required specifically to design all types of sustainable buildings. It is important to acknowledge sustainability in buildings is a complex subject involving many disciplines and that it is possible for graduates, with experience, to work as a specialist primarily in this field.

The design of safe buildings is important for Victorians and places a high-level of responsibility for building designers. The unit, *Design safe buildings* is unique to this qualification and this unit recognises the need for risk management in the design, construction and use of residential and commercial buildings, and the implementation of risk management strategies for health and safety hazards.

Industry and enterprise

There is an ongoing need for skilled building designers in Victoria. A search for job vacancies on Seek (July 2013) showed 146 vacancies for people with skills and knowledge directly related to the outcomes of this qualification.

Advice from industry in regional Victoria is that the employment outlook is stable as the building designers have a client base for custom designed homes and renovations/expansion projects. Demand is being driven by a steady increase in the number of experienced industry professionals retiring and young families moving to the region from metropolitan areas.

As stated in Melbourne 2030 – Planning for Sustainable Growth, an extra 620,000 households will be required over this time, creating demand for housing and the associated infrastructure required for this population growth. This will create employment in the construction sector, which includes building designers. This growth is currently reflected in the urban growth areas of Melbourne and regional Victoria and forms the basis of projections that indicate greater demand for social housing, affordable private and rental living.

Sources: www.dpcd.vic.gov.au/planning/plansandpolicies/planningformelbourne/planninghistory/melbourne2030 accessed 30 July 2013 and the National Housing Supply Council – Housing supply and affordability – key indicators, 2012

Building design graduates underpin the architectural and construction industry. They work in a team environment within a firm in an entry-level position or as an experienced designer, or they may establish and operate their own business.

Summary of the skills and knowledge outcomes (Project Steering Committee)

In reviewing the applicability of the current course outcomes, and identifying future skills and knowledge requirements, a number of consultation and validation processes occurred.

Consultation for the reaccreditation involved the following.

- An industry skills and knowledge workshop on the 25 May 2013 with 28 building professionals in attendance, specifically to identify the future trends in the industry (and ensure they are reflected in the curriculum) and to review the existing units of competency.
- An initial round of consultation on the units of competency, nominal hours and skills and knowledge requirements. With the units posted using an online feedback mechanism to maximise opportunities for consultation across Victoria. Invitations to contribute were sent to the 3,200 members of the BDAV, Victorian registered training organisations (RTOs), and the Victorian Advanced Building Studies Network Group.
- A second round of consultation on the revised units of competency.
- A range of meetings and phone interviews with building designers, teachers, current students, the Victorian Building Authority, the BDAV Executive, Construction and Property Services Industry Skills Council (CPSISC).

3.2 Review for reaccreditation

The outcomes of the consultation and validation are reflected in this document and the revised units of competency.

Importantly a project Steering Committee to oversee the development of the course was established with the assistance of the BDAV.

Mapping to existing Training Packages

A detailed mapping of existing Training Packages content has been undertaken and it has been found that this qualification:

- does not duplicate, by title or coverage, the outcomes of an endorsed Training Package qualification
- is not a subset of a single Training Package qualification that could be recognised through one or more statements of attainment or a skill set
- does not include units of competency additional to those in a Training Package qualification that could be recognised through statements of attainment in addition to the qualification
- does not comprise units that duplicate units of competency of a Training Package qualification.

The CPSISC has also confirmed that they will not be developing an Advanced Diploma of Building Design (Architectural) in the foreseeable future.

In August 2011 the original qualification was amended to include two units developed specifically to address a recommendation from the 2009 Bushfire Royal Commission. These two units address the skills and knowledge requirements to conduct a Bushfire Attack Level (BAL) assessment.

Revisions are based on formal and informal data collected from RTO teaching staff, student feedback and through input from the Steering Committee. Throughout the consultation processes it was clear that the current course was meeting industry needs and required only minor amendments to ensure currency of terminology and slight changes in the skills set.

22268VIC Advanced Diploma of Building Design (Architectural) replaces and is equivalent to 21953VIC.

The main areas identified for improvement to the course included:

- adding the term 'relevant legislation' and the building legislation hierarchy to the range statement in the majority of units, enabling the curriculum to be further 'future proofed'.

- minor amendments to the unit template to ensure consistency with the VRQA requirements and nationally endorsed units of competency
- amending the title of two units of competency to reflect the definition of relevant legislation
- removing the requirement to set out a building site, emphasising the site survey requirements including measuring existing buildings
- a reference to town planning and planning legislation, where required.

This qualification will replace the existing 21953VIC course structure and is equivalent to the superseded course.

All new students will be required to be enrolled in the new course from 30 June 2014. The following is the equivalence table.

Previous course	Current course	Relationship
21953VIC Advanced Diploma of Building Design (Architectural)	22268VIC Advanced Diploma of Building Design (Architectural)	The 22268VIC Advanced Diploma of Building Design (Architectural) replaces and is equivalent to 21393VIC Advanced Diploma of Building Design (Architectural). There can be no new enrolments in the 21393VIC after 30 June 2014.
VPAU582 Undertake site survey and analysis to inform design process	VU21587 Undertake site survey and analysis to inform design process	Not equivalent. Focus on completing a site analysis and measurement rather than a site survey.
VPAU583 Apply structural and construction technology to the design of residential buildings	VU21588 Apply structural and construction technology to the design of residential buildings	Equivalent
VPAU584 Apply structural and construction technology to the design of commercial buildings	VU21589 Apply structural and construction technology to the design of commercial buildings	Equivalent
VPAU585 Comply with codes and standards in the design of residential buildings	VU21590 Comply with relevant legislation in the design of residential buildings	Equivalent
VPAU586 Comply with codes and standards in the design of commercial buildings	VU21591 Comply with relevant legislation in the design of commercial buildings	Equivalent

Previous course	Current course	Relationship
VPAU587 Design safe buildings	VU21592 Design safe buildings	Equivalent
VPAU588 Design sustainable buildings	VU21593 Design sustainable buildings	Equivalent
VPAU589 Integrate services layout into design documentation	VU21594 Integrate services layout into design documentation	Equivalent
VPAU590 Produce working drawings for residential buildings	VU21596 Produce preliminary and working drawings for residential buildings	Equivalent
VPAU591 Produce working drawings for commercial buildings	VU21597 Produce working drawings for commercial buildings	Equivalent
VPAU592 Select construction materials for building projects	VU21598 Select construction materials for building projects	Equivalent
VPAU593 Provide design solutions for residential and commercial buildings	VU21599 Provide design solutions for residential and commercial buildings	Equivalent
VPAU594 Integrate digital applications into architectural workflows	VU21600 Integrate digital applications into architectural workflows	Equivalent
VPAU595 Present architectural designs	VU21601 Present architectural designs	Equivalent
VPAU596 Manage architectural project administration	VU21602 Manage architectural project administration	Equivalent
VPAU597 Undertake complex architectural projects	VU21603 Undertake complex architectural projects	Equivalent
VPAU349 Work safely in the construction industry	CPCCOHS1001A Work safely in the construction industry	Not equivalent
BSBOHS404B Contribute to the implementation of strategies to control OHS risk	Deleted	Some content moved to BSBPMG415A Apply project risk-management techniques
BSBSMB404A Undertake small business planning	BSBSMB404A Undertake small business planning	Equivalent
VU20716 Conduct a Bushfire Attack Level (BAL) assessment	VU21604 Conduct a Bushfire Attack Level (BAL) assessment	Equivalent
VU20717 Apply Bushfire Attack Level (BAL) assessment to design and construction process	VU21605 Apply Bushfire Attack Level (BAL) assessment to design and construction process	Equivalent

4. Course outcomes

4.1 Qualification level

Standards 1, 2, 3 and 4 AQTF Standards for Accredited Courses

This qualification is consistent with the criteria and specifications of the AQF Advanced Diploma qualification type descriptor as outlined in the AQF Second Edition, January 2013.

Skills: Graduates of 22268VIC Advanced Diploma of Building Design (Architectural) will have a broad range of cognitive, technical and communication skills to select and apply methods and technologies to:

- analyse, diagnose, design and execute judgments across a broad range of technical applications of the National Construction Code and other relevant legislation
- interpret plans and specifications to produce working drawings
- problem solve solutions to develop well resolved design outcomes for residential and commercial buildings
- transmit information to others in developing and coordinating architectural project documentation.

Knowledge: Graduates of 22268VIC Advanced Diploma of Building Design (Architectural) will have specialised and integrated technical and theoretical knowledge with depth within one or more fields of work and learning, such as:

- demonstrating an understanding of specialised knowledge of structural and construction technology
- employing a range of applications required in architectural workflows
- applying the principles of sustainability and safety to building design, including the technical knowledge of selecting suitable construction materials.

Application of skills and knowledge: Graduates of 22268VIC Advanced Diploma of Building Design (Architectural) will demonstrate the application of skills and knowledge by:

- generating ideas through the analysis and of information and concepts at an abstract level in the application of design principles and theories
- producing two and three-dimensional drawings in accordance with industry best practice and to a level suitable for building permit approval
- communicating and clarifying complex structures and layouts when presenting graphic design solutions to key stakeholders.

4.2 Employability skills

According to the AQF the volume of learning for an Advanced Diploma is typically 1.5 to 2 years. As the 22268VIC Advanced Diploma of Building Design (Architectural) is currently being delivered by RTOs in 2 to 2.5 years, this is consistent with this specification.

The volume of learning incorporates structured and unstructured learning activities such as research and evaluate pathway options to independently develop and implement a learning plan over time to enable learning goals to be reviewed and amended.

In accordance with Standard 4 AQTF Standards for Accredited Courses, this course has employability skills.

4.3 Recognition given to the course (if applicable)**Victorian Building Practitioners Board**

The program is a state accredited and nationally recognised qualification that enables graduates to work for registered building practitioners, architects and other design professionals in related industries. Graduates seeking to register as a building practitioner and practice as a sole practitioner must satisfy the requirements set out by the Building Regulations 2006 for the category of Building Design DP-AD (Architectural).

These requirements currently mandate the prescribed qualification for registration as the 22268VIC Advanced Diploma in Building Design (Architectural) plus 12 months practical experience to the satisfaction of the BPB.

The 22268VIC Advanced Diploma of Building Design (Architectural) has replaced the previous qualifications for the purposes of registration to practice as a building designer in the State of Victoria.

To ensure the currency of this information, graduates must check the requirements for registration at <http://www.vba.vic.gov.au>.

Continuing Professional Development

There is an expectation that any person undertaking training and assessment in this qualification, or part thereof, will make a commitment to available continuing professional development programs.

<p>4.4 Licensing/ regulatory requirements (if applicable)</p>	<p>Participants entering a construction site to undertake work in Victoria will require a Construction Induction Card issued by WorkSafe.</p> <p>This can be applied for after completion of the unit <i>CPCCOHS1001A Work safely in the construction industry</i>.</p> <p>There are no other licensing requirements for this course.</p>
<p>5. Course rules</p>	<p>Standards 2, 6, 7 and 9 AQTF Standards for Accredited Courses</p>
<p>5.1 Course structure</p>	<p>To be awarded the 22268VIC Advanced Diploma of Building Design (Architectural), participants are required to successfully complete all 21 core units as set out in the following table.</p> <p>Participants who do not complete the full course will be issued with a Statement of Attainment for the unit(s) successfully completed.</p>

Unit of competency/ module code	Field of Education code (6-digit)	Unit of competency/module title	Prerequisite	Nominal hours
VU21587	040305	Undertake site survey and analysis to inform design process	Nil	40
VU21588	040199	Apply structural and construction technology to the design of residential buildings	Nil	180
VU21589	040199	Apply structural and construction technology to the design of commercial buildings	Nil	120
VU21590	040199	Comply with relevant legislation in the design of residential buildings	Nil	40
VU21591	040199	Comply with relevant legislation in the design of commercial buildings	Nil	50
VU21592	040199	Design safe buildings	Nil	40
VU21593	040199	Design sustainable buildings	Nil	90

Section B: Course information

Unit of competency/ module code	Field of Education code (6-digit)	Unit of competency/ module title	Prerequisite	Nominal hours
VU21594	040199	Integrate services layout into design documentation	Nil	40
VU21596	040199	Produce preliminary and working drawings for residential buildings	Nil	180
VU21597	040199	Produce working drawings for commercial buildings	Nil	180
VU21598	040199	Select construction materials for building projects	Nil	40
VU21599	040199	Provide design solutions for residential and commercial buildings	Nil	200
VU21600	040301	Integrate digital applications into architectural workflows	Nil	240
VU21601	040199	Present architectural designs	Nil	120
VU21602	040199	Manage architectural project administration	Nil	60
VU21603	040199	Undertake complex architectural projects	Nil	280
CPCCOHS1001A		Work safely in the construction industry	Nil	6
BSBPMG415A		Apply project risk-management techniques	Nil	40
BSBSMB404A		Undertake small business planning	Nil	50
VU21604	040199	Conduct a Bushfire Attack Level (BAL) assessment	Nil	60
VU21605	040199	Apply Bushfire Attack Level (BAL) assessment to the design and construction process	VU21604	30
Total nominal hours				2,086

5.2 Entry requirements

The entry requirement for this course is Australian Core Skills Framework (ASCF) Level 3.

An individual competent at Level 3 of the ASCF will be able to demonstrate:

Learning

A participant at this level will need to be able to plan, implement and adjust processes as required to achieve learning outcomes and seek new challenges. They also will need to experiment with new learning strategies and familiar contexts and apply some strategies in less familiar contexts. In an educational settings, this means they should be able to perform tasks such as the following:

- List references to be used in independent study.
- Interpret diagrams and illustrations and comment on the usefulness of these to their own learning.
- Participate in a learning support group.

Reading

A participant at this level will need to be able to evaluate and integrate information and ideas to build meaning from a range of familiar (and some unfamiliar) texts and text types. They also will need to be able to select and apply a range of reading strategies, which are appropriate to the purpose and type of the text and activity. In an educational setting, this means they should be able to perform tasks such as the following:

- Follows information presented in manuals, instructions and technical drawings.
- Reads and interprets diagrams and graphs that are unambiguously presented.
- Interprets information from a graphic, table or chart to form an opinion, predict a trend or make recommendations.
- Reads a diagram and comments on how information supports or refutes a particular point of view.

Writing

A participant at this level will need to be able to communicate relationships between ideas and information in a style appropriate to audience and purpose. They should also be able to select vocabulary, grammar structures and conventions, which are appropriate to the text.

In an educational setting, this means they should be able to perform tasks such as the following:

- Prepares an assignment or written project report which may include graphs or diagrams for a specified purpose
- Uses a range of software packages to complete assignments

Oral communication

A participant at this level will need to be able to select and use appropriate strategies to establish and maintain spoken communication in familiar and some unfamiliar contexts. They should be able to derive meaning from a range of oral texts in familiar and some unfamiliar contexts. In an educational setting, this means they should be able to perform tasks such as the following:

- Works with a partner to develop an oral presentation.
- Listens to spoken instructions and chooses appropriate action, eg how to organise course materials and complete work, including electronic storage.
- Presents information to a small group on a particular topic and responds to questions.

Numeracy

A participant at this level will need to be able to select and interpret mathematical information that may be partially embedded in familiar and some less familiar texts and tasks. They should also be able to select from and use a variety of mathematical and problem solving strategies in a range of familiar and some less familiar contexts. Finally, they should be able to use a combination of informal and formal oral and written mathematical language and representation to communicate mathematically. In an educational setting, this means they should be able to perform tasks such as the following:

- Uses a calculator and/or a spreadsheet to undertake the numerical calculations required as part of a course of study and discusses the results
- Collects, collates and discusses data from a survey undertaken and prepares a report

6. Assessment

6.1 Assessment strategy

Standards 10 and 12 AQTF Standards for Accredited Courses

All assessment will be consistent with: Standard 1.2 of the Australian Quality Training Framework (AQTF) Essential Conditions and Standards for Continuing (or Initial) Registration.

See: AQTF User guides to the Essential Conditions and Standards for Continuing (or Initial) Registration:
[http://www.training.com.au/documents/AQTF Essential Conditions and Standards for Continuing Registration.pdf](http://www.training.com.au/documents/AQTF_Essential_Conditions_and_Standards_for_Continuing_Registration.pdf)

Consistent with Standard 1, Element 5 of the AQTF Essential Conditions and Standards for Continuing (or Initial) Registration, RTOs must ensure that Recognition of Prior Learning (RPL) is offered to all applicants in determining competency for credit.

The following principles should be used as a guide to the assessment approach:

- assessment tasks/activities should be grounded in a relevant context and not be culturally biased
- participants should be assessed across a wide range of tasks integrated into practice, in order to increase reliability and validity of assessment. One-off assessment tasks do not provide a reliable and valid measure of competence
- instructions for assessment tasks should be clear, explicit and ordered. Participants must know what is expected of them and the criteria by which they will be judged
- time allowed to complete a task should be reasonable and specified, and should allow for preparation and re-drafting as appropriate to the task
- assessment should be validated. Moderation is likely to be a critical tool in validation. A range of validation strategies should be used, for example, mentoring, client satisfaction surveys, peer review and co-assessments
- appropriate reference materials should be available to participants during assessment eg personal word lists, dictionaries, thesaurus, calculators.

Assessment tools must meet the rules of evidence. To meet the rules, evidence must be:

- valid, for example, address the elements and performance criteria, reflect the skills and knowledge described in the unit of competency, show application in the context described in the Range Statement

- current, for example, demonstrate the candidate's current skills and knowledge
- sufficient, for example, demonstrate competence over a period of time, demonstrate repeatable competence, not inflate the language, literacy and numeracy requirements beyond those required in performing the task
- authentic ie the work of the participant is corroborated/verified.

Where possible, an integrated approach to assessment is suggested in relation to the competency outcomes of the qualification. Integration can refer to:

- elements and performance criteria from the same unit being linked together for assessment

or

- elements and performance criteria from a range of units being grouped together for assessment.

Imported units of competencies must be assessed according to the rules of the relevant Training Package.

Assessment methods and collection of evidence will involve application of skills and knowledge to building design/drafting workplaces or simulated environments.

All assessment activities will be related to a building design context.

A range of assessment methods will be used, such as:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of building specifications and required documentation
- research projects
- practical assessment in the development of a set of working drawings
- portfolio of documentation for an architectural project including preliminary drawings and design images
- direct questioning
- sketches and digitally generated images for the presentation of a design concept.

Assessment must be consistent with the conditions and method of assessment specified in each unit.

There is no mandatory workplace assessment for the qualification, with the exception of the unit *VU21604 Conduct a Bushfire Attack Level (BAL) assessment* require that the competency be assessed on actual sites.

6.2 Assessor competencies

Assessor competencies for this course must be consistent with the requirements of Standard 1, Element 1.4 of the AQTF Essential Conditions and Standards for Continuing Registration.

The standards for registration normally require that trainers and assessors:

- have the necessary training and assessment competencies as determined by the National Quality Council or its successors
- have the relevant vocational competencies at least to the level being delivered or assessed
- continue to develop their vocational education and training (VET) skills and knowledge as well as their industry currency and trainer/assessor competence.

In addition to the above, assessors must have comprehensive and current knowledge of the industry and the job or role against which performance is being assessed. Assessors should also have appropriate interpersonal and communication skills.

Alternatively, a panel, team or partnership approach involving assessors and technical experts may be adopted whereby the assessment is conducted by a team/panel/partnership in which at least one assessor has the competencies determined by the National Skills Standards Council (NSSC) and the other assessor(s) have the relevant vocational competencies, at least to the level being assessed.

Assessors of the imported units of competency must meet the guidelines of the relevant Training Package.

7. Delivery

7.1 Delivery modes

Standards 11 and 12 AQTF Standards for Accredited Courses

There are no restrictions on offering the program on either a full-time or part-time basis. There is no mandatory workplace delivery. Participants should be exposed to real-work environments and examples/case studies.

Strategies should be selected to reflect the nature of the elements and performance criteria and the needs of the participants. Some areas of content may be common to more than one element or more than one competency and therefore integration may be appropriate.

The course aims to develop practical competencies within an industry setting. Practical demonstrations and opportunity for application are considered to provide the most suitable strategy to reflect the objectives of the course and the background to its development.

7.2 Resources

The use of suitable assignments is also recommended, where appropriate.

An emphasis on occupational health and safety (OHS) and environmental considerations must be integrated and reinforced at all times.

Delivery of units of competency will take into consideration the individual needs of students and will involve blended delivery mode including:

- workshops
- individual assignments
- team-based assignments
- applied learning in the workplace or simulated building design/drafting environment.

Learners may be supported through:

- online (Internet, social media, email and telephony)
- face to face conferencing, mentoring and interviews
- ad hoc arrangements, and regular progress monitoring, particularly for practical work.

Access is required to current industry materials, equipment and facilities used in design drafting. In particular, access is required to the following:

- computers
- hardware devices such as:
 - scanners
 - digitisers
 - printers/plotters
 - digital projectors/display devices
 - external storage devices
 - workstation platform
- digital software which could include:
 - Building Information Modelling (BIM) and integrated BIM software applications
 - design documentation software
 - graphic development and/or editing software
 - Internet and network communication platforms
 - multimedia, animation and rendering software
- hand sketching materials
- materials for model building
- Internet access
- relevant legislation as defined in the range statement.

	<p>Refer to individual units for specific resources requirements.</p> <p>The vocational competency requirements for trainers must be to at least the level of those being delivered and are stipulated further in Section 6.2.</p> <p>Units imported from Training Packages must reflect the requirements for trainers specified in the relevant Training Package, and must be delivered and assessed in the context of a design drafting work environment.</p>
8. Pathways and articulation	<p>Standard 8 AQTF Standards for Accredited Courses</p> <p>There are no formal articulation arrangements in place. Pathways to degrees in architecture are available but arrangements must be made with individual universities.</p> <p>As the course includes imported units from two nationally endorsed Training Packages, credit transfer is available in relation to any qualifications that include the imported units.</p>
9. Ongoing monitoring and evaluation	<p>Standard 13 AQTF Standards for Accredited Courses</p> <p>The Curriculum Maintenance Manager – Building Industries is responsible for the ongoing monitoring and evaluation of the 22268VIC Advanced Diploma of Building Design (Architectural).</p> <p>Ongoing monitoring and evaluation will ensure that:</p> <ul style="list-style-type: none"> • the course continues to meet current needs of the building design industry • changes to national competency standards are reflected • developments in assessment methodology are reflected • the course reflects client feedback. <p>The formal course evaluation by the Curriculum Maintenance Manager – Building Industries will normally be undertaken halfway through the accreditation period and will be based on student and teacher evaluation surveys and industry stakeholder surveys/consultation.</p> <p>Should a Training Package be endorsed that contains a qualification equal to the Advanced Diploma of Building Design (Architectural) then the Training Package qualification will supersede this course.</p> <p>The VRQA will be formally notified of any changes to the course documentation.</p>

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VU21587

Undertake site survey and analysis to inform design process

Unit descriptor

This unit of competency specifies the outcomes required to undertake a site survey and a site analysis for residential and commercial building projects.

It includes the use of basic surveying equipment, recording and interpretation of data, and evaluation of, and compliance with relevant legislation.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required by building designers to undertake a basic site survey and a site analysis for building projects within the context of relevant legislation.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- | | |
|--|---|
| <p>1. Prepare to carry out a measured survey</p> | <p>1.1 <i>Relevant information and documentation</i> is collected prior to undertaking survey.</p> <p>1.2 On site <i>occupational health and safety (OHS) hazards</i> are identified, controls implemented and appropriate documentation completed, according to <i>workplace safety procedures</i>.</p> <p>1.3 Levelling equipment is identified and inspected for damage, wear and serviceability.</p> |
| <p>2. Undertake a site analysis and record site and building information</p> | <p>2.1 Relationship of site to adjoining properties and <i>surrounding environment</i> is identified and recorded to establish the context of the development.</p> <p>2.2 <i>Physical characteristics and local climate conditions</i> of the site are noted and recorded for consideration in the design of the building.</p> |

ELEMENT	PERFORMANCE CRITERIA
	<p>2.3 Field sketches are produced which accurately record site and building elements in plan, elevation and section.</p> <p>2.4 Field sketch data is transferable to accurate, scaled measured drawing format.</p> <p>2.5 Digital images of relevant site and building elements are taken, where required, to assist in the development of accurate scaled measured drawings.</p>
<p>3. Measure and record linear distances on site using basic surveying equipment</p>	<p>3.1 Distances are measured accurately using basic surveying equipment.</p> <p>3.2 Overall distances are accurately calculated from field data.</p>
<p>4. Interpret and apply data from a site survey to determine horizontal and vertical angles</p>	<p>4.1 Collate site analysis data to determine site features, existing conditions and levels.</p> <p>4.2 Preliminary levels are determined (read) both horizontal and vertical angles to inform initial design processes.</p> <p>4.3 Results are recorded according to workplace procedures.</p>
<p>5. Plot contours and cut and fill</p>	<p>5.1 Spot level values are used to interpolate contour lines, which are plotted accurately in plan.</p> <p>5.2 Cut and fill batters are calculated and accurately plotted in plan and section.</p>
<p>6. Produce measured drawings and documentation for existing conditions</p>	<p>6.1 Measured drawings and site details are developed from site survey and site analysis data.</p> <p>6.2 Measured drawings and site details are produced to scale, accurately depicting site and building elements, and within accepted time frames and to industry standards.</p> <p>6.3 Documentation is completed in compliance with the relevant legislation.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel where required
 - read and interpret:
 - * field data/geo digital databases
 - * reports
 - * site plan
 - * land title
 - * specifications
 - * working drawings
 - use language and concepts appropriate to industry conventions
- Written skills to:
 - accurately record and interpret site measurements and other data to industry standards
 - produce field sketches
- Numeracy skills to apply measurements and calculations
- Problem solving skills to interpret reports, working drawings and specifications
- Planning and organisational skills to:
 - collect, organise and analyse information for site analysis
 - prepare equipment for site survey
- Technological skills to:
 - complete documentation and calculations
 - use basic survey equipment
- Working safely in a design drafting working environment and on a site, according to relevant legislation and workplace procedures and policies

Required knowledge

- Specifications and capabilities of basic surveying equipment and application
- Process for the administration and preparation of working drawings, specifications and other relevant documentation
- Workplace occupational health and safety (OHS) procedures and documentation

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Relevant information and documentation includes:

- planning scheme:
 - environmental
 - heritage
- field/geo digital data
- maps
- site plan
- title.

Occupational health and safety (OHS) hazards include:

- existing vegetation
- manual handling
- surveying equipment
- underground services
- uneven ground.

Workplace safety procedures include:

- safe work method statement
- construction induction card
- hazard identification and control procedures.

Surrounding environment includes:

- building levels
- built form and character of adjacent development
- heritage characteristics
- location and height of walls built to the site boundary
- location and use of adjacent buildings/fenestration and other features
- significant trees and vegetation on adjoining properties and in the public realm
- street frontage features such as service poles, street trees, kerb crossovers, bus stops and other services
- views, private open spaces and solar access of neighbouring properties.

Physical characteristics

include:

- access and connection points
- contours and geotechnical conditions where appropriate
- drainage and services
- existing buildings
- fences, boundaries and easements
- noise sources
- orientation
- views from the site.

Local climate conditions

include:

- aspect
- wind direction
- topography
- microclimates.

Basic surveying equipment

includes:

- dumpy levels
- tilting level
- automatic level
- total stations
- chains and tapes
- theodolites
- Global Positioning System (GPS).

Relevant legislation may

include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - Building Code of Australia (BCA), Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with organisational policies and procedures, including OHS
- undertake a basic site survey and a detailed site analysis for residential building and/or commercial building projects, in compliance with the applicable local government authority and relevant legislation
- produce measured drawings and other documentation detailing site information and building elements as determined by the project brief, organisational procedures and in compliance with the applicable local government authority.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation, including land title, site plan, working drawings and specifications
- measuring and levelling equipment
- the BCA and relevant Australian Standards.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

VU21588

Apply structural and construction technology to the design of residential buildings

Unit descriptor

This unit of competency specifies the outcomes required to apply structural and construction technology to the design of residential buildings. It requires compliance with state legislation and the provisions for Building Code of Australia (BCA) Classes 1 and 10 and relevant Australian Standards as they apply to the structural and construction components of a residential building.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required to apply structural and construction technology to the design of residential buildings, which comply with current legal responsibilities of building designers for construction methods. The outcomes of this unit do not cover the required skills and knowledge for the application of structural and construction technology to the design of commercial buildings, which are addressed in the unit *VPUA583 Apply structural and construction technology to the design of commercial buildings*.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Apply the legislative requirements for the design of residential buildings

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Relevant state legislation impacting on design and construction is investigated and interpreted for a residential building.
- 1.2 Relevant sections of the BCA and Australian Standards are researched and applied to the ***structural and construction principles*** of residential buildings.
- 1.3 ***Local government planning and construction regulations*** are investigated and interpreted for the design and construction of a residential building.

ELEMENT	PERFORMANCE CRITERIA
2. Investigate site	<p>2.1 Site is investigated to plan site preparation, which incorporates design intent and statutory requirements.</p> <p>2.2 Existing site conditions and design and construction elements are analysed to establish site impact on structural elements.</p> <p>2.3 Termite risk management is assessed and implemented according to the relevant legislation.</p> <p>2.4 Specifications for footing and slab construction design are specified and recorded in all supporting documentation, in compliance with current standards.</p>
3. Analyse and apply construction techniques and/or methodologies	<p>3.1 Structural systems are analysed and construction methodologies are applied to solve construction system and design issues.</p> <p>3.2 Structural principles are integrated into the building fabric to accommodate materials and finishes, according to relevant standards and design intent.</p> <p>3.3 Alternative approaches to the construction of residential buildings are considered to accommodate special conditions and in accordance with relevant standards and design intent.</p> <p>3.4 Construction sequencing and attendance of trades is identified to ensure efficient building processes.</p> <p>3.5 Design solutions are developed and sketched and/or documented using performance-based solutions.</p>
4. Specify requirements for framing	<p>4.1 Timber wall, floor and roof framing systems are designed and detailed in accordance with timber framing code and with consultation with engineer, if required.</p> <p>4.2 Bracing and tie-down system is designed and detailed to meet structural requirements.</p> <p>4.3 Steel framing systems are identified and detailed in accordance with construction practices.</p> <p>4.4 Framing requirements, including all fixings and materials are specified and details documented.</p>
5. Specify requirements for masonry	<p>5.1 Unreinforced and reinforced masonry systems are identified and detailed for the construction of internal and external walls in compliance with the relevant legislation.</p> <p>5.2 Details of weatherproofing are indicated to meet relevant Australian Standards.</p>

ELEMENT	PERFORMANCE CRITERIA
6. Specify requirements for safety, health and amenity	6.1 Statutory requirements for fire separation are researched and incorporated into design to provide separation and means of escape, in compliance with the relevant legislation.
	6.2 Wet area materials and sealing of wall and flooring junctions are specified and details documented.
	6.3 Facilities and room heights are designed and documented in accordance with the relevant legislation.
	6.4 Opportunities for natural light and ventilation are considered and mechanical air handling systems for heating, cooling and ventilation are selected on the basis of efficiency and performance.
	6.5 Sound insulation materials are selected for sound transmission for walls and penetrations and in accordance with the relevant legislation.
	6.6 The provisions for safe movement and access , including disabled access, are designed in accordance with the relevant legislation.
	6.7 Building insulation levels, glazing requirements and ventilation are analysed to determine energy usage.
7. Specify requirements for finishes and services	7.1 Details for claddings, linings, finishes and coatings are specified in accordance with the relevant legislation.
	7.2 Joinery fabrication and installations are selected and details of materials and finishes are documented.
	7.3 Provisions for the installation and connection of services are specified in accordance with the relevant legislation.

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * construction drawings and specifications
 - * state regulatory authority requirements
 - * Australian Standards
 - * relevant sections of the BCA
 - * relevant legislation
 - use language, terminology and concepts appropriate to industry conventions
- Written skills to:
 - accurately document construction specifications
 - prepare documentation to an accepted industry standard
- Numeracy skills to apply measurements and calculations to construction systems
- Problem solving skills to:
 - interpret relevant legislation for the design and construction of a residential building
 - apply construction techniques and methodologies to the intent of the design
 - specify requirements for construction standards and practices
 - select structural members according to project or specification requirements
- Initiative and enterprise skills to:
 - combine materials into workable construction systems
 - analyse site conditions to establish specifications
 - resolve construction and design issues with regard to structural systems
 - work with relevant consultants/consultant documentation

Required knowledge

- Structural components and construction methodologies and related terminology
- The application of the principles of construction of residential buildings
- The characteristics, performance and application of construction materials
- Working drawings and specifications
- Effects of legislative requirements for residential buildings on the design approval process

- Integration of services in a residential building design
- Statutory requirements for fire separation
- Specifications for a residential building providing optimum safety, health and amenity for users

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Structural and construction principles include:

- construction methods, standards and services in compliance with relevant legislation and design specifications such as:
 - compatibility of structural elements
 - differential movement
 - effects of deflection
 - effects of shrinkage
 - effects of wind
 - integration of elements and/or systems
 - principles of beams and column design
 - solution of force systems
 - behaviour of structural materials
 - thermal expansion and contraction
 - timber framing design connection details
- types and behaviour of loads.

Local government planning and construction regulations include:

- occupational health and safety (OHS)
- relevant Australian Standards
- town planning
- Victorian Code for Residential Development.

Site preparation includes:

- access
- batter/gradients
- earthworks and/or cut and fill
- existing services
- interpretation of topographical features
- orientation
- platforms
- retaining walls

- soil classification
- stormwater
- surface and subsoil drainage
- termite risk management
- trenches.

Existing site conditions and design and construction elements include:

- adjacent property
- building design
- construction systems
- integration with building fabric
- properties of concrete
- properties of steel reinforcing
- set out
- soil conditions
- structural adequacy
- topography.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Structural systems may include, but are not limited to:

- bracing and tie-down
- columns, beams and lintels
- composite structures
- concrete footing and slab systems
- suspended floors
- connection methods and systems
- masonry (solid and cavity)
- reinforcement types and placement
- timber floor, wall and roof framing.

Structural principles include:

- forces
- loads
- stresses and strains.

Special conditions include:

- alpine conditions
- altitude
- bushfire hazards
- cyclone categories
- local wind loads
- other conditions relevant to specific local conditions
- seismic activity.

Timber wall, floor and roof framing include:

- composition of natural and manufactured timber products
- connection principles and methodologies
- floor framing
- design of floor framing layouts
- provision for and inclusion of bracing and tie-down and services
- roof framing:
 - connections
 - conventional roofing systems
 - truss design
 - truss layout
- stress grading
- wall framing:
 - allowance for linings and finishes
 - calculation of sizes
 - configuration of composite timber structures
 - jointing systems
 - wind loads.

Bracing and tie-down include:

- calculation of bracing requirements
- calculation of tie-down requirements
- calculation of wind loads
- creation of bracing schedules in accordance with accepted industry standards
- creation of tie-down schedules
- provision of tie-down requirements and construction systems
- selection of suitable bracing to meet requirements and construction system(s).

- Steel framing systems** include:
- basic portal frame
 - cold formed steel framing systems
 - hot rolled steel members, eg columns, beams.

- Unreinforced and reinforced masonry systems** include:
- aerated autoclaved concrete
 - articulation
 - blockwork
 - brick or block veneers
 - expansion joints and proprietary items
 - jointing
 - load bearing brickwork
 - non-loading brickwork
 - mortars
 - piers
 - shrinkage
 - ventilation bonding.

- Weatherproofing** includes:
- damp proof courses and flashings
 - drainage
 - sub-floor ventilation
 - agricultural drainage
 - waterproof retaining walls
 - ventilation
 - width of cavity.

- Statutory requirements for fire separation** include:
- class of building
 - concrete, blockwork, brickwork AAC, lightweight construction, eg plasterboard
 - fire resistance levels
 - fire source features
 - fire stairs and isolated stairs
 - housing in bushfire areas according to regional regulations
 - multi-residential timber-framed construction
 - non-combustible materials
 - paths of travel
 - protection of openings
 - sole occupancy units.

Safe movement and access

include:

- access for maintenance, including:
 - roof access
 - built-in provision of roof hatch ladders
 - walk platforms
 - roof mounted services
 - fall arrest systems
- adequate lighting for daily use and emergencies
- balustrade
- handrails
- stair tread nosings
- stairs construction
- swimming pool fencing
- tactile indicators.

Joinery fabrication and installations

include:

- cupboards
- kitchen benching
- window and door frames.

Services include:

- air-conditioning/climate control
- communication systems
- electricity
- gas
- mechanical ventilation
- sewerage and drainage
- water.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with legislative requirements applicable to the design of residential buildings
- apply the principles of structural and construction to the design of residential buildings in compliance with the applicable local government authority, relevant legislation and the BCA
- develop specifications for structural components of a residential building and the requirements for safe and healthy use of the building.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation, including land title, site plan, working drawings and specifications and relevant legislation
- research resources, including industry-related information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of construction technology
- case study of best practice for a specific building project
- report detailing recommended performance-based solutions to a design problem for a residential building.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21589

Apply structural and construction technology to the design of commercial buildings

Unit descriptor

This unit of competency specifies the outcomes required to apply structural and construction technology to the design of commercial buildings. It requires compliance with state legislation and the provisions for Building Code of Australia (BCA) Classes 2 to 9 and relevant Australian Standards as they apply to the structural and construction components of a commercial building.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to apply structural and construction technology to the design of commercial buildings and includes compliance with current legal responsibilities of building designers for construction methods. The outcomes of this unit do not cover the required skills and knowledge for the application of structural and construction technology to the design of residential buildings, which are addressed in the unit *VU21588 Apply structural and construction technology to the design of residential buildings*.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Apply the regulatory requirements for the design of commercial buildings

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 ***Relevant legislation*** impacting on design and construction is investigated and interpreted for a commercial building.
- 1.2 Relevant sections of the BCA and Australian Standards are researched and applied to the ***structural and construction principles*** of commercial buildings.
- 1.3 ***Local government planning and construction regulations*** are investigated and interpreted for the design and construction of a commercial building.

ELEMENT	PERFORMANCE CRITERIA
2. Investigate site	<p>2.1 Site features and available services are identified to plan site preparation to inform the design intent and for preparation of documentation.</p> <p>2.2 Soil engineer's report is interpreted to determine specifications for footing systems appropriate for foundation design.</p> <p>2.3 Environmental issues impacting on the site are identified and controlled according to regulatory requirements.</p>
3. Analyse and apply construction techniques and/or methodologies	<p>3.1 Structural systems are analysed and construction methodologies are applied to solve construction system and design issues.</p> <p>3.2 Structural principles are integrated into the building fabric to accommodate materials and finishes, according to relevant standards and design intent.</p> <p>3.3 Alternative approaches to the construction of commercial buildings are considered to accommodate special conditions and in accordance with relevant standards and design intent.</p> <p>3.4 Scope of work and performance requirements are determined and documented according to project requirements.</p>
4. Specify structural requirements	<p>4.1 Timber wall, floor and roof framing systems are designed and detailed in accordance with timber framing code and with consultation with engineer if required.</p> <p>4.2 Bracing and tie-down system is designed and detailed to meet structural requirements.</p> <p>4.3 Steel framing systems are identified and detailed in accordance with construction practices.</p> <p>4.4 Framing requirements, including all fixings and materials are specified and details documented.</p> <p>4.5 Unreinforced and reinforced masonry systems are identified and detailed for the construction of internal and external walls in compliance with the relevant legislation.</p> <p>4.6 Details of weatherproofing are indicated to meet relevant Australian Standards.</p>

ELEMENT	PERFORMANCE CRITERIA
5. Comply with fire resistance requirements	<p>5.1 Building is designed to maintain structural stability and provide safeguards in the event of fire.</p> <p>5.2 Specifications for building design comply with statutory requirements for fire separation and relevant legislation.</p>
6. Specify requirements for safety, health and amenity	<p>6.1 Wet area materials and sealing of wall and flooring junctions are specified and details documented.</p> <p>6.2 Facilities and room heights are designed and documented in accordance with the relevant legislation.</p> <p>6.3 Opportunities for natural light and ventilation are considered and mechanical air handling systems for heating, cooling and ventilation are selected on the basis of efficiency and performance.</p> <p>6.4 Sound insulation materials are selected for sound transmission for walls and penetrations and in accordance with the relevant legislation.</p> <p>6.5 The provisions for safe movement and access are designed in accordance with the relevant legislation.</p> <p>6.6 Building insulation levels, glazing requirements and ventilation are analysed to determine energy usage.</p>
7. Specify requirements for construction	<p>7.1 Details for claddings, linings, finishes and coatings are specified in accordance with the relevant legislation.</p> <p>7.2 Joinery fabrication and installations are selected and details of materials and finishes are documented.</p> <p>7.3 Provisions for the installation and connection of services are specified in accordance with the relevant legislation.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * construction drawings and specifications
 - * state regulatory authority requirements
 - * Australian Standards
 - * relevant sections of the BCA
 - * other relevant legislation
 - * reports prepared by specialised personnel
 - use language, terminology and concepts appropriate to industry conventions
- Written skills to:
 - accurately document construction specifications
 - prepare documentation to an accepted industry standard
- Numeracy skills to apply measurements and calculations to construction systems
- Problem solving skills to:
 - interpret relevant legislation for the design and construction of a commercial building
 - apply construction techniques and methodologies to the intent of the design
 - specify requirements for construction standards and practices
 - select structural members according to project or specification requirements
- Initiative and enterprise skills to:
 - combine materials into workable construction systems
 - analyse site conditions to establish specifications
 - resolve construction and design issues with regard to structural systems
 - work with relevant consultants/consultant documentation
- Planning and organisational skills to collect, organise and analyse information for:
 - the interpretation of legislation
 - the development of building design and specifications.
- Technological skills to complete documentation and calculations
- Self management skills to enable construction specifications to be completed within designated time frame

- Teamwork skills during consultation with, and coordination of, internal and external personnel
- Working safely in a design drafting working environment and on a site, according to legislation and workplace procedures and policies

Required knowledge

- Structural components and construction methodologies and related terminology
- The principles of construction of commercial buildings
- The characteristics, performance and application of construction materials
- Working drawings and specifications
- Effects of legislative requirements on the design approval process
- Integration of services in a building design
- Statutory requirements for fire separation for commercial buildings
- Specifications for a commercial building providing optimum safety, health and amenity for users

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Structural and construction principles include:

- construction methods, standards and services in compliance with relevant legislation and design specifications such as:
 - compatibility of structural elements
 - differential movement
 - effects of deflection
 - effects of shrinkage
 - effects of wind
 - integration of elements and/or systems
 - principles of beams and column design
 - solution of force systems

- behaviour of structural materials
- thermal expansion and contraction
- timber framing design connection details
- types and behaviour of loads.

Local government planning and construction regulations include:

- occupational health and safety (OHS)
- relevant Australian Standards
- town planning.

Site preparation includes:

- access
- batter/gradients
- earthworks and/or cut and fill
- existing services
- interpretation of topographical features
- orientation
- platforms
- retaining walls
- soil classification
- stormwater
- surface and subsoil drainage
- termite risk management
- trenches.

Footing systems include:

- bored piers
- dewatering
- driven piles
- ground stabilisation
- pad and pedestal footings
- pier and beam
- raft slabs
- retaining walls
- tanking.

Structural systems may include, but is not limited to:

- bracing and tie-down
- columns, beams and lintels
- composite structures
- concrete footing and slab systems
- connection methods and systems
- masonry (solid and cavity)

- non-structural systems:
 - cladding systems which must include environmental components such as water harvesting and shading/screening devices
- reinforcement types and placement
- suspended floors
- timber floor, wall and roof framing.

Structural principles include:

- forces
- loads
- stresses and strains.

Special conditions include:

- altitude
- bushfire hazards
- local wind loads
- other conditions relevant to specific local conditions
- seismic activity.

Scope of work includes:

- characteristics
- compatibility
- dimensions
- location
- patterns
- quantities
- sizes
- surfaces
- type of products/services.

Performance requirements include:

- cost
- detail relating to availability of material
- heritage factors
- nominated subcontractors
- provision of site access/facilities
- quality assurance
- standard procedures
- standards of work
- work schedules.

Timber wall, floor and roof framing include:

- composition of natural and manufactured timber products
- connection principles and methodologies
- floor framing:
 - design of floor framing layouts
- provision for and inclusion of bracing and tie-down and services
- roof framing:
 - truss design
 - truss layout
 - conventional roofing systems
 - connections
 - allowance for roofing
- stress grading
- wall framing:
 - wind loads
 - calculation of sizes
 - configuration of composite timber structures
 - jointing systems
- allowance for linings and finishes.

Bracing and tie-down include:

- calculation of bracing requirements
- calculation of tie-down requirements
- calculation of wind loads
- creation of bracing schedules in accordance with accepted industry standards
- creation of tie-down schedules
- provision of tie-down requirements and construction systems
- selection of suitable bracing to meet requirements and construction system(s).

Steel framing systems include:

- basic portal frame
- cold formed steel framing systems
- hot rolled steel members, eg columns, beams.

Unreinforced and reinforced masonry systems include:

- aerated autoclaved concrete
- articulation
- blockwork
- brick or block veneers
- expansion joints and proprietary items
- jointing
- load bearing brickwork
- non-loading brickwork
- mortars
- piers
- shrinkage
- ventilation bonding.

Weatherproofing includes:

- damp proof courses and flashings
- drainage
- ventilation
- width of cavity.

Safeguards include:

- design that allows for:
 - avoiding damage to other buildings
 - fire brigade intervention
 - safe evacuation of the building.

Statutory requirements for fire separation include:

- fire resistance levels
- fire source features
- class of building
- multi-residential timber-framed construction
- concrete, blockwork, brickwork AAC, lightweight construction, eg plasterboard
- protection of openings
- sole occupancy units
- paths of travel
- fire stairs and isolated stairs
- non-combustible materials
- housing in bushfire areas according to regional regulations.

Safe movement and access

include:

- access for maintenance, including:
 - roof access
 - built in provision of roof hatch ladders
 - walk platforms
 - roof mounted services
 - fall arrest systems
- adequate lighting for daily use and emergencies
- balustrade
- handrails
- stair tread nosings
- stairs construction
- swimming pool fencing
- tactile indicators.

Joinery fabrication and installations include:

- cupboards
- kitchen benching
- window and door frames.

Services include:

- air-conditioning
- communication systems
- electricity
- gas
- mechanical ventilation
- sewerage and drainage.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with legislative requirements applicable to the design of commercial buildings
- apply the principles of structural and construction to the design of commercial buildings in compliance with the applicable local government authority, relevant legislation and the BCA
- develop specifications for structural components of a commercial building.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation, including land title, site plan, working drawings and specifications and relevant legislation
- appropriate support materials
- research resources, including industry-related information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of construction technology
- case study of best practice for a specific building project
- report detailing recommended performance-based solutions to a design problem.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21590 Comply with relevant legislation in the design of residential buildings

Unit descriptor

This unit of competency specifies the outcomes required to access, interpret and apply relevant legislation to the design of residential buildings. It includes the ability to apply a range of design solutions for residential buildings (Building Code of Australia (BCA) Classes 1 and 10), in compliance with the BCA and make recommendations for alternative solutions as required. It requires thorough knowledge of the purpose and content of the BCA.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to apply relevant legislation to the design of residential buildings and includes compliance with current legal responsibilities of building designers. The outcomes of this unit do not cover the required skills and knowledge for compliance with codes and standards in the design of commercial buildings, which are covered in the unit *VU21591 Comply with relevant legislation in the design of commercial buildings*.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Classify buildings

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 The nature of a building is determined according to use and arrangement.
- 1.2 The criteria of the BCA are determined to apply the defined classification.
- 1.3 BCA requirements for classifications are identified and interpreted.

ELEMENT	PERFORMANCE CRITERIA
2. Access and interpret relevant code other legislative requirements	2.1 Victorian building regulations are referenced in relation to the hierarchy of legislation. 2.2 Relevant performance requirements and provisions are determined from the National Construction Code that applies to residential buildings. 2.3 Australian Standards referenced in the BCA are accessed and interpreted.
3. Analyse and apply a range of solutions to a design problem	3.1 Alternative solutions to a construction or design problem that comply with the requirements of the BCA are discussed and proposed in accordance with company policies and procedures. 3.2 Assessment methods referenced in the BCA are analysed to determine whether a construction or design solution complies with performance requirements or Deemed-to-Satisfy (DTS) provisions of the BCA. 3.3 Performance-based solutions are identified and documented in accordance with the BCA. 3.4 Relevant documentation is identified and completed according to the requirements of relevant legislation .

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * relevant legislation
 - * site plans
 - * the BCA
 - * specifications
 - * working drawings
 - use language and concepts appropriate to industry conventions
- Written skills to document design solutions and other workplace documentation
- Numeracy skills to apply measurements and calculations

- Problem solving skills to design concepts and principles in accordance with the BCA, namely BCA Classes 1 and 10
- Planning and organisational skills to collect, organise and analyse information from relevant legislation
- Teamwork skills when working with internal and external personnel
- Technological skills to complete documentation and calculations
- Working safely in a design drafting working environment and on a site, according to legislation and workplace procedures and policies

Required knowledge

- Legal responsibilities and obligations of building designers
- Basic design principles and the behaviour of structures under stress, strain, compression, bending or combined actions
- BCA performance hierarchy
- Definitions and common technical terms or usage specified under general provisions of the BCA
- Understanding of the BCA in relation to BCA Classes 1 and 10
- General nature of materials and the effects of performance
- Relevant Australian Standards
- Relevant legislative and occupational health and safety (OHS) requirements, codes and practices

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

- Assessment methods** include:
- specifications and definitions in the BCA for:
 - comparison with DTS provisions
 - evidence of suitability
 - expert judgment
 - verification methods.

- Performance requirements** include:
- performance-based contractual requirements that must be fulfilled by any party
 - those contained within other legislation applicable to a specific project
 - those determined to be relevant to a specific project according to the BCA

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- apply organisational policies and procedures, including quality assurance requirements where applicable
- interpret the building hierarchy of legislation and the associated compliance requirements
- access, interpret and apply codes and standards to the design of a specific residential building project
- recommend alternative solutions to a design or construction problem in accordance with relevant legislation.

Context of and specific resources for assessment

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation. Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- the BCA and relevant Australian Standards.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of relevant legislation
- written assignment detailing the relevant codes and standards for a specific project
- report detailing recommended performance-based solutions to a design problem
- drawing documentation and specifications demonstrating compliance with relevant legislation.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21591

Comply with relevant legislation in the design of commercial buildings

Unit descriptor

This unit of competency specifies the outcomes required to access, interpret and apply relevant legislation to the design of commercial buildings. It includes the ability to apply a range of design solutions to the construction or design of a commercial building (Building Code of Australia (BCA) Classes 2 to 9), in compliance with the BCA and make recommendations for alternative solutions as required. It requires thorough knowledge of the purpose and content of the BCA.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to apply relevant legislation to the design of commercial buildings and includes compliance with current legal responsibilities of building designers for construction methods. The outcomes of this unit do not cover the required skills and knowledge for compliance with codes and standards in the design of residential buildings, which are covered in the unit *VU21590 Comply with relevant legislation in the design of residential buildings*.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Classify buildings

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 The nature of a building is determined according to use and arrangement.
- 1.2 The criteria of the BCA are determined to apply the defined classification.
- 1.3 BCA requirements for classifications are identified and interpreted.

ELEMENT	PERFORMANCE CRITERIA
2. Access and interpret relevant code and other legislative requirements	2.1 Victorian building regulations are referenced in relation to the hierarchy of legislation.
	2.2 Relevant performance requirements and provisions are determined from the National Construction Code series that apply to residential buildings.
3. Analyse and apply a range of solutions to a design problem	3.1 Alternative solutions to a design problem that comply with the requirements of the BCA are discussed and proposed in accordance with company policies and procedures.
	3.2 Assessment methods referenced in the BCA are analysed to determine whether a construction or design solution complies with performance requirements or Deemed-to-Satisfy (DTS) provisions of the BCA.
	3.3 Performance-based solutions are identified and documented in accordance with the BCA.
	3.4 Relevant documentation is completed according to the requirements of the relevant legislation .

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel where required
 - read and interpret:
 - * relevant legislation
 - * site plans
 - * the BCA
 - * specifications
 - * working drawings
 - use language and concepts appropriate to industry conventions
- Written skills to document design solutions and other workplace documentation
- Numeracy skills to apply measurements and calculations
- Problem solving skills to design concepts and principles in accordance with the BCA, namely BCA Classes 2 to 9
- Planning and organisational skills to collect, organise and analyse information from relevant legislation

- Teamwork skills when working with internal and external personnel
- Technological skills to complete documentation and calculations
- Working safely in a design drafting working environment and on a site, according to legislation and workplace procedures and policies

Required knowledge

- Legal responsibilities and obligations of building designers
- Basic design principles and the behaviour of structures under stress, strain, compression, bending or combined actions
- BCA performance hierarchy
- Definitions and common technical terms or usage specified under general provisions of the BCA
- Understanding of the BCA in relation to BCA Classes 2 to 9
- General nature of materials and the effects of performance
- Relevant Australian Standards
- Relevant legislative and occupational health and safety (OHS) requirements, codes and practices

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Assessment methods include:

- specifications and definitions in the BCA for:
 - comparison with DTS provisions
 - evidence of suitability
 - expert judgment
- verification methods.

Performance requirements include:

- performance-based contractual requirements that must be fulfilled by any party
- those contained within other legislation applicable to a specific project
- those determined to be relevant to a specific project according to the BCA.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- apply organisational policies and procedures, including OHS and quality assurance requirements where applicable
- interpret the building hierarchy of legislation and the associated compliance requirements
- access, interpret and apply relevant legislation to the design of a specific commercial building project
- recommend alternative solutions to a design or construction problem in accordance with relevant legislation.

Context of and specific resources for assessment

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- the BCA and relevant Australian Standards.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge relevant legislation
- written assignment detailing the relevant codes and standards for a specific project
- report detailing recommended performance-based solutions to a design problem
- drawing documentation and specifications demonstrating compliance with relevant legislation.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21592**Design safe buildings****Unit descriptor**

This unit of competency specifies the outcomes required to apply safe design principles to control occupational health and safety (OHS) risk during the life of a building. It includes the ability to identify and comply with legal responsibilities and obligations and evaluate OHS hazards associated with the design, construction and use of a building during its life cycle. Applying safe design principles requires consultation with stakeholders and specialist advisors and the ability to make recommendations for alternative design solutions and incorporate risk controls into the building design and end use.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit supports the attainment of the skills and knowledge required for building designers to design safe buildings, which comply with current OHS legislation and relevant sections of the National Construction Code.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

1. Investigate OHS requirements in the design process

- 1.1 ***Legal responsibilities*** and obligations of building designers for the safety of end users and beneficiaries are identified to enable the elimination of ***OHS hazards*** and control residual OHS risk.
- 1.2 ***Stakeholders*** involved in the design and construction process are consulted to determine ***specific OHS issues***.
- 1.3 ***Sources of current information and data*** of OHS principles, materials, technology and systems are researched for application in the design and construction process.
- 1.4 Client is consulted to confirm the needs of those involved in the ***subsequent life cycle stages*** of the building.

ELEMENT	PERFORMANCE CRITERIA
2. Undertake hazard identification and OHS risk evaluation	<p>2.1 OHS risks are identified and a risk analysis conducted across the life cycle of the building according to the hierarchy of control.</p> <p>2.2 OHS risk controls are selected through a systematic analysis of the likelihood and consequences of exposure to the hazard.</p> <p>2.3 A process for review of hazard identification and risk control is developed to incorporate potential alterations to design decisions or specifications.</p> <p>2.4 A residual risk register is established and the information circulated to those involved in the downstream or subsequent life cycle stages.</p>
3. Design to facilitate safe construction, use and maintenance of a building	<p>3.1 Benefits of safe design are identified and communicated to stakeholders.</p> <p>3.2 Situations are identified where consultation with specialist advisors is required, and their services are utilised as necessary.</p> <p>3.3 Client is informed of any high risks in design requirements and alternatives, including design modifications, and these are agreed and documented.</p> <p>3.4 Risk controls are incorporated into design to facilitate the safe use and maintenance of the building, in accordance with legislative requirements.</p> <p>3.5 Relevant documentation is provided to client for the education and training of end users and employees, to ensure safe and efficient operation and maintenance of the building.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * the Building Code of Australia (BCA)
 - * relevant OHS legislation and Australian Standards
 - * workplace documentation relating to the safe design of buildings
 - * plans, drawing and specifications
 - use language and concepts appropriate to industry conventions
- Written skills to:
 - produce workplace documentation
 - record data and findings on historical and current information pertaining to OHS
- Problem solving skills to:
 - identify legal responsibilities and obligations regarding safe design
 - analyse and evaluate data on OHS hazards, reports and compensation claims
 - negotiate client expectations of OHS outcomes
 - apply principles of safe design to the life cycle of a building
- Planning and organisational skills to collect, organise and analyse information on safe design
- Initiative and enterprise skills in:
 - developing practical risk controls
 - recommending alterations to design to improve safety
- Teamwork skills when consulting specialist advisors and stakeholders
- Self management skills in recognising limits of own expertise and seeking the advice of others, when required
- Learning skills in maintaining up-to-date knowledge of safe design principles and changes to legislation
- Technology skills to produce required documentation
- Working safely in a design drafting working environment, according to legislation and workplace procedures and policies

Required knowledge

- Legislative requirements for OHS information, data and consultation
- Principles and practices of a systematic approach to risk management
- Basic principles of anthropometry
- Direct and indirect influences that impact on OHS and the environment in the design and use of a building
- The hierarchy of control and considerations for deciding between different methods of control
- Interdependent relationships between ergonomics and stressors such as physiological factors, awkward posture, poor lighting and ventilation and thermal environment
- Legislative responsibilities of building designers with regard to OHS at all stages of design, construction and end use of a building
- The Victorian Building Commission Essential Services manual

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Legal responsibilities as stated in:

- Australian Standards specified in Conditions of Contracts
- duties and responsibilities as stated in Occupational Health and Safety Act and Regulations
- relevant sections of the BCA.

OHS hazards may include, but are not limited to:

- accessing roofs, walkways, stairs for both the users of the building and maintenance personnel
- exposure to health hazards from biological materials
- exposure to occupational violence
- head injuries
- inadequate vehicle/pedestrian separation
- inadequate ventilation of lighting
- limited access for emergency services
- limited access to undertake systems of work including cleaning and maintenance activities
- poor siting of buildings or lack of separation between multiple buildings
- storage and handling of dangerous goods and hazardous substances
- work involving exposure to high energy hazards eg temperature
- working at height
- materials used within the construction process.

- Stakeholders** include:
- all maintenance contractor personnel
 - all visiting personnel to the premises
 - client personnel, employees and agents
 - end user personnel, employees and agents
 - relevant design and construction personnel.
- Specific OHS issues** may include:
- any hazards that could impact on those involved in the design, construction phase and the end use of the building. In particular, the requirements for all visitors to the construction site to meet current legislative obligations and work site procedures.
- Sources of current information and data** includes:
- Acts, Regulations, codes of practice and Australian Standards
 - the BCA
 - Commonwealth and state OHS and other regulatory bodies such as the Australian Safety and Compensation Council
 - industry advisory bodies
 - professional and industry associations
 - research literature.
- Subsequent life cycle stages** include:
- construction
 - design
 - maintenance and servicing
 - supply/installation
 - use.
- Risk analysis** may include:
- accessing the effectiveness of existing controls
 - analysing previous compensation claims and hazard reports
 - defining the range of consequences and the likelihood of their occurrence
 - determining a level of risk
 - identifying demographic of end user
 - researching industry specific hazards.

The hierarchy of control may include:

- eliminating the hazard, and where this is not possible, minimising risk by:
 - substitution
 - isolation
 - engineering controls
 - administrative controls
 - using personal protective equipment (PPE).

Risk register may include:

- an indication of the likelihood of the consequences occurring
- possible consequences in terms of injury or damage
- scenarios or circumstances under which injury or illness may occur.

High risks may include, but are not limited to

- siting of building(s) or structure(s)
- high consequence hazards such as:
 - temperature
 - pressure
 - health hazards
- systems of work such as:
 - inadequate vehicle/pedestrian access
 - exposure to hazardous substances
 - working at height
- environment such as inadequate ventilation or lighting
- incident mitigation such as:
 - siting of assembly areas
 - inadequate egress
 - inadequate emergency services access.

Risk controls include:

- identifying solutions from recognised standards
- applying risk management techniques
- discussing design options
- consultation processes for changes in design.

Relevant documentation includes:

- material relating to key design elements such as:
 - exterior roof and wall materials
 - key mechanical machinery
 - landscaping
 - location of services
 - warranties
 - windows and exterior doors.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design drafting workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with legal responsibilities and obligations and organisational policies and procedures, including OHS
- implement risk management processes for the identification of OHS hazards and selection of suitable controls
- consult with relevant stakeholders to determine safety requirements in the life cycle stages of a building
- design a safe building which complies with current legislative requirements for the design, construction and use of a building.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation, including the BCA and Australian Standards.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant legislation, standards and codes
- relevant specifications and documentation, including working drawings, specifications and plans
- appropriate support materials
- research resources, including OHS related information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of OHS legislation
- case study of best practice for a specific building project
- development of a risk register for a specific building project
- portfolio of design documentation relevant to the safe design of a building.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21593**Design sustainable buildings****Unit descriptor**

This unit of competency specifies the outcomes required to apply the principles of sustainability to building design.

It includes the application of sustainable practices to minimise negative impacts of the construction process and land use on the environment, incorporate passive design, sustainable water use and energy efficiency into a building design and select suitable materials for the construction of the building. It requires compliance with relevant legislation, Australian Standards and the Building Code of Australia (BCA).

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to design sustainable buildings within the context of relevant legislation, the BCA and Australian Standards.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Determine the impacts of building development on the natural environment

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Impacts of building development on surrounding ecosystems are researched to identify the benefits of sound environmental policy.
- 1.2 ***Triple Bottom Line approaches*** are determined for consideration in the designing of buildings.
- 1.3 Current ***government and industry responses*** to Ecologically Sustainable Development (ESD) are researched and representative ***organisations*** for ESD are identified to ascertain current policies and legislation.

ELEMENT	PERFORMANCE CRITERIA
2. Incorporate sustainable criteria into building design	<p>2.1 Location specific climates and their characteristics are identified and their impact on building design is researched to inform the design.</p> <p>2.2 Basic principles and integration for building orientation, minimal site impact, thermal mass, insulation, glass exposure and ventilation are determined to maximise integration of sustainable design principles in the design.</p> <p>2.3 Site influences and sun path are considered to maximise opportunities for passive heating and cooling.</p> <p>2.4 Passive design principles are incorporated into a design project.</p> <p>2.5 Sustainable site development practices are included in design specifications.</p> <p>2.6 Appropriate form of construction is selected and documented according to client brief and specifications.</p>
3. Select sustainable materials	<p>3.1 Characteristics of sustainable materials are identified and analysed to inform material selection.</p> <p>3.2 Sustainability of a range of building materials is compared and suitable materials are selected for a specific building design, in accordance with current legislation and the BCA.</p>
4. Incorporate systems for sustainable water use	<p>4.1 Systems for water collection, storage, use and re-use are incorporated into building design, in accordance with relevant legislation and local restrictions.</p> <p>4.2 Alternative systems for reticulated water and effluent disposal are investigated and described.</p> <p>4.3 Strategies to prevent run-off are investigated and incorporated into design.</p>
5. Incorporate energy efficiency into building design	<p>5.1 Energy efficient design principles are identified in accordance with current legislation and the BCA.</p> <p>5.2 Renewable energy sources are researched and integrated into building design and best practice options for energy conservation are recommended.</p> <p>5.3 Selection and use of energy efficient fittings, appliances and services are determined and included in design specifications.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * the BCA
 - * relevant legislation and Australian Standards
 - * other relevant documentation
 - research information on sustainable building principles
 - use language and concepts appropriate to industry conventions
- Written skills to:
 - develop recommendations and strategies for sustainable building design
 - document data and findings to industry standards
- Problem solving skills to:
 - analyse and evaluate data on construction materials and integrate sustainable and energy efficient systems into building design
 - determine the potential cost versus benefit of alternative sustainable options
- Planning and organisational skills to collect, organise and analyse information on sustainable building practices
- Initiative and enterprise skills in interpreting information and developing sustainable design solutions
- Learning skills in updating knowledge of sustainable materials and building practices
- Technological skills to:
 - complete documentation and calculations
 - operate computer energy rating systems, where applicable
- Working safely in a design drafting working environment, according to legislation and workplace procedures and policies

Required knowledge

- Principles of sustainability
- Mandatory disclosure
- Green star
- Building adaptation for catastrophic events responding to climate change
- Indoor environmental quality (air quality, thermal comfort, acoustics)
- Characteristics of ecosystems

- Macro and micro climates
- Site topography
- Effects of fossil fuels on the atmosphere
- Energy consumption relative to construction processes and building use
- Greenhouse gas emissions and ozone depletion theories
- Impacts of climate change
- Impacts of national strategies on building design
- Principles of designing buildings for durability and adaptability
- Life cycle assessment principles
- Basic principles of cradle-to-grave analysis
- Nature of construction materials and effect on performance
- R values (overall thermal resistance) for construction material
- Software used to predict building performance
- Energy auditing principles
- Processes for the administration and preparation of documentation
- Processes for the development of documentation such as working drawings and specifications
- The BCA Deemed-to-Satisfy (DTS) energy efficiency provisions
- Occupational health and safety (OHS) workplace policies and procedures
- Relevant federal, state or territory legislation and local government policy and procedures

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Triple Bottom Line approaches are:

- the impacts on natural and human capital, as well as financial capital. They focus on decision making and reporting which explicitly considers economic, environmental and social performance.

Government and industry responses may include:

- Brundtland Report
- Emissions Trading Green Paper
- Environmental Management Systems
- ISO 14000 Standards from International Organization for Standardisation
- Kyoto Protocol
- National Greenhouse Response Strategy

- National Strategy for Ecologically Sustainable Development (NSES D)
- UN Local Agenda 21 – the Rio Declaration on Environment and Development
- Commonwealth, state and local government Acts, Regulations and development
- carbon trading
- codes of practice
- state environment protection policies.

Organisations include, but are not limited to:

- Australian Building Codes Board
- Australian Greenhouse Office (AGO)
- Environment Australia
- Environmental Protection Agency (EPA)
- Green Building Council (GBC)
- Leadership in Energy and Environmental Design (LEED)
- Living Building Challenge.

Location specific climates include:

- Australian climates influenced by topological and geographical elements
- climate zones as classified by the BCA DTS energy efficiency provisions
- micro climates in specific locations.

Site influences include:

- existing vegetation
- natural water courses
- noise
- orientation
- prevailing winds
- topography
- views.

Sun path includes:

- shadow angle calculation
- shadow map diagrams
- orientation.

Passive design principles

include:

- natural air flow
- natural and artificial shading
- orientation
- passive cooling
- passive heating
- thermal mass.

Sustainable site development practices include:

- maintaining appropriate existing vegetation
- minimal site excavation
- preservation of natural features
- recycling stations
- uninterrupted natural water courses
- utilisation of existing roads, thoroughfares and utilities
- water containment techniques and strategies to prevent run-off
- rainwater collection and re-use during construction.

Sustainable materials include those which:

- are biodegradable
- are locally manufactured or available on-site
- are remanufactured, re-usable or recycled
- can be re-used or recycled
- do not contain or emit toxic substances
- do not have a negative impact on the environment during their production, usage and disposal
- have a low embodied energy
- require minimal processing.

Range of building materials

includes:

- caulks and adhesives
- concrete
- doors
- flooring and floor coverings
- insulation
- interior finishes and trim
- masonry
- mechanical systems/heating, ventilation and air-conditioning
- paintings and coatings
- plumbing systems and equipment

- renewable energy components
- roofing
- thermal and moisture protection
- timber, plastics and composites
- windows and glazing systems.

Water collection, storage, use and re-use includes:

- black water systems filter beds
- bladder storage
- greywater systems
- rainwater tanks.

Strategies to prevent run-off include:

- maximising the use of impervious surfaces
- preservation of existing vegetation
- water collection.

Energy efficient design principles include:

- application and assessment of the BCA performance-based solutions
- best practice to conserve energy:
 - appliance usage
 - building location and orientation
 - choice and product performance
 - compliance with legislation pertinent to conserving energy
 - living practices that maximise benefit
- climate conditions:
 - climate zones in Australia specified in the BCA
 - micro climates associated with a specific area
- energy consumption:
 - low energy lighting
 - solar hot water systems
 - star rated appliances
 - window coverings and glazing
- energy efficient construction:
 - construction methods
 - durability and adaptability
 - efficient design briefs
 - geography and topography of site
 - location
 - materials used which maximise re-use potential
 - method of application
- Building Information Modelling (BIM)

- star rating systems:
 - Building Energy Rating Scheme (BERS) computer model
 - First Rate computer model
 - Nationwide House Energy Rating Scheme (NatHERS) computer model
- outcomes for building users:
 - avoiding sick building syndrome
 - workplace productivity measures.

Renewable energy sources include:

- biomass energy
- geothermal energy
- hydroelectric energy
- solar energy
- wind energy
- co/tri generation sources.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- apply the principles of sustainable building design in accordance with current legislation and government policies
- evaluate and recommend sustainable materials suitable for the construction of a specific building design in accordance with client brief and specifications
- research, evaluate and report on data and findings, make recommendations and develop strategies for the design of sustainable buildings for at least one building development project that complies with the applicable local government authority, relevant legislation and the BCA.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation
- appropriate support materials
- research resources, including industry-related information.

Reasonable adjustments for people with disabilities must be made to assessment processes, where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge required of current sustainable materials and building practices
- research and reporting on case studies of best practice sustainable buildings
- report on sustainable construction materials
- portfolio of a range of sustainable construction materials.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VI21594**Integrate services layout into design documentation****Unit descriptor**

This unit of competency specifies the outcomes required to integrate the layout of services and connections into building design documentation for residential (Building Code of Australia (BCA) Classes 1 and 10) and commercial (BCA Classes 2 to 9) buildings. It includes the knowledge and application of current sustainable and energy efficient practices and appliances and involves consultation with other professionals to obtain agreement on service layout details and specifications.

It requires compliance with relevant legislation, Australian Standards and the BCA.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to integrate services layout into designs for residential and commercial buildings in consultation with other professionals and finalise documentation in compliance with relevant legislation and the BCA.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Document layouts of water supply and hot water systems

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 ***Water supply***, connection and layout are identified and documented for buildings connected to a town supply or a tank storage supply, in accordance with the ***relevant legislation***.
- 1.2 Installation of water services supplying fire hydrants, fire hose reels and fire sprinkler systems and interconnection of water tanks for fire services are identified in accordance with the relevant legislation.
- 1.3 ***Details of hot water systems*** are evaluated and documented according to suitability and energy rating to maximise energy efficiency.

ELEMENT	PERFORMANCE CRITERIA
2. Document sewerage and drainage disposal methods and layouts	<p>2.1 Sewerage connection and layout are determined for connection, in accordance with the relevant legislation.</p> <p>2.2 Disposal of sewerage from fixtures situated below the level of the local authority sewer for both domestic and commercial buildings are identified in accordance with the relevant legislation.</p> <p>2.3 Methods for disposing of stormwater drainage systems are identified and design and installation of stormwater drainage systems are documented in accordance with the relevant legislation.</p>
3. Document methods and layout for ventilation, air-conditioning and fire protection systems	<p>3.1 Methods and layout of mechanical ventilation and air-conditioning systems are evaluated and documented according to energy rating to maximise energy efficiency and optimise indoor environmental quality.</p> <p>3.2 Systems for natural ventilation are evaluated to determine optimal building performance.</p> <p>3.3 Methods for smoke hazard management are evaluated and documented according to the relevant legislation.</p> <p>3.4 Requirements for fire protection systems for various building classifications are evaluated and documented in accordance with the relevant legislation.</p>
4. Document natural and artificial lighting options	<p>4.1 Design considerations for natural lighting are evaluated to determine optimal user comfort in accordance with Australian Standards for lighting levels.</p> <p>4.2 Artificial lighting and light sources are compared to recommended service luminance, in accordance with the relevant legislation.</p>
5. Document electrical and electronic services layout	<p>5.1 Electrical and electronic service systems are evaluated and documented and supply authorities are identified.</p> <p>5.2 Design and installation of emergency warning systems, emergency lighting and exit signage are evaluated and documented in accordance with the relevant legislation.</p> <p>5.3 Methods of vertical transportation are evaluated and documented in accordance with the relevant legislation.</p>

ELEMENT	PERFORMANCE CRITERIA
6. Finalise services layout	6.1 Details of services layout and any required amendments are confirmed with service engineer or other consultants. 6.2 Shop drawings and other relevant documentation are checked and signed off against design specifications.

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - consult with other professionals and negotiate required amendments, as required
 - read and interpret:
 - * relevant documentation and legislation
 - * the BCA
 - * plans, working drawings and specifications
 - use language and concepts appropriate to industry conventions, including industry terminology and definitions
 - use and interpret non-verbal communication
 - numerical skills to apply measurements and basic calculations relating to service installations
- Written skills to:
 - accurately document details and specifications of services layout
 - prepare documentation to an accepted industry standard
- Teamwork skills to work effectively with clients and other stakeholders
- Problem solving skills to:
 - interpret information from plans and drawings
 - identify and resolve typical faults and problems
 - evaluate mechanical ventilation and air-conditioning for energy efficiency
 - apply standards to artificial lighting and light sources
- Planning and organising skills to collect, organise and analyse information on services layouts
- Initiative and enterprise skills to apply design concepts and principles relating to service installations
- Self management skills to enable the completion of work tasks according to timelines and project schedule

- Technology skills to:
 - use relevant computer software
 - produce documentation and calculations
- Ability to work safely in a design drafting working environment, according to legislation and workplace procedures and policies

Required knowledge

- Nature of materials and effect on performance relating to service installations
- Working drawings and specifications
- A variety of design concepts and principles relating to service installation
- Role and responsibilities of building designers relating to services layout
- Service installation terminology, definitions, installation methods and hazards in relation to devices and systems using Australian Standards, the BCA and manufacturers' specifications
- Sustainability and energy efficiency principles and practices in relation to services installation

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Water supply includes:

- a town supply
- single and two-stage pumping for multi-function connected services
- tank storage supply relative to the public water supply and reservoir heights.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Details of hot water systems include:

- area to be serviced
- height of installation
- number of outlets and energy sources available
- type of occupancy
- type of system.

Sewerage connection and layout includes:

- local authority sewerage drainage system
- septic or bio-chemical treatment unit
- graded or vertical discharge pipes
- inspection shafts and ORGs.

Mechanical ventilation and air-conditioning include:

- air-conditioning applications
- air distribution including mechanical ventilation for car parks
- air filtration including air filters, ducting, main filter types
- air intake systems
- fire dampers
- fume discharge systems
- smoke control and exhaust systems
- warm water and cooling towers.

Fire protection systems include:

- fire and smoke detectors and alarms
- fire collars
- fire hydrants, fire hoses and reels
- sprinkler systems.

Design considerations for natural lighting include:

- glare reduction
- low life cycle cost
- reduced emissions
- reduced operating costs
- reflectance of interior surfaces
- window size and spacing.

Electrical and electronic service systems include:

- categories of cabling and layout of equipment for:
 - data
 - telecommunications
 - lift controls
 - power supplies
- service systems safeguards and access for maintenance, repair and extension
- telecommunications connection to site and distribution facilities
- type of service (emergency power and alternative power sources).

Methods of vertical transportation include:

- escalators
- hoists
- lifts
- pedestrian movers.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate design drafting workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- develop documentation which integrates services layout into the design of a residential or commercial building
- consult with other professionals to negotiate details of services layout
- interpret and comply with relevant legislation.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- specifications and documentation for services layout
- the BCA and relevant Australian Standards
- research resources, including industry-related information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of current practices in the layout of services
- development of documentation integrating services layout
- research project on energy efficient heating, ventilation and air-conditioning systems.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21596**Produce preliminary and working drawings for residential buildings****Unit descriptor**

This unit of competency specifies outcomes required to produce two and three-dimensional drawings in accordance with standard industry practice and to a level suitable for building permit approval applications. It includes the ability to read and interpret plans and specifications and to produce preliminary and working drawings for residential buildings (Building Code of Australia (BCA) Classes 1 and 10).

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to produce preliminary and working drawings for residential buildings (BCA Classes 1 and 10) within the context of relevant legislation, the BCA and Australian Standards.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- | | |
|---|--|
| 1. Produce preliminary drawings | <p>1.1 <i>Types of preliminary drawings</i> required and <i>key features</i> to be recorded conform to the scope and standard of the job being undertaken.</p> <p>1.2 Tools and equipment required for producing sketches/drawings are prepared and checked for safety and serviceability.</p> <p>1.3 Simple two and three-dimensional drawings are created to resolve construction details.</p> |
| 2. Read, interpret and articulate plans and specifications for a residential building | <p>2.1 Relevant <i>plans and specifications</i> are identified to develop a set of working drawings.</p> <p>2.2 Key information is located, interpreted and articulated according to relevant specifications and <i>relevant legislation</i>.</p> <p>2.3 Advice is sought from client and other stakeholders, when required, to articulate and clarify any issues.</p> |

ELEMENT	PERFORMANCE CRITERIA
3. Produce preliminary working drawings	<p>3.1 Working drawings for residential buildings are produced using standard drawing conventions, and in accordance with current Australian Standards.</p> <p>3.2 Industry best practice conventions are applied to the production of building drawings.</p>
4. Produce a set of working drawings	<p>4.1 Working drawings are completed to meet architectural conventions and in accordance with the relevant legislation.</p> <p>4.2 Working drawings are checked with team members for consistency of presentation, cross-referencing and accuracy and to comply with relevant legislation.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm client needs and share information with team members
 - read and interpret:
 - * the BCA
 - * relevant legislation and Australian Standards
 - * plans and specifications
 - * other relevant documentation
 - * use language and concepts appropriate to industry conventions
 - * use and interpret non-verbal communication
- Written skills to produce simple preliminary drawings
- Teamwork skills to:
 - work effectively with clients and other stakeholders
 - produce preliminary and working drawings within allocated responsibilities
- Problem solving skills to interpret information from plans, specifications and client brief to develop required preliminary drawings
- Planning and organising skills to produce preliminary and working drawings within an allocated time frame
- Initiative and enterprise skills to achieve creative and innovative approaches in the production of drawing tasks
- Numeracy skills to apply calculation and measuring techniques

- Technological skills to:
 - use computer software to enable production of working drawings
 - complete documentation and calculations

Required knowledge

- Architectural drawing protocols
- Architectural conventions and features including direction, scale, key, contours, symbols and abbreviations
- Processes for the administration and preparation of documentation
- Processes for the interpretation of reports, working drawings and specifications
- Research methods
- Structural, design and construction principles of buildings
- Process for the consideration of a budget constraint
- Relevant federal or state legislation and local government policy and procedures, including OHS requirements

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Types of preliminary drawings include:

- floor plans
- land boundaries and footprint of building/site plans
- orthographic drawings
- schematic drawings that show articulation of services
- sectional views that detail key construction elements.

Key features include:

- building levels and variations
- fixtures and fittings
- services
- electrical layout
- wall penetrations (doors/windows)
- walls.

- Plans and specifications** include:
- plans:
 - set of working drawings
 - construction technology
 - details
 - finishes and specification notes to a standard suitable for building approval
 - sections relating to main components of construction
 - information from consultants may include:
 - soil tests
 - shop drawings (steel fabrication)
 - structural engineering drawings
 - survey plans and level plans for construction site
 - costing/preliminary estimates
 - energy rating
 - Bushfire Attack Level (BAL)
 - temporary structures and works.

- Relevant legislation** may include:
- Acts and ordinance
 - Regulations
 - National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
 - Australian Standards
 - practice and technical notes.

- Working drawings for residential buildings** include:
- area analysis
 - BCA Classes 1 and 10 buildings
 - computer-generated or paper-based presentations
 - construction and general notes
 - details
 - elevations
 - floor plans
 - location
 - neighbouring buildings
 - plan and specification interpretation
 - projections

- sections
- services
- residential dwellings (elementary or conventional)
- site plans
- two and three-dimensional drawings.

Standard drawing conventions include:

- appropriate scale
- graphic symbols
- lettering
- line work (line weight/line type)
- numbering.

Building drawings may apply to:

- banks and landscaping
- base structure – timber and masonry
- cathedral ceilings
- certificate of title to land
- chimney construction
- complex roof and wall shapes
- composite construction (eg steel and timber)
- conversion of plans and specifications to architectural and building detail
- drawing protocols, including:
 - abbreviations
 - legends
 - lettering standards
 - numbering
 - paper size
 - scale
 - standard units of measurement
 - symbols
- electrical connections plan
- excavation cut and fill
- flashings and box gutters
- general plumbing services plan
- glazing, including bay window construction
- insulation and sarking
- internal and external wall claddings

- joinery
- land surveyor plans
- large span timber beams and connections, including glue laminated beams
- levels and contours
- retaining walls
- roof construction
- sewerage connection and easement plan
- soil classification and tests
- stairs
- stormwater connection and easement plan
- timber and masonry
- upper floor construction
- wall construction
- window and door schedules.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with occupational health and safety (OHS) regulations applicable to workplace operations
- apply organisational policies and procedures, including quality assurance requirements where applicable
- produce two and three-dimensional drawings for residential building projects
- complete working drawings to industry best practice and as determined by the project brief.

Context of and specific resources for assessment

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- computer facilities and drafting environment with appropriate levels of illumination and ventilation
- workplace instructions relating to safe work practices
- the BCA and relevant Australian Standards
- research resources, including industry-related systems information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of building specifications and required documentation
- practical assessment in the development of a set of working drawings.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21597**Produce working drawings for commercial buildings****Unit descriptor**

This unit of competency specifies outcomes required to produce two and three-dimensional drawings in accordance with standard industry practice and to a level suitable for building permit approval applications. It includes the ability to read and interpret plans and specifications and to produce working drawings for commercial buildings (Building Code of Australia Classes 2 to 9).

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to produce working drawings for commercial buildings (BCA Classes 2 to 9) within the context of relevant legislation, the BCA and Australian Standards.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- | | |
|--|--|
| 1. Produce preliminary drawings | <p>1.1 Simple two and three-dimensional preliminary drawings are created using architectural drawing conventions and in compliance with <i>relevant legislation</i>.</p> <p>1.2 Sectional drawings of simple structural elements are created using architectural drawing conventions.</p> <p>1.3 Essential information is recorded on drawings with symbols and abbreviations according to architectural drawing conventions.</p> |
| 2. Read and interpret plans and specifications for a commercial building | <p>2.1 Relevant <i>plans and specifications</i> are identified to develop a set of working drawings.</p> <p>2.2 Key information is located, interpreted and articulated according to relevant specifications and relevant legislation.</p> <p>2.3 Advice is sought from client and other stakeholders, when required, to articulate and clarify any issues.</p> |

ELEMENT	PERFORMANCE CRITERIA
3. Produce preliminary working drawings	<p>3.1 Requirements and criteria for preliminary working drawings are interpreted according to the scope of the job being undertaken.</p> <p>3.2 Preliminary working drawings with annotated construction details are completed in accordance with the relevant legislation.</p>
4. Produce a set of working drawings	<p>4.1 Scope of works and time frame for completion of drawings is negotiated and agreed.</p> <p>4.2 Working drawings are completed to meet architectural conventions and in accordance with the relevant legislation.</p> <p>4.3 Detailed specifications are included on working drawings and are completed to architectural conventions.</p> <p>4.4 Working drawings are checked for consistency of presentation, cross-referencing and accuracy and to ensure compliance with relevant legislation.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm client needs and share information with team members
 - read and interpret:
 - * the BCA
 - * plans and specifications
 - * relevant legislation and Australian Standards
 - * other relevant documentation
 - produce simple preliminary drawings
 - use language and concepts appropriate to industry conventions
 - use and interpret non-verbal communication
- Teamwork skills to:
 - work effectively with clients and other stakeholders
 - negotiate individual work tasks with others
- Problem solving skills to interpret information from plans, specifications and client brief.

- Planning and organising skills to produce working drawings within allocated time frame
- Initiative and enterprise skills to achieve creative and innovative approaches in relevant drawing tasks
- Numeracy skills to:
 - produce drawings for commercial buildings
 - apply calculation and measuring techniques
- Technological skills to:
 - use computer software to enable production of working drawings
 - complete documentation and calculations
- Working safely in a design drafting working environment according to organisational policies and procedures

Required knowledge

- Drafting and drawing protocols
- Industry conventions for the production of working drawings
- Processes for the administration and preparation of documentation
- Processes for the interpretation of reports, working drawings and specifications
- Relevant federal or state legislation and local government policy and procedures, including occupational health and safety (OHS) requirements
- Research methods
- Structural, design and construction principles of buildings
- Process for the consideration of a budget constraint

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Plans and specifications

include:

- plans:
 - set of working drawings
 - construction technology
 - details
 - finishes and specification notes to a standard suitable for building approval
 - sections relating to main components of construction
- information from consultants may include:
 - soil tests
 - shop drawings (steel fabrication)
 - structural engineering drawings
 - survey plans and level plans construction site
 - costing/preliminary estimates
 - energy rating
 - Bushfire Attack Level (BAL)
 - temporary structures and works.

Preliminary working drawings

include:

- area analysis
- BCA Classes 2 to 9 buildings
- computer-generated or paper-based presentations
- construction notes
- details
- elevations
- floor plans
- general notes
- location or neighbouring buildings
- plan and specification interpretation
- projections
- sections
- services
- site plans
- two and three-dimensional drawings
- type 'B' and type 'C' buildings.

Working drawings applies to:

- banks and landscaping
- base structure – timber and masonry
- certificate of title to land
- complex roof and wall shapes
- composite construction (eg steel and timber)
- conversion of plans and specifications to architectural and building detail
- drawing protocols including:
 - abbreviations
 - legends
 - lettering standards
 - numbering
 - paper size
 - scale
 - standard units of measurement
 - symbols
- electrical connections plan
- excavation cut and fill
- flashings and box gutters
- general plumbing service plan
- glazing, including window and door schedules
- insulation and sarking
- internal and external wall claddings
- joinery
- land surveyor plans
- large span timber beams and connections, including glue laminated beams
- levels and contours
- research journal in accordance with project aims, comprising:
 - photographs
 - record of site visits
 - sections
 - three-dimensional sketches
- retaining walls
- roof construction

- sewerage connection and easement plan
- soil classification and tests
- stairs
- stormwater connection and easements plan
- timber and masonry
- upper floor construction
- wall construction.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with OHS regulations applicable to workplace operations
- apply organisational policies and procedures, including quality assurance requirements where applicable
- produce two and three-dimensional drawings for commercial buildings (BCA Classes 2 to 9)
- complete working drawings to industry best practice and as determined by the project brief.

Context of and specific resources for assessment

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- computer facilities and drafting environment with appropriate levels of illumination and ventilation
- workplace instructions relating to safe work practices
- the BCA and relevant Australian Standards
- research resources, including industry-related systems information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of building specifications and requirements for working drawings
- practical assessment in the development of working drawings for commercial buildings.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21598**Select construction materials for building projects****Unit descriptor**

This unit of competency specifies the outcomes required to evaluate and select a range of suitable construction materials for building projects, taking into account a range of criteria including physical attributes, cost and sustainability.

It includes the ability to analyse properties and characteristics to determine their suitability for application in the construction of a building. It requires selection of materials that comply with relevant legislation, Australian Standards and the Building Code of Australia (BCA).

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to select suitable construction materials for buildings within the context of relevant legislation, the BCA and Australian Standards.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Analyse characteristics of construction materials

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Manufacturing processes of a range of **construction materials** is researched to establish limitations of practical application.
- 1.2 Quality standards and performance of materials are investigated for adherence to the **relevant legislation** and the suitability for **types of structures**.
- 1.3 Materials are analysed to determine their application with regard to substructure, fixings, coatings or finishes, specific construction systems, visual effects and compatibility.

ELEMENT	PERFORMANCE CRITERIA
2. Evaluate materials for their suitability for building projects	1.4 Manufacturing/conversion tolerances are detailed, including 'building in' tolerances to determine their impact on material properties.
	1.5 New and emerging construction materials are researched to ensure industry best practice and sustainability application.
	1.6 Relevant information is recorded in a suitable format for future reference.
	2.1 Materials are investigated to identify their sustainable characteristics to minimise environmental impact.
	2.2 Materials are analysed for their thermal and acoustic characteristics to determine appropriate applications, in accordance with the relevant legislation.
	2.3 Materials are analysed to determine durability, structural integrity and fire resistance to determine appropriate applications, in accordance with the relevant legislation.
3. Recommend suitable materials	2.4 Defects , short and long-term degradation, timber preservation and protection of metals are investigated to determine appropriate applications, in accordance with the relevant legislation.
	2.5 Transportation, on-site storage requirements and handling of materials is investigated to determine their impact on construction methodology and occupational health and safety (OHS) level of risk.
	3.1 A range of commonly used construction materials is selected, according to their purpose, standard application and manufacturer's specifications.
3. Recommend suitable materials	3.2 Construction materials and interior finish products are recommended for specific attributes and characteristics , in accordance with design specifications.
	3.3 Specifications for construction materials are determined and recorded.

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * the BCA
 - * relevant legislation and Australian Standards
 - * plans, drawings and specifications
 - use language and concepts appropriate to industry conventions
- Written skills to document data and findings to industry standards
- Problem solving skills to:
 - identify typical defects in construction materials
 - analyse and evaluate data on construction materials
- Planning and organisational skills to collect, organise and analyse information on construction materials
- Initiative and enterprise skills in:
 - selecting suitable construction materials, taking into account a range of criteria including physical attributes, cost and sustainability
 - applying selection principles relating to performance of materials according to their purpose
- Technological skills to complete documentation and calculations
- Working safely in a design drafting working environment, according to legislation and workplace procedures and policies

Required knowledge

- Manufacturing processes and their effects on the use and application of construction materials
- Structural, thermal, acoustic and visual properties of materials and how these are utilised to achieve a desired outcome and meet specifications and legislative requirements
- Durability, weatherability, jointing, thermal expansion, compatibility, connection systems with regard to the application of materials
- Systems, processes and methodology used to incorporate materials into a structure
- Substructures, jointing systems and fixings required to incorporate materials into a building
- Effect of substructures on the use of materials
- Effect of transport, handling and storage on materials

- Principles of designing buildings for durability and adaptability
- Life cycle assessment principles
- Nature of construction materials and effect on performance
- Environmental impact issues relating to material selection and use
- R and U values (overall thermal resistance) for construction material
- Grading process and grade markings used to categorise timber and timber products
- Relevant sections of the BCA and relevant federal, state or territory legislation
- Material safety data sheets

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Construction materials include, but are not limited to:

- adhesives and sealants
- admixtures
- cement
- clay bricks and pavers
- composite materials, eg sandwich panels
- concrete cast in situ
- fire rated protective coatings
- glass
- metals
- mortars
- plaster and plasterboard
- plastics
- pre-cast structural concrete components
- sandstone
- terracotta and concrete roof tiles
- timber and timber products
- engineered timber products.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Types of structures include:

- structures with concrete skeleton and slabs
- structures with steel and metallic column and member construction
- structures with timber and other composite material construction.

Sustainable characteristics include:

- materials that have minimal packaging
- high recycled content or recyclability
- locally produced or sourced
- low embodied energy
- low in volatile organic compounds (VOCs)
- low life cycle cost ease of demolition, disassembly, re-use and disposal
- materials that are easily cleaned and maintained
- raw materials sourced with minimal negative environmental impact.

Thermal and acoustic characteristics include:

- combustibility
- expansion joint requirements
- fire indices
- fire resistance and insulation values for composite materials
- resonance
- sound transmission coefficients
- thermal expansion and contraction
- thermal resistance (R and U values).

Durability includes:

- longevity
- sturdiness
- weatherability.

Structural integrity includes:

- compatibility with other materials and/or systems
- structural properties.

Fire resistance includes:

- fire resistance levels to meet the BCA.

Defects include:

- those caused by incorrect placement, installation or application or in naturally occurring materials.

Transportation, on-site storage requirements and handling includes:

- carnage or other methods of handling
- fixing systems
- on-site quality control
- on-site handling and storage
- road transport.

Interior finish products include, but are not limited to:

- ceramic tiles
- chipboard
- laminates
- MDF board
- tilt up panel.

Specific attributes and characteristics include:

- aesthetics
- availability
- cost
- durability
- sustainability.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate design drafting workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- identify, analyse and evaluate the characteristics of construction materials for their application and sustainability
- comply with the requirements of the relevant legislation with regard to the thermal acoustic and fire resistant qualities of construction materials
- make recommendations for suitable materials to satisfy construction requirements, aesthetics, cost effectiveness, client brief and the requirements of the relevant legislation.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation including legislative documents and standards
- appropriate support materials, including current information and data on the characteristics and use of construction materials
- samples of construction materials or examples of material use in situ
- research resources, including industry-related information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm the knowledge of sustainable building materials
- reinforcing the integration of employability skills with workplace tasks and job roles
- case studies of best practice in the use of appropriate materials for a building project.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21599 Provide design solutions for residential and commercial buildings

Unit descriptor

This unit of competency specifies the outcomes required to apply the theories and principles of design to the design of buildings. It can be applied to both residential buildings (Building Code of Australia (BCA) Classes 1 and 10) and commercial buildings (BCA Classes 2 to 9). It requires the ability to research, analyse and evaluate information on the history and elements of architecture and their influence on current practice. It includes developing a design response, which meets the requirements of a project brief, and communicating a final design solution to relevant stakeholders.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to apply the principles and theories of design to residential and commercial building projects.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Research the key movements of global architecture

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 A range of ***research techniques*** is used to source information on the ***influential periods of global architecture*** through the works of recognised architects and designers.
- 1.2 ***Architectural terminology and language*** is identified for application in research.
- 1.3 Own knowledge and understanding of global architecture is developed through review and ***critical analysis*** of the ***influences and features*** of recognised works.
- 1.4 The ***principal characteristics*** of predominant architectural styles are researched and recorded.
- 1.5 Impacts of global architecture are analysed for their influence on Australian regional architecture.

ELEMENT	PERFORMANCE CRITERIA
2. Determine design principles	<p>2.1 The history and main principles of design theories are researched and examined to inform, compare and contrast with present beliefs, methods and practice.</p> <p>2.2 Design principles are researched which constitute sound and innovative design and its practice on a tectonic concept.</p> <p>2.3 The relationship between art, architecture and nature is explored to determine the application of form, functionality and aesthetics in design.</p> <p>2.4 Principles of symmetry, rhythm and symbolism in art and architecture are researched and compared with current theories of culture, politics and technology.</p>
3. Apply design principles to the context of a site	<p>3.1 The project brief is analysed to determine client requirements for the design.</p> <p>3.2 The correlation between human behaviour, function, aesthetics, typology, neighbourhood character and site context is analysed to determine patterns of movement, spatial relationships and visual goals determined by the project brief.</p> <p>3.3 Circulation patterns/bubble diagrams are developed to illustrate patterns of movement and spatial relationships.</p> <p>3.4 Social, sustainable and technical factors are integrated in accordance with relevant building and planning regulatory requirements and contextual and site restraints.</p>
4. Develop and express ideas through freehand sketching	<p>4.1 Principal elements of sketching are identified and explored through visual and sketched studies of built forms and their internal and external features.</p> <p>4.2 Sketches are produced using a range of media to interpret design solutions and concepts and to illustrate details of construction, structural and aesthetic elements of a design.</p> <p>4.3 Selected rendering techniques are used to enhance readability and interpretation and to display a range of material finishes.</p> <p>4.4 Sketches are produced with accurate proportions and in accordance with project timelines, as required.</p>

ELEMENT	PERFORMANCE CRITERIA
5. Resolve and communicate design solutions to a built form	5.1 Architectural theories are evaluated and integrated to a conceptual program.
	5.2 Features of comparable building designs are researched to inform the development of a design solution.
	5.3 Design theories, concepts and ideas are combined to produce a design solution.
	5.4 The elements of human needs, the environment, sustainability and technology are integrated into a concept design.
	5.5 A range of alternative responses is developed and reviewed and a final solution is selected for presentation to relevant stakeholders.
	5.6 The final design solution is confirmed against the project brief and communicated to relevant stakeholders through 2D or 3D media .

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel
 - communicate a design solution
 - read and interpret:
 - * construction drawings and specifications
 - * Australian Standards
 - * relevant sections of the BCA
 - * research material including architectural literature and relevant texts
 - use language, terminology and semantics relevant to building design and architecture
- Written skills to:
 - document research on the influences of global architecture and design principles
 - produce freehand sketches for the interpretation of a design or of architectural features

- Problem solving skills to:
 - apply design theories and ideas to a built form
 - apply design principles within regulatory requirements
 - respond to the challenges of irregular shaped sites
- Initiative and enterprise skills to:
 - resolve construction and design issues with regard to structural systems and site context
 - incorporate functionality and aesthetics into a built form
 - compare historical and main design principles with modern practices and methods
 - develop a design response according to the project brief requirements
- Planning and organisational skills to:
 - collect, organise and analyse information on:
 - * world architecture and its principal characteristics
 - * the works of recognised architects and designers
 - * complete design response within allocated time frame
- Learning skills in the development of own knowledge and understanding of global architecture
- Technological skills to research and record information
- Teamwork skills to consult with client and other stakeholders
- Working safely in a design drafting working environment, according to legislation and workplace procedures and policies

Required knowledge

- Architectural terminology and semantics
- Design processes
- Influential architects and designers of the 20th and 21st Centuries
- Global and Australian regional architectural styles
- Architectural concepts applied to a design solution
- Principles of structural and construction technology
- Basic principles of anthropometrics and ergonomics
- Material characteristics and applications
- Tectonic themes
- Regulatory, contextual and site constraints
- Planning concepts
- Principles of human behaviour, functionality and aesthetics
- Historical and modern design principles
- Modern theories of culture, politics and technology

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Research techniques include:

- architectural literature and references
- desk research
- Internet
- interviews
- photographs and digital images
- observations of built environment
- site visits.

Influential periods of global architecture may include but are not limited to:

- Edwardian
- Georgian
- Victorian
- gothic
- mid-20th Century
- post modern
- post-industrial
- renaissance
- 21st Century
- colonial
- early modern.

Architectural terminology and language includes:

- aesthetics
- allegory
- classical
- composition
- contemporary
- context
- culture
- deconstruction
- ecology
- esquisse
- form
- genius loci
- identity

- metaphor
- organic
- palimpsest
- phenomenology
- post-structural
- primitive
- regionalism
- schematic
- style
- symbolism
- tectonic
- typology
- zeitgeist.

Critical analysis includes:

- analysing and evaluating
- critiquing
- comparing and contrasting beliefs, interpretations and theories
- developing criteria for evaluation
- debating and discussing
- noting significant similarities and differences
- reading and listening
- reflecting.

Influences and features include:

- contemporary theories and concepts
- distinctive architectural language or element that can be attributed to a particular designer or architect
- thinkers and philosophers.

Principal characteristics include:

- external
- internal
- materials
- structural systems.

Design principles include:

- aesthetics
- balance
- contrast
- dominance (emphasis)
- functionality
- gradation
- harmony
- proportion
- radiation
- repetition
- rhythm
- scale
- symmetry
- unity.

Social, sustainable and technical factors include:

- privacy and degrees of transparency
- inherent flexibility of design (allowing for adaptive re-use)
- purpose and meaning to design's constructional/structural system or expression.

Principal elements of sketching include:

- proportion
- scale light, shade texture
- composition
- line weight
- negative and positive space.

Range of media includes:

- coloured pencils
- erasers
- ink
- markers
- pastels
- pencils
- transferring mediums
- various paper types
- water colours.

- Rendering techniques** include:
- burnishing
 - hatching
 - line drawings
 - negative space
 - rubbing
 - scoring
 - stippling
 - tonal rendering.

- Material finishes** include:
- natural finishes, eg stone, timber, slate, rammed earth, vegetation
 - non-reflective textured materials used both internally and externally, eg carpet, tiles, pavers, brick, rendered surfaces
 - reflective surfaces, eg walls, floors, mirrors, glass, water.

- 2D or 3D media** include:
- Building Information Modelling (BIM)
 - detailed hand drawn or digitally generated drawings
 - freehand sketches.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate design drafting workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- research and apply knowledge of global architecture, architects and designers and their influences on modern design theories
- apply architectural concepts to a built form
- develop a design solution which meets the requirements of the project brief
- communicate design solutions to stakeholders using a range of media.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation and legislation
- images of significant buildings reflecting specific architectural styles and features
- research resources, including architectural literature.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- practical demonstration of digital production of project documentation in real or simulated work conditions, with questioning to confirm knowledge of designing objects in three dimensions
- submission of project documentation, both physical and digital, that complies with project brief
- portfolio of documentation for an architectural project.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21600

Integrate digital applications into architectural workflows

Unit descriptor

This unit of competency specifies the outcomes required to use a range of digital applications in architectural workflows. It includes the ability to determine the appropriate digital applications required for specific project outputs and the application of architectural standards and conventions to produce and manage the project. Work is likely to be undertaken with limited supervision and in consultation with team members and external consultants.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to produce outputs for architectural projects using a variety of digital applications.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Determine digital production of architectural workflows
2. Analyse project requirements to determine outputs

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Productivity advantages are investigated and applied to data management systems, organisational standards and overall practice workflows.
- 1.2 Individual workflows are established for projects to maximise productivity within given time frames.
- 1.3 ***Team strategies*** are organised to enable collaboration between participants in the project team.
- 2.1 Project brief is evaluated to determine the documentation and data requirements within the project scope.
- 2.2 Relevant external stakeholders and internal personnel are identified to plan development of documents according to order of precedence and agreed timelines.
- 2.3 ***Digital security issues*** are considered and workplace procedures for copyright and privacy are complied within the communication of documents.

ELEMENT	PERFORMANCE CRITERIA
3. Select project formats	<p>2.4 Hardware requirements are evaluated to determine their limitations and suitability.</p> <p>2.5 Work is planned to ensure compliance with the Building Code of Australia (BCA), relevant Australian Standards and other relevant legislation.</p>
4. Produce digital data for projects	<p>3.1 Appropriate applications are selected to produce required documentation.</p> <p>3.2 Digital protocols are determined to develop the project documentation according to workplace policy and client requirements.</p> <p>4.1 File formats and transfer protocols and standards are established to enable the use of data in chosen applications.</p> <p>4.2 Object data and component libraries are selected and/or created for implementation in project outputs.</p> <p>4.3 Relevant information is researched from reliable sources to ensure compliance with regulatory building requirements.</p> <p>4.4 Appropriate application working environments are employed to ensure productive workflow.</p>
5. Produce project outputs	<p>5.1 Digital and physical output methods are selected to ensure compliance with industry standard delivery methods and client requirements.</p> <p>5.2 Conventions and standards related to layout and print sizing, for both physical and digital outputs, are identified and implemented.</p> <p>5.3 Digital and physical communication conventions are examined and selected according to their cost effectiveness and sustainability.</p> <p>5.4 Interim check plots are produced to confirm that outputs meet project requirements and modifications are made as necessary.</p> <p>5.5 Final hard copies of project documentation are produced for submission to relevant stakeholders, in compliance with regulatory requirements.</p> <p>5.6 Outputs are evaluated to ensure compliance with planned project outcomes.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - engage and interact with digital and electronic distributed information and learning systems
 - read and interpret:
 - * construction drawings and specifications
 - * state regulatory authority requirements/relevant legislation
 - * Australian Standards
 - * relevant sections of the BCA
 - * software manuals
 - use language, terminology and concepts appropriate to industry conventions
- Planning and organising skills to:
 - coordinate workflows according to priorities and agreed timelines
 - confirm outputs meet project requirements
- Teamwork skills for collaboration and consultation with both external and internal personnel
- Initiative and enterprise skills to:
 - create and/or use object data and component libraries
 - analyse file structures and use them effectively
- Self management skills to enable the production of documentation within allocated time frame
- Ability to critique work produced for the purposes of feedback and contribution to work teams
- Learning skills in self directed approach to updating skills in software use and knowledge of emerging technologies
- Technology skills to use software applications suitable for production of documentation required for the project
- Numeracy skills to produce required documentation

Required knowledge

- Functions and management of software programs required for the production of various stages of project documentation
- The application of standards and conventions in the production of architectural documentation
- The application of construction and materials technology in the production of architectural documentation
- Principles of design and their application
- Principles of designing objects and spaces in three-dimensions and their translation into computer-based design methodologies
- Organisational quality requirements for the production of digital outputs
- Organisational and legislative requirements for documentation in all stages of building design project
- Occupational health and safety (OHS) legislation and guidelines relevant to software use
- Recognition of file structures

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

- Team strategies*** could include:
- collaboration amongst practice team members
 - collaboration with external consultants
 - identifying individual roles and responsibilities.

- Digital security issues*** include:
- protection of client privacy
 - protection of client and organisation intellectual property
 - permissions for access to folders and files
 - maintenance of digital storage.

- Hardware requirements*** include:
- devices such as:
 - scanners
 - digitisers
 - printers/plotters
 - digital projectors/display devices
 - external storage devices
 - workstation platform.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - BCA, Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Appropriate applications could include, but are not limited to:

- 5D software
- animation software
- Building Information Modelling (BIM) software
- design documentation software
- graphic development and/or editing software
- internet and network communication platforms
- multimedia and rendering software.

Digital protocols may vary according to workplace policies but include:

- archiving
- digital back-up
- platforms
- production set-up and management.

Transfer protocols include:

- distributed information systems
- transfer of data
- transfer of images
- data from consultants.

Relevant information includes:

- information from Australian websites and publications
- trade literature.

Digital and physical output methods include, but are not limited to:

- email
- online
- paper output
- physical model, eg 3D printer or cam device.

Communication conventions include, but are not limited to:

- methods to transfer data through communication services such as:
 - email/social media
 - FTP/Internet cloud services etc
 - webclient servers.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design drafting workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- apply organisational policies and procedures, including OHS and quality assurance requirements, where applicable
- comply with copyright and trade practices legislation and organisational privacy and security policies and procedures
- produce digitally generated information for an architectural project
- collaborate and consult with team members and outside agencies
- meet the criteria of the project brief to the required standard and within allocated timelines.

Context of and specific resources for assessment

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant legislation.

Resource implications for assessment include:

- appropriate computer hardware and software
- access to architectural conventions, best practice and workplace procedures
- the BCA and relevant Australian Standards
- task sheets, sample drawings and supporting documentation, as required.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- practical demonstration of digital production of project documentation in real or simulated work conditions, with questioning to confirm knowledge of designing objects in three dimensions
- submission of project documentation, both physical and digital, that complies with project brief
- portfolio of documentation for an architectural project.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21601**Present architectural designs****Unit descriptor**

This unit of competency specifies the outcomes required to present a design concept for an architectural project. The design could be for a residential (Building Code of Australia (BCA) Classes 1 and 10) or commercial (BCA Classes 2 to 9) building. It includes reviewing the project brief, developing presentation materials and presenting the final design concept to relevant stakeholders. Materials for presentation could include preliminary drawings, computer generated drawings/images, or models. It requires the ability to effectively clarify or communicate ideas and the design concept to stakeholders.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit supports the skills and knowledge required for building designers to present an architectural design to relevant stakeholders. Work is likely to be under limited or no supervision and in consultation with a variety of stakeholders.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

1. Plan presentation

- 1.1 The project brief is reviewed to confirm ***requirements for presentation.***
- 1.2 Suitable presentation format is selected according to project brief, timelines and budgetary limitations.
- 1.3 Relevant stakeholders are consulted during presentation planning to ensure appropriate format and materials are determined.
- 1.4 Consultation with team members is undertaken to determine individual responsibilities and time frames in the planning of presentation.

ELEMENT	PERFORMANCE CRITERIA
2. Produce presentation images and/or models	2.1 Presentation materials and equipment are selected to suit the format and purpose of the presentation and client requirements.
	2.2 Final drawings/models are produced for presentation to stakeholders within agreed time frames and to industry standards.
	2.3 A range of presentation materials is produced to assist comprehension of final design.
3. Make presentation to client or stakeholder	3.1 Equipment and materials are organised for presentation and team members are briefed on their roles and responsibilities for the presentation, as required.
	3.2 Non-verbal and verbal communication techniques are used to secure and maintain the interest of the audience.
	3.3 Opportunities are provided for stakeholders to seek clarification on central concepts and ideas, and presentation is adjusted to meet the needs of the audience, if required.
	3.4 Key concepts are summarised at strategic points to facilitate understanding.

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret:
 - * project brief
 - * architectural documentation
 - use language, terminology and concepts appropriate to industry conventions
- Facilitation and presentation skills to communicate design concept to stakeholders

- Written skills to:
 - sketch preliminary presentation drawings using a variety of media and different techniques, as required
 - communicate design ideas and concepts in sketch format
 - prepare documentation to an accepted industry standard
- Problem solving skills to:
 - identify requirements for presentation according to project brief
 - liaise with stakeholders to plan presentation
- Initiative and enterprise skills to:
 - develop presentation that meets client requirements
 - produce presentation materials to industry standard to assist client in understanding key features of design
- Planning and organisational skills to:
 - plan, prepare and facilitate a design presentation
 - complete work within accepted time frames
- Technological skills to:
 - complete presentation materials using a variety of computer software
 - operate presentation equipment
 - develop presentation materials
- Self management skills to coordinate own responsibilities in planning presentation within designated time frame
- Teamwork skills during consultation with, and coordination of, internal and external personnel
- Working safely in a design drafting working environment, according to legislation and workplace procedures and policies

Required knowledge

- Techniques required for sketches/drawings
- Colour and its applications
- Rendering techniques and applications
- Relationship between sketching and rendering techniques and the appropriate media
- Computer digital editing applications
- Presentation methods and techniques
- Occupational health and safety (OHS) requirements in the development and facilitation of a design presentation

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Requirements for presentation include:

- budget
- documentation
- presentation materials
- stakeholders
- timing.

Presentation materials include:

- 2D images
- 3D images
- animated views
- models
- plans and elevations.

Non-verbal and verbal communication techniques include:

- body language
- emotion
- eye contact
- facial expression
- gestures
- intonation
- speaking style
- voice quality, pitch and volume.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- liaise with client and external stakeholders in the development of a design presentation
- prepare and facilitate a design presentation to industry standard
- communicate design ideas and solutions with sketches and images.

Context of and specific resources for assessment

This competency is to be assessed using industry best practice, safety requirements and environmental constraints relevant to a design drafting workplace.

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- access to appropriate computer hardware and software to enable the production of digital images
- access to electronic equipment required for the presentation of design concept
- workplace instructions relating to safe work practices and addressing hazards and emergencies.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of a design presentation in real or simulated work conditions, with questioning to confirm knowledge of design presentation techniques and materials
- sketches and digitally generated images for the presentation of a design concept
- portfolio of sketches and design images
- models representing design concept for a building project.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21602

Manage architectural project administration

Unit descriptor

This unit of competency specifies the outcomes required to manage architectural administration and the development of project documentation. It requires the knowledge of the legislation pertaining to project administration and the ability to comply with the organisational requirements for quality assurance. Work is expected to be undertaken in consultation with both internal personnel and external consultants and with limited supervision.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to manage the documentation and administration requirements for architectural projects.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Determine documentation processes

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Schedule of drawings required for approval stages is developed and items included in the contract documentation are determined.
- 1.2 The process for contract documentation development, including the order of precedence, is determined and the associated legal responsibilities are reviewed.
- 1.3 The main forms of contracts, their essential components and the process of contract enforcement are reviewed, including the means for dispute resolution.
- 1.4 Conditions under which a contract can be deemed valid/invalid are determined.
- 1.5 Organisational systems for recording, storage and retrieval of information are complied with, including processes for privacy and security.
- 1.6 Procedures for all types of file management, printing and electronic communication are followed in the development of project documentation.

ELEMENT	PERFORMANCE CRITERIA
2. Determine requirements for approval submission	<p>2.1 Planning scheme provisions are researched to determine state and local planning policies, zones and overlays and other provisions affecting land use and development.</p> <p>2.2 Types of planning permit and additional approvals are identified and details reviewed according to the requirements of the planning scheme.</p> <p>2.3 Required documentation is identified for planning approval submission according to local council specifications.</p> <p>2.4 Stages of approval process are determined according to particular project requirements and recorded for inclusion in project management schedule.</p>
3. Complete a standard contract	<p>3.1 Statutory authorities connected to the project are identified and applicable information is obtained.</p> <p>3.2 Quality assurance standards and procedures are identified which may impact on building projects and contracts.</p> <p>3.3 Types of standard architectural/building contracts required for specific stages in the documentation process are identified and the appropriate templates are accessed, including the relevant legislation requirements.</p> <p>3.4 Standard contract is completed ensuring all information is correct and complies with relevant legislation and organisational quality assurance procedures.</p> <p>3.5 Basic cost indicators are calculated for a specific building project and invoices are prepared in accordance with organisational procedures.</p>
4. Determine requirements for copyright compliance	<p>4.1 Legal principles for copyright are identified and the implications for designers are analysed.</p> <p>4.2 Organisational procedures for copyright and protection against plagiarism are identified and all documentation is developed in compliance.</p>
5. Determine requirements for <i>Competition and Consumer Act</i>	<p>5.1 The provisions of the Competition and Consumer Act that impact on design drafting practices are researched.</p> <p>5.2 The impacts of these provisions are analysed and the organisational procedure for their management is followed, to ensure compliance with legislation.</p>

ELEMENT	PERFORMANCE CRITERIA
6. Complete a standard specification	6.1 Standard forms of specifications are identified and the limitations are defined with reference to a specific building project.
	6.2 Specification is selected and customised as necessary, to suit the building project, in consultation with relevant parties.
	6.3 Standard/customised specification for the building project is completed to a professional standard.
7. Complete project management schedule	7.1 Parameters, milestones and benchmarks associated with a building project are identified.
	7.2 Project constraints are analysed and strategies are implemented for their management.
	7.3 Schedule is produced showing project milestones and various approval stages to ensure effective project management.

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel, where required
 - read and interpret complex documents including:
 - * relevant legislation, codes and standards
 - * National Construction Code
 - * planning permit application requirements and other relevant documentation
 - use language and concepts appropriate to industry conventions
- Written skills to:
 - prepare project documentation
 - correspond with external personnel
- Numeracy skills to calculate basic cost indicators for a building project
- Problem solving skills to:
 - determine appropriate contract to suit an architectural project
 - determine the limitations of standard specifications and justify their selection

- Planning and organising skills to:
 - prepare documentation in readiness for approval stages
 - manage project documentation processes
 - coordinate work with external personnel and agencies, as required
- Learning skills to:
 - identify impacts of quality assurance standards and procedures
 - identify legal principles of copyright
- Self management skills to meet timelines and project schedule
- Teamwork skills when working with internal and external personnel
- Technological skills to use computers and other office equipment
- Work safely in a design drafting working environment and on a site, according to legislation and workplace procedures and policies

Required knowledge

- Common terminology, definitions, methods, process and procedures used in relation to a design drafting office
- Occupational health and safety (OHS) requirements associated with a design drafting office
- Basic understanding of legislation and how it relates to architectural services and the building industry including:
 - Domestic Building Contracts Act
 - Contract Law
 - Competition and Consumer Act
 - copyright
 - building approvals
 - requirements of statutory authorities
 - Occupational Health and Safety Act
 - income tax and GST
 - Australian Standards
- Professional associations and regulatory bodies including:
 - Building Designers Association of Victoria
 - Master Builders Association of Australia
 - Australian Institute of Architects
 - Victorian Building Authority
 - Housing Industry Association
- Legal liabilities of parties involved in the execution of a building project
- Basic cost indicators for a building project

- Standard architectural/building contracts and their essential components
- Contract documentation process including order of precedence and relationships between the documents
- Tender process
- Legal liabilities of each party within the terms of the contract conditions under which a contract can be deemed valid/invalid
- Agencies and the means available in the process of contract enforcement
- Means for the resolution of disputes
- The principles of project management
- Use and implication of specification notes on drawings and the difference between a specification
- File transmittal, revision and management of project file
- Project management software, where applicable

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Zones include:

- business
- commercial
- industrial
- mixed use
- public land
- residential
- special purpose.

Overlays include:

- design and development
- environmental audit
- heritage
- significant landscape.

Types of planning permit
include:

- advertising signage
- business planning
- construction and/or extension of single or multi-dwellings on a lot
- industrial planning
- subdivision planning
- waiver of car parking.

Additional approvals include:

- building permit
- environmental licence
- health approval
- heritage approval
- liquor licence
- waste discharge licence
- works approval.

Documentation includes, but is not limited to:

- A3 plans
- application form
- boundary re-establishment survey
- concept landscape plan
- copy of title
- requirements of reference authorities
- design response plan
- elevations
- neighbourhood and site description plan
- neighbourhood character design response form
- roof plan
- sections
- shadow diagrams
- site layouts
- site photographs
- streetscape elevation
- written statement.

Relevant legislation may include:

- Acts and ordinance
- Regulations
- National Construction Code series:
 - Building Code of Australia (BCA), Volume 1 and 2
 - Plumbing Code of Australia, Volume 3
- Australian Standards
- practice and technical notes.

Quality assurance standards and procedures include:

- Australian Standards as they relate to quality assurance
- definitions of quality
- project quality plan
- quality assurance checklist
- quality assurance system such as:
 - quality management
 - quality control
- quality manual
- quality procedure and task instruction.

Standard architectural/building contracts are based on:

- availability of builder
- client need
- company policy
- construction time frame
- level of risk
- project size.

Documentation process includes:

- concept design
- construction
- contract documentation
- design development
- proposal
- schematic design
- working drawings.

Basic cost indicators include:

- cost indicator program
- costing guide
- cost table
- preliminary estimate.

Copyright includes:

- copyright duration
- copyright infringement
- copyright of employees
- copyright pertaining to the designer being employed as a sub-contractor or secondary consultant
- copyright relating to the use of documents
- definitions

- fees paid to building designers
- intellectual property
- licence to utilise documents on the construction site
- minimising copyright risk
- patent
- registered designs
- trademark.

Competition and Consumer

Act includes:

- consumer law concepts
- standards of business conduct
- specific protections
- offences
- enforcement and remedies.

Standard forms of specifications include:

- contracts
- estimates
- plans, elevations, sections and details
- specification types:
 - 'natspec'
 - customised
- trade packages.

Project constraints include:

- budget restrictions
- client requirements
- gaps in expertise
- need for expert consultation
- relevant authorities
- relevant project standards
- time constraints.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design drafting workplace conditions, materials, activities, responsibilities and procedures.

Holistic or project-based assessment with other related units is recommended.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with OHS legislation and its relationship to the design office and building sites
- determine requirements for contract legislation, standard architectural and building contracts, contract documentation processes and legal implications for all parties and liability
- comply with copyright and competition and consumer legislation
- apply quality assurance principles
- complete standard contracts and specifications associated with a specific architectural project
- complete a project management schedule for an architectural project.

Context of and specific resources for assessment

Assessment of required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- documentation including quality assurance standards and procedures and standard contract templates
- the BCA and relevant Australian Standards and legislation
- project management software.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may include:

- observation of tasks in real or simulated work conditions, with questioning to confirm the knowledge required to manage project administration
- individual/group assignments to research and analyse relevant legislation
- projects to develop project schedule for a building project
- practical exercises to develop documentation for a building project.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21603

Undertake complex architectural projects

Unit descriptor

This unit specifies the outcomes required to undertake complex architectural projects for residential (Building Code of Australia (BCA) Classes 1 and 10) and/or commercial (BCA Classes 2 to 9) buildings. It includes consultation with a client to prepare a project brief and the development and presentation of a design concept that meets the requirements of the brief and relevant legislative requirements and codes and standards. It requires the preparation of all necessary documentation and the development of a critical path management diagram. It requires thorough knowledge of the BCA, relevant Australian Standards and local authority regulatory requirements.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit of competency supports the attainment of the skills and knowledge required for building designers to complete complex architectural projects, which comply with the BCA and other relevant legislation. Work is expected to be undertaken in consultation with other stakeholders and under limited supervision.

It requires the problem solving skills to complete a design/documentation project.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Determine requirements for the project

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Client is consulted to confirm details of building design to develop the project brief.
- 1.2 Preliminary analysis of planning and local authority regulations is undertaken to ascertain requirements.
- 1.3 Feasibility study is performed to determine and document the viability of the project.

ELEMENT	PERFORMANCE CRITERIA
2. Develop design concept	<p>1.4 Site analysis and survey are undertaken and a detailed site analysis is prepared for planning permit application.</p> <p>1.5 Brief is drafted and evaluated against client requirements and submitted to client for confirmation, and any amendments are negotiated.</p> <p>2.1 Design response is developed in accordance with client brief and presentation drawings/models are produced for client presentation.</p> <p>2.2 Design concept is presented to client using a variety of presentation materials to assist in understanding key concepts.</p> <p>2.3 Approval for the final design is obtained from client, and the relevant documentation is finalised for client contract.</p>
3. Finalise design	<p>3.1 The approved design is finalised and reviewed against the budget and the appropriate documentation is developed to adequately communicate the design.</p> <p>3.2 A preliminary selection of materials and finishes is selected in accordance with project brief.</p> <p>3.3 Planning application documents are prepared and the client is assisted with lodgement of the Town Planning application and the processes to complete the application and advertising process.</p> <p>3.4 Consultation is undertaken with local authorities, neighbours and other interested parties, if required.</p> <p>3.5 Design work to be undertaken by external personnel is coordinated, as required.</p> <p>3.6 Design concepts for internal spaces, finishes and services are developed and relevant documentation is developed or obtained.</p>
4. Prepare and coordinate documentation development	<p>4.1 Documents are prepared in accordance with workplace procedures to enable the project to be tendered.</p> <p>4.2 Details of specifications are integrated into documentation, as required.</p> <p>4.3 Joinery and internal spaces and electrical documents are prepared or facilitated for inclusion into contract set.</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>4.4 Drainage and landscape documents are prepared or facilitated for inclusion into contract set.</p> <p>4.5 Work from specialist consultants is coordinated and integrated into architectural documentation.</p> <p>4.6 Opinion of probable cost is prepared or facilitated and completed documents are checked and submitted for building approval.</p>
5. Prepare a critical path management diagram	<p>5.1 Suitable methods for building procurement are determined according to project brief and organisational procedures.</p> <p>5.2 Requirements for project supervision are determined to ensure design intent and specifications comply with contract documents and project schedule.</p> <p>5.3 Stages for the implementation of progress claims, claims for extensions of time and issuing of progress certificates are identified according to the project schedule.</p> <p>5.4 Stages for the preparation of defect notices and certificates for practical completion and final completion are identified according to the project schedule.</p> <p>5.5 A critical path management diagram is finalised and confirmed with relevant stakeholders for all stages in the design and construction process.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements and share information with internal and external personnel where required
 - read and interpret
 - * relevant legislation
 - * Australian Standards
 - * relevant sections of the National Construction Code
 - use language, terminology and concepts appropriate to industry conventions
 - communicate design concept to client and other stakeholders

- Written skills to:
 - sketch preliminary design solutions and presentation drawings using a variety of media and different techniques, as required
 - prepare documentation to an accepted industry standard
- Problem solving skills to:
 - ascertain local regulatory requirements
 - identify key stages of design and construction process
 - coordinate work from consultants into architectural documentation
 - compare tender processes
- Initiative and enterprise skills to:
 - develop design solutions that meet client requirements
 - negotiate amendments to the client brief
- Planning and organisational skills to:
 - coordinate the team members in the development of documentation
 - liaise with client and stakeholders throughout the project
 - complete work within accepted time frames
- Technological skills to:
 - produce presentation materials and contract documentation using a variety of computer software
 - operate presentation equipment
- Self management skills to coordinate own responsibilities and complete tasks according to project schedule
- Teamwork skills to:
 - coordinate team members and their work output
 - coordinate work from other consultants.
- Working safely in a design drafting working environment and on a building site, according to legislation and workplace procedures and policies

Required knowledge

- Relevant legislation including:
 - Building Act
 - Building Regulations
 - Planning and Environment Act
 - Occupational Health and Safety Act
 - Domestic Buildings Contracts Act
 - Building and Construction Security of Payment Act
 - Environment Protection Act and Regulations
 - Disability Services Act
 - Health Act and Regulations
 - Heritage Regulations

- Relevant sections of the BCA
- State and local regulatory requirements
- Legal responsibilities of building designers
- Sustainable building practices
- Essential safety measures for buildings
- Construction materials and finishes
- Construction and structural principles
- Design theories and principles
- Workplace procedures and documentation requirements for building project administration
- Digital software used in the production of presentation materials and documentation

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Site analysis includes:

- local climate conditions
- physical characteristics
- relationship of site to adjoining buildings and surrounding environment.

Client requirements include:

- allocation of space
- any limitations that impact on the design
- budget estimate including construction, design and statutory costs
- construction methodology
- fittings and furniture
- intended site
- materials and finishes
- project timelines
- purpose and function of the proposed building
- specific fixtures.

Presentation materials include:

- 2D images
- 3D images
- animated views
- models
- plans and elevations.

- External personnel** include:
- electricians
 - engineers
 - heating, ventilation and air-conditioning engineers
 - interior designers
 - landscapers
 - plumbers.
- Documents** include:
- project brief.
- Specifications** include:
- appliances
 - interior and exterior finishes
 - type, strength and size/quantity of materials
 - workmanship.
- Procurement** includes:
- forms of tendering
 - lump sum
 - design and construct
 - cost plus.
- Project supervision** includes:
- administering variations and obtaining client approvals
 - meeting with client, contractors and other stakeholders
 - periodic site visits
 - providing instructions to clarify contract documents
 - providing supplementary details and information
 - reviewing shop drawings and other builder's submissions.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques replicate building design workplace conditions, materials, activities, responsibilities and procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with legislative requirements applicable to the design of buildings
- develop a design and documentation for a residential and/or commercial building in compliance with the relevant legislation
- develop a critical path management diagram according to the project schedule
- comply with the organisational processes for project administration.

Context of and specific resources for assessment

Assessment of essential required knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian Standards' requirements.

Resource implications for assessment include:

- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and documentation, including land title, site plan, working drawings and specifications and relevant legislation
- appropriate support materials
- research resources, including industry related information.

Method of assessment

Evidence should be gained through a range of methods to ensure valid and reliable assessment and consistency in performance.

Evidence should be gathered as part of the learning process, where appropriate, and could be from assessment of the unit alone, through an integrated assessment activity or a combination of both. Evidence should:

- reinforce the integration of employability skills with workplace tasks and job roles
- be transferable to other circumstances and environments
- relate to a number of performances assessed on different occasions which reflects the scope of the job role.

Assessment methods may:

- include observation of tasks in real or simulated work conditions, with questioning to confirm knowledge of legislative requirements for the design of a residential or commercial building
- reinforce the integration of employability skills with workplace tasks and job roles
- include evidence relating to a number of performances assessed on different occasions which reflects the scope of the job role.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

VU21604

Conduct a Bushfire Attack Level (BAL) assessment

Unit descriptor

This unit of competency specifies the outcomes required to conduct Bushfire Attack Level (BAL) assessments. This includes relevant theoretical knowledge of fire, understanding of the regulatory framework, assessing a location and education of and consultation with clients about the benefits of achieving the required fire resistance.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Application of the unit

This unit is aimed at determining the BAL of a site by following steps to assess the bushfire risk of the site and using this information to select the BAL from appropriate tables of information using Method 1 (the simplified bushfire risk method from AS 3959).

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Analyse cause and effect of bushfires

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Requirements relevant to undertaking a BAL assessment are identified and complied with including ***occupational health and safety (OHS)***, legislative, organisational and certification requirements.
- 1.2 ***Bushfire behaviour*** is analysed to determine potential impact on ***buildings*** and the environment in bushfire-prone areas.
- 1.3 The impact of topography and weather conditions are analysed to determine the risk of bushfires occurring and potential impact on human life and protection of buildings.
- 1.4 ***Sources of combustion*** are identified to determine how they influence bushfires.

ELEMENT	PERFORMANCE CRITERIA
	<p>1.5 Stakeholders are consulted and information sources accessed to identify benefits of undertaking a BAL assessment.</p> <p>1.6 Responsibilities of local, state and national authorities are reviewed to determine their role in minimising the impact of bushfires.</p>
<p>2. Correlate information about site conditions</p>	<p>2.1 Objectives of legislation and standards covering buildings in bushfire-prone areas are reviewed to identify measures to improve performance of buildings when subjected to bushfire attack.</p> <p>2.2 The location of the site is identified to determine the Fire Danger Index (FDI) for the site.</p> <p>2.3 Site vegetation classification, vegetation type and exclusions are identified to determine potential contribution to supporting fire progress.</p> <p>2.4 The distance of vegetation from buildings is measured to determine the level of bushfire risk to the site.</p> <p>2.5 The slope of the land under the classified vegetation is measured to determine the direct influence on the severity of a bushfire.</p>
<p>3. Determine the BAL for site</p>	<p>3.1 The FDI, vegetation classification and type, distance of vegetation and slope are used to select the BAL applicable to the site.</p> <p>3.2 The BAL assessment relevant to the site is checked to confirm accuracy.</p> <p>3.3 Limitations of the outcome of the BAL assessment are communicated to client.</p> <p>3.4 Benefits of achieving required fire resistance are discussed with client.</p> <p>3.5 Details of the BAL assessment are documented and reported according to organisational requirements.</p>

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Communication skills to:
 - comply with legislation, regulations, standards, codes of practice and established safe practices and procedures for undertaking a BAL assessment
 - identify problems and demonstrate appropriate response procedures
 - use appropriate communication and interpersonal techniques with colleagues and others
 - accurately record and report workplace information, and maintain documentation

Required knowledge

- Applicable Commonwealth, state or territory licensing, legislative, regulatory or certification requirements and codes of practice relevant to the full range of processes for evaluating fire potential and prevention
- Organisational and site standards, requirements, policies and procedures for undertaking a BAL assessment
- Principles of cultural diversity and access and equity
- Environmental protection requirements
- Established communication channels and protocols
- Problem identification and resolution
- Environmental risks and hazard prevention
- Procedures for recording, reporting and maintaining workplace records and information
- Appropriate mathematical procedures for estimation and measurement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Occupational health and safety (OHS) requirements may include, but are not limited to:

- the use of personal protective equipment and clothing
- safety equipment
- first aid equipment
- hazard and risk control
- appropriate Safe Work Method Statement (SWMS)
- appropriate fitness for the task

- Bushfire behaviour** includes:
- how bushfires move across different landscapes and vegetation
 - heat transfer – convection, radiation, conduction
 - ember attack
 - variable weather conditions
 - nature and outcome of fire.
- Buildings** includes:
- new buildings
 - alterations and additions to existing buildings.
- Sources of combustion** include, but are not limited to:
- those specified in the relevant Australian Standards referred to in the Building Act and its associated codes eg National Construction Code as applicable, including state and territory variations.
- Stakeholders** include, but are not limited to:
- residents in identified high risk areas
 - architects
 - building designers
 - building surveyors
 - builders and land developers
 - local fire authorities
 - community groups
 - regulatory authorities.
- Information sources** include, but are not limited to:
- Internet
 - building industry associations
 - fire services
 - local council
 - national and state governments
 - libraries
 - Victorian Building Authority.
- Legislation and standards** include, but are not limited to:
- Building Act/planning scheme and its associated codes eg National Construction Code as applicable, including state and territory variations, Victorian building regulations.
 - AS 1530 Methods for fire tests on building materials, components and structure
 - AS 1684 Residential timber – framed construction
 - AS 1720 Timber structures – design methods

- AS 3837 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter
- AS 3959 Construction of buildings in bushfire-prone areas.

Fire Danger Index (FDI):

- measures the probability of a bushfire starting and includes the rate of spread, intensity and difficulty of suppression according to various combinations of temperature, relative humidity, wind speed and estimate of fuel state.

Vegetation classification as stated in the Australian Standards includes:

- forest
- woodland
- shrubland
- scrub
- mallee/mulga
- rainforest
- grassland.

Vegetation type as stated in the Australian Standards include:

- tall woodland
- open forest
- low open forest
- pine plantation
- woodland
- open woodland
- low woodland
- low open woodland
- open shrubland
- closed heath
- open heath
- low shrubland
- closed scrub
- open scrub
- tall shrubland
- tall closed forest
- closed forest
- low closed forest
- low open shrubland
- hummock grassland
- closed tussock grassland

- tussock grassland
- open tussock
- sparse open tussock
- dense sown pasture
- sown pasture
- open herbfield
- sparse open herbfield.

Exclusions include:

- low threat vegetation and non-vegetated areas
- refer to AS 3959.

Distance of vegetation:

- measured horizontally from the edge of the building (including parts of the building without external walls eg decking, carport) to the edge of the vegetation closest to the building.

Slope refers to:

- relates to the upslope or downslope of land under the classified vegetation in relation to the building, not the slope between the classified vegetation and the building
- refers to the limitations of Method 1 and Method 2 in AS 3959.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with applicable Commonwealth, state or territory legislative and regulatory requirements and codes of practice, including OHS, environmental and organisational policies and procedures relevant to undertaking a BAL assessment
- communicate effectively and work safely with others
- explain the purpose and processes associated with undertaking a BAL assessment
- determine the level of bushfire risk by undertaking a minimum of **two** separate BAL assessments. Competency must be assessed on **actual sites** and include different vegetation classifications and site slopes.

Context of and specific resources for assessment

Assessment is to comply with relevant regulatory or Australian Standards requirements.

Assessment of essential underpinning knowledge, other than confirmatory questions, will usually be conducted in an off-site context.

Competency **must** be assessed on **actual sites** although additional BAL assessments may be undertaken on simulated sites.

The following resources should be made available:

- a range of appropriate sites
- specifications and work instructions
- clipboard, pencil and scale rule
- appropriate measuring instruments
- magnetic compass and/or Global Positioning System (GPS) (for remote areas)
- digital camera
- Internet access for aerial views eg Google maps, Nearmap
- AS 3959 Construction of buildings in bushfire-prone areas
- Australian Standards Handbook HB 330 Living in bushfire-prone areas
- industry practice notes
- ongoing professional development requirements.

Method of assessment

Assessment must satisfy the Assessment Guidelines of the course and must be undertaken on appropriate sites.

Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and must also reinforce the integration of employability skills.

The assessment environment should not disadvantage the candidate.

Assessment practices should take into account any relevant language or cultural issues related to Aboriginality, gender or language backgrounds other than English.

Where the participant has a disability, reasonable adjustment may be applied during assessment.

Language and literacy demands of the assessment task should not be higher than those of the work role.

Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge for **two** separate BAL assessments.

Assessment methods must confirm the ability to correctly interpret and apply the essential underpinning knowledge.

Assessment methods may include:

- direct observation in real-work conditions with questioning to confirm knowledge of relevant theoretical knowledge of fire and regulatory requirements
- research and report on case studies of a range of BAL assessments for underpinning knowledge
- review of written assignment on benefits of educating and consulting with clients
- evaluation of reports on causes and effects of bushfires
- review of documentation of BAL assessments.

VU21605

Apply Bushfire Attack Level (BAL) assessment

Unit descriptor

This unit of competency specifies the outcomes required to access, interpret and apply Bushfire Attack Level (BAL) assessments to the design and construction of buildings.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

However this unit forms part of a minimum qualification requirement for registration with the Building Practitioners Board as a building designer (architectural).

Employability skills

This unit contains employability skills.

Prerequisite unit(s)

The unit *VU21604 Conduct a Bushfire Attack Level (BAL) assessment* is a prerequisite unit for this unit.

Application of the unit

This unit is aimed at applying the outcome of a BAL assessment to building design, material selection and construction methods so that buildings better withstand the effects of a bushfire and thus provide a greater level of protection for occupants and buildings.

ELEMENT

Elements describe the essential outcomes of a unit of competency.

1. Access legislative requirements

PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

- 1.1 Requirements relevant to applying a BAL assessment in a bushfire-prone area and in a Bushfire Management Overlay (BMO) to the design and construction process are identified and complied with including **occupational health and safety (OHS)**, legislative, organisational and certification requirements.
- 1.2 Objectives of **relevant legislation** covering buildings in bushfire-prone areas are reviewed to identify measures to improve performance of **buildings** when subjected to bushfire attack.
- 1.3 Responsibilities of local, state and national authorities are reviewed to identify their role in minimising the impact of bushfires.

ELEMENT	PERFORMANCE CRITERIA
2. Interpret relevant bushfire information	2.1 Standard definitions associated with bushfires are explained in the context of building design.
	2.2 Purpose of applying a BAL assessment is determined to inform design decisions.
	2.3 Effects of bushfires on humans and buildings are explained as they relate to each BAL.
	2.4 Risks associated with each BAL are analysed to determine impact on building design, materials and construction methods.
3. Integrate bushfire protection requirements into building design and construction	3.1 Building designs and individual design features are analysed to determine their resistance to bushfire and reduce the level of risk to occupants.
	3.2 Features and benefits of materials are analysed to determine their suitability for the BAL assessment.
	3.3 Design and construction requirements for buildings in bushfire-prone areas reflect the outcomes of the BAL assessment and the Australian Standards.

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

- Comply with legislation, Regulations, standards, codes of practice and established safe practices and procedures for applying a BAL assessment to the design and construction process
- Identify problems and demonstrate appropriate response procedures
- Use appropriate communication and interpersonal techniques with colleagues and others
- Accurately record and report workplace information, and maintain documentation

Required knowledge

- Applicable Commonwealth, state or territory licensing, legislative, regulatory or certification requirements and codes of practice relevant to the full range of processes for evaluating fire potential and prevention
- Organisational and site standards, requirements, policies and procedures for applying a BAL assessment to the design and construction process
- Principles of cultural diversity and access and equity
- Environmental protection requirements

Required knowledge and understanding includes:

- established communication channels and protocols
- problem identification and resolution
- environmental risks and hazard prevention
- procedures for recording, reporting and maintaining workplace records and information
- appropriate mathematical procedures for estimation and measurement.

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Occupational health and safety (OHS) requirements may include, but are not limited to:

- the use of personal protective equipment and clothing
- safety equipment
- first aid equipment
- hazard and risk control
- appropriate fitness for the task.

Relevant legislation includes, but is not limited to:

- Building Act and its associated codes eg National Construction Code as applicable, including state and territory variations
- Building Regulations
- Planning scheme
- AS 3959 Construction of buildings in bushfire-prone areas.

Buildings includes:

- new buildings
- alterations and additions to existing buildings.

Definitions associated with bushfires include, but are not limited to:

- BAL
- Fire Danger Index (FDI)
- Fire Resistance Level (FRL)
- Flame Zone (FZ)
- distance of vegetation
- slope
- vegetation classification and type.

Effects of bushfires include, but are not limited to:

- ember attack
- radiant heat
- direct flame contact.

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with applicable Commonwealth, state or territory and local legislative and regulatory requirements and codes of practice, including OHS, environmental and organisational policies and procedures relevant to applying a BAL assessment to the design and construction process
- communicate effectively and work safely with others
- explain the importance of incorporating the outcomes from a BAL assessment into the design and construction process
- incorporate BAL requirements into the design and construction of at least one building.

Context of and specific resources for assessment

Assessment is to comply with relevant regulatory or Australian Standards requirements.

Assessment of essential underpinning knowledge, other than confirmatory questions, will usually be conducted in an off-site context.

Competency may be assessed with reference to a combination of actual and simulated sites.

Designs must incorporate sites with different vegetation classifications and site slopes.

The following resources should be made available:

- specifications and work instructions
- AS 3959 Construction of buildings in bushfire-prone areas
- Internet access for aerial views eg Google maps, Nearmap
- appropriate measuring instruments
- a BAL assessment
- materials and equipment relevant to applying outcomes from BAL assessments to the design and construction process.

Method of assessment

- Assessment must satisfy the Assessment Guidelines of the course and must be undertaken using appropriate sites.
- Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of employability skills.
- The assessment environment should not disadvantage the candidate.
- Assessment methods must confirm consistency and accuracy of performance for **at least one design**, together with application of underpinning knowledge.
- Assessment methods must confirm the ability to correctly interpret and apply the essential underpinning knowledge.

Assessment methods may include:

- direct observation in real-work conditions with questioning to confirm knowledge of relevant theoretical knowledge of bushfire and regulatory requirements
- research and report on case studies of a range of designs incorporating BAL assessments
- review of written assignment on bushfire protection requirements in building designs
- evaluation of reports detailing causes and effects of bushfires
- review of Australian Standards referenced for incorporation into designs for bushfire resistant construction.