

Report and Options Paper

An analysis of the capacity of current plumbing qualifications to prepare practitioners to develop performance solutions

March 2019

Disclaimer:

This report is intended to be used by the VBA to understand the capacity of current training packages to prepare plumbing practitioners to develop performance solutions. This report should only be used for its intended purpose. The results presented may be inappropriate for other purposes. Any copies of this report provided to third parties must be complete copies of the entire report.

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List of Reviewed Qualifications

CPC20712	Certificate II in Drainage	31
CPC20812	Certificate II in Metal Roofing and Cladding	32
CPC32413	Certificate III in Plumbing	34
CPC32513	Certificate III in Plumbing (Mechanical Services)	36
CPC32713	Certificate III in Gas Fitting	38
CPC32612	Certificate III in Roof Plumbing	40
CPC32813	Certificate III in Fire Protection	42
CPC40912	Certificate IV in Plumbing and Services	44
CPC50412	Diploma of Plumbing and Services	46
CPC50612	Diploma of Hydraulic Services and Design	48

1. Introduction and background to the report

Learning Lane is pleased to submit this report to the Victorian Building Authority (VBA), following a detailed analysis into the capacity of the current nationally accredited plumbing qualifications to equip plumbing practitioners to identify the need for, develop and document Performance Solutions.

This report was commissioned by the VBA following the findings of a June 2018 report by Regulatory Impact Solutions (RIS) which identified a number of issues likely to contribute to non-compliant roofing (stormwater) work, including limited awareness and use of Performance Solutions among plumbing practitioners.

The RIS report recommended that practitioner knowledge and competency be improved through compulsory continuing development (CPD) and that the VBA review the competency units and training for plumbing practitioners. It recommended that competency units include training on the development of Performance Solutions to meet the Plumbing Code of Australia (PCA) performance requirements. Not wishing to limit its review of training content to that delivered in the class of roofing (stormwater) work, the VBA seeks through this report to understand the capacity of the current Training Package(s) to deliver on Performance Solutions across all classes of regulated plumbing work in Victoria. To be clear, this report does not consider what Registered Training Organisations (RTOs) deliver in relation to Performance Solutions, nor the quality of any such training, but rather, it seeks to identify if the current plumbing qualifications require Performance Solutions to be taught as a means towards compliance with the PCA.

The findings and options outlined in the present analysis, provide clear, well researched advice about the capacity of the current training framework to address the skills and knowledge required to undertake Performance Solutions in different classes of plumbing work. It provides an analysis of qualifications and units of competency that sit within:

- CPC Construction, Plumbing and Services Training Package
- CPC08 Construction, Plumbing and Services Training Package
- CPP Property Services Training Package
- CPP07 Property Services Training Package

The report reveals that the current plumbing qualifications are inadequate in addressing Performance Solutions as a means of complying with the PCA. It posits that at best, training organisations might broadly cover compliance with Australian standards and codes, but in the absence of explicit reference to the different approaches towards achieving compliance (which can include either DtS or

Performance Solutions or a combination of both)¹ a student could graduate with little to no knowledge of:

- how or when to develop Performance Solutions in plumbing work, and
- how to identify if a Performance Solution had been incorporated into work undertaken by previous plumbers.

The report presents a range of options for redressing identified gaps in units of competency however it also recognises that national consultation processes required to effect change to accredited qualifications and units of competency can take time. To that extent, the report looks beyond formal education and training and considers measures available to the VBA which sit outside the national training framework.

2. Project Methodology

The Project Methodology was designed to answer the following questions:

1. Do the current nationally accredited plumbing qualifications address fundamental knowledge and skills required to undertake Performance Solutions and how to develop them in plumbing work?

If yes, then:	If no, then:
• Is the scope of qualifications and units of competency in which Performance Solutions is covered, complete? • Do any qualifications or units require enhancement to improve the coverage of Performance Solutions?	• In which qualifications and units of competency should Performance Solutions be addressed? • Are there existing units in non-plumbing qualifications which cover Performance Solutions that could be relevant to plumbers? • Is there a case for a new unit(s) to be developed to address Performance Solutions in plumbing work? If so, what should such a unit(s) include?

2. Using the national Vocational Education and Training (VET) framework, what mechanisms are available to the VBA to redress any deficiency in knowledge and skills relating to the use of Performance Solutions in plumbing work?

3. What non-training related mechanisms are available to the VBA to identify gaps in knowledge and skills relating to the use of Performance Solutions in plumbing work?

The methodology consisted of a desktop review of all plumbing qualifications, 89 units of competency required for registration and licensing as a plumbing practitioner in Victoria, as well as other plumbing and non-plumbing specific units of competency.

¹ PCA A0.3 Meeting the Performance Requirements.

The review was undertaken as follows:

- technical review of qualifications
- technical review of units used for registration and licensing of plumbing practitioners in Victoria, and
- technical review of CPC, CPC08, and CPP Training Packages

Technical review of qualifications

A technical review of ten qualifications was undertaken to identify if and to what extent the skills and knowledge associated with developing Performance Solutions is addressed. The review was limited to those qualifications which contain content that is relevant for the registration or licensing of plumbing practitioners in Victoria. The analysis considered the unit titles and vocational outcomes of each of the following qualifications:

- CPC20712 Certificate II in Drainage
- CPC20812 Certificate II in Metal Roofing and Cladding
- CPC32413 Certificate III in Plumbing
- CPC32513 Certificate III in Plumbing (Mechanical Services)
- CPC32713 Certificate III in Gas Fitting
- CPC32612 Certificate III in Roof Plumbing
- CPC32813 Certificate III in Fire Protection
- CPC40912 Certificate IV in Plumbing and Services
- CPC50412 Diploma of Plumbing and Services, and
- CPC50612 Diploma of Hydraulic Services Design.

The technical review of qualifications is contained in **Appendix A**.

Technical review of units used for registration and licensing of plumbing practitioners in Victoria

A technical review of the 75 gazetted units of competency required for registration as a plumbing practitioner in Victoria and 14 units of competency required for licensing of plumbing practitioners in Victoria, in each of the main and specialised classes of plumbing work was undertaken. This included analysing skill and / or knowledge content relevant to:

- identifying that a plumbing task will not or cannot comply with the Deemed to Satisfy (DtS) requirements of the PCA

- identifying the need for a Performance Solution
- developing a Performance Solution, and
- completing compliance documentation required to support a Performance Solution.

The review considered all mandatory aspects of each unit, including the following sections:

- elements and performance criteria
- required skills and knowledge
- evidence guide, notably the critical aspects for assessment and evidence required to demonstrate competency in the unit, and
- range statement, in which different work environments and situations are provided for.

The technical review of units used for registration and licensing purposes is contained in **Appendix B**.

Technical review of CPC, CPC08 and CPP Training Packages

A technical review of the units within the CPC, CPC08, CPP and CPP07 Training Packages was undertaken using the same criteria as shown above for units required for registration and licensing. The purpose of this was to identify the capacity of units which are not gazetted for registration or licensing of plumbing practitioners, to deliver and assess competency in developing Performance Solutions as many units could still be undertaken as core or elective units within a plumbing qualification.

The technical review of units is contained in **Appendix C**.

2.1 Source Documents

The following authoritative documents informed the analysis:

National Construction Code 2016: Volume 3 - Plumbing Code of Australia

The Plumbing Code of Australia (PCA) is a performance-based code. The performance requirements of plumbing work can be achieved through DtS Solutions and/or through the development of Performance Solutions.

A Performance Solution is a solution that complies with Performance Requirements other than by complying with Deemed-to-Satisfy Provisions.

A Performance Solution must either –

- comply with the Performance Requirements; or
- at least equate to the DtS Provisions

This is expressed in **Part A0.4 of the PCA** as follows:

- (a) A Performance Solution must—
- (i) comply with the Performance Requirements; or
 - (ii) be at least equivalent to the Deemed-to-Satisfy Provisions, and be assessed according to one or more of the Assessment Methods.
- (b) A Performance Solution will only comply with the NCC when the Assessment Methods used satisfactorily demonstrate compliance with the Performance Requirements.

It is important to note that prior to 2016, a Performance Solution was referred to as an Alternative Solution. When identifying the presence of knowledge and skill covering Performance Solutions in the plumbing qualifications and units of competency, the potential use of the term Alternative Solution was considered.

VBA Industry Guidance Notes

The VBA has published a range of guidance information on developing Performance Solutions, which was consulted as part of this research project. Step 4 of the *VBA Industry Guide: Performance Solutions for Plumbing Installations* specifies that:

Full copies of the Performance Solution including the design brief, plans, results and final report should also be provided to the property owner. This information will also be relevant and important when the installation subjected to the Performance Solution needs to be worked on in future, such as repairs, servicing, alteration, and/or maintenance.²

This highlights the importance of documenting Performance Solutions as a means of informing future practitioners of the nature of the work that was undertaken. Future practitioners could include those who undertake appliance testing, maintain or repair plumbing systems. This immediately brings to mind those undertaking testing and maintenance of fire protection services such as sprinkler systems. Indeed where a practitioner carries out work as a Performance Solution, this must be identified as such

² VBA Industry Guide: Performance Solutions for Plumbing Installations, July 2016
<https://www.vba.vic.gov.au/_data/assets/pdf_file/0007/45844/Industry-Guide-Performance-Solutions.pdf>

on the Compliance Certificate.³ As such, it is likely that even if a practitioner does not need to know *how* to develop a Performance Solution, they may need to understand *what* a Performance Solution is and be able to identify that one has been incorporated into the design or installation of a system, prior to their undertaking testing, maintenance or repair work.

The CPC and CPC08 Construction, Plumbing and Services Training Packages

The Construction, Plumbing and Services Training Package is a nationally accredited Training Package. It contains qualifications which develop the skills and knowledge required by practitioners in major trade occupations including carpentry, concreting, gas fitting, scaffolding, shopfitting, demolition, fire protection and construction management.

At the time of writing, the qualifications for this Training Package are contained in two documents: CPC and CPC08. CPC contains qualifications and units of competency that have been revised to meet the current 2012 Standards for Training Packages. The 2012 Standards for Training Packages were introduced and endorsed in November 2012, by the then Standing Council on Tertiary Education, Skills and Employment (SCOTESE).⁴ The new *Standards for Training Packages* resulted in significant template changes to units of competency and qualifications. All Training Packages were to be revised to meet the new Standards for Training Packages by no later than 31 December 2015. For various reasons, including the need to give urgent priority to some qualifications over others plus the time and resources required to consult with industry to ensure the transition of units and qualifications did not result in a loss of critical content, there are still some qualifications and units of competency in the training system which have not yet been revised to meet the 2012 Standards. Such is the case with the qualifications and units of competency governing the work of plumbing practitioners. CPC08 for example, contains qualifications and units of competency which have not yet been revised to meet the 2012 Standards for Training Packages. As units and qualifications in CPC08 are revised to meet the 2012 Standards for Training Packages, they will be re-coded and added to CPC.⁵

³ *ibid.* page 4.

⁴ In 2013, the Council of Australian Governments (COAG) established the COAG Industry and Skills Council to replace SCOTESE.

⁵ At the time of writing, Artibus Innovation is in the process of revising a number of qualifications and units within CPC and CPP that will include revising and updating them to meet the 2012 Standards including 132 units of competency and 7 qualifications:

CPC2XX19 Certificate II in Drainage

CPC3xx19 Certificate III in Fire Protection

CPC3XX19 Certificate III in Gas Fitting

CPC3XX19 Certificate III in Plumbing

CPC3XX19 Certificate III in Roof Plumbing

CPC4XX19 Certificate IV in Plumbing and Services

CPC5XX19 Diploma of Hydraulic Services Design

For the purpose of this report and for completeness, the review considered units in both CPC and CPC08.

The CPP and CPP07 Property Services Training Packages

This Training Package contains qualifications in fire protection, real estate, security, surveying and spatial information services, building design, cleaning, waste management, home sustainability assessment and other specialisations. At the time of writing, the qualifications for this Training Package are contained in two documents: CPP and CPP07. For the purpose of this report and for completeness, the review considered units in both CPP and CPP07 focussing on units that are included in plumbing qualifications.

Victoria Government Gazette

The Government Gazette dated 16 November 2018 was consulted to confirm the current units of competency approved by the VBA for registration and licensing in the main and specialised classes of plumbing work.

3. What is a Performance Solution?

The NCC is a performance-based code. The performance requirements of the code can only be achieved through either complying with DtS provisions, through developing a Performance Solution or a combination of both DtS and Performance Solution.

A Performance Solution is therefore an alternative method of complying with the Performance Requirements other than by a DtS solution.⁶ This is expressed in **A0.4 of NCC Volume 3** which states:

- (a) A Performance Solution must—
 - (i) comply with the Performance Requirements; or
 - (ii) be at least equivalent to the Deemed-to-Satisfy Provisions, and be assessed according to one or more of the Assessment Methods.
- (b) A Performance Solution will only comply with the NCC when the Assessment Methods used satisfactorily demonstrate compliance with the Performance Requirements.

⁶ NCC Volume 3, General Provisions.

As can be seen in the above text, Assessment Methods are used to demonstrate compliance. An understanding of the different Assessment Methods is therefore a requirement of practitioners carrying out Performance Solutions. **A0.6 of NCC Volume 3** provides for the following Assessment Methods:

- (a) Evidence to support that the use of a material or *product*, form of construction or design meets a *Performance Requirement* or *Deemed-to-Satisfy Provision* as described in A2.2.
- (b) Verification Methods such as—
 - (i) the *Verification Methods* in the NCC; or
 - (ii) such other *Verification Methods* as the authority having jurisdiction accepts for determining compliance with the *Performance Requirements*.
- (c) Expert Judgment
- (d) Comparison with the Deemed-to-Satisfy Provisions.

Whilst it is not the intention of this report to detail what each of the above Assessment Methods requires, it is sufficient to note that the development of a Performance Solution is not a simple, straightforward task. It is a task which requires:

- a robust understanding of relevant provisions of the NCC and in the case of plumbing work, the PCA
- time to consult with others, develop and document the solution
- significant documentation as evidence of the solution meeting the performance requirements
- retention of supporting documentation including reports and correspondence as evidence of the Performance Solution, for at least 10 years, and
- details to be provided on the compliance certificate for the work.

3.1 Documentation of Performance Solutions

A Performance Solution must be fully documented. NCC Volume 3 provides that examples of the kind of documentation which should be prepared and retained include:

- (b) In cases where a *Performance Solution* has been proposed —
 - (i) details of the relevant *Performance Requirements*; and
 - (ii) the *Assessment Method* or methods used to establish compliance with the relevant *Performance Requirements*; and
 - (iii) details of any *Expert Judgment* relied upon including the extent to which the judgement was relied upon and the qualifications and experience of the expert; and
 - (iv) details of any tests or calculations used to determine compliance with the relevant *Performance Requirements*; and
 - (v) details of any Standards or other information which were relied upon.

3.2 Who is responsible for developing Performance Solutions?

NCC Volume 3 states that the scope of each provision encompasses the design, construction, installation, replacement, repair, alteration and maintenance of a range of plumbing work. This is described in the following excerpt from **A0.2 Scope**, in NCC Volume 3 which specifies that sections B to F of NCC Volume 3:

- (a) ... contain the requirements for the design, construction, installation, replacement, repair, alteration and maintenance of any part of a —
 - (i) water service;
 - (ii) sanitary plumbing and drainage system;
 - (iii) stormwater drainage system;
 - (iv) heating, ventilation and air-conditioning system; or
 - (v) on-site wastewater management system.

It would appear therefore that knowledge of Performance Solutions is required at some level, by any practitioner who undertakes 'design, construction, installation, replacement, repair, alteration and maintenance' of plumbing systems.

It is unclear however if practitioners across all stages of the plumbing process, share a common understanding of their individual role in developing and documenting Performance Solutions. The stand-alone installer of roofing (stormwater) systems may be given a set of plans and specifications which knowledge and experience suggest are not compliant with the PCA – but where does responsibility for compliance begin and end? Is the installer required to:

- carry out the installation as per the approved plans? or,
- refer the plans back to the designer or other relevant stakeholder, highlighting that the work as specified will not comply with DtS provisions of the PCA and seek proof of an approved Performance Solution?

The VBA in consultation with industry, may wish to consider this a possible question for further research and clarification.

As will be seen in the analysis of components of training delivered to plumbing practitioners across all fields of expertise, the role of the installer in such a situation is not explicitly covered in training. This could go some way towards explaining the existence of non-compliant work.

3.3 Developing industry knowledge of Performance Solutions

From NCC 2016, the Australian Building Codes Board (ABCB), the body responsible for the development of the NCC, set about increasing awareness and understanding of the performance-based nature of the NCC. Initiatives included amending terminology used in the NCC such as replacing the term ‘alternative solution’ with ‘performance solution’ as well as publishing web based educational videos, case studies, FAQs and other learning resources designed to increase practitioner understanding of what a Performance Solution is and how one is developed. A range of these educational resources, provide information on developing Performance Solutions specifically in plumbing work⁷ such as:

- **Vacuum toilet systems:** Demonstrates a Performance Solution for the installation of a sanitary plumbing system for the refurbishment of a large historic building where the required grades of a traditional gravity system could not be achieved.⁸
- **Siphonic roofwater systems:** Demonstrates a Performance Solution for the design of a roof drainage system for a large industrial building, where the roof area is large and a conventional system would not be appropriate.⁹

⁷ ABCB, *Performance Solutions for Plumbing*: <<https://www.abcb.gov.au/Resources/Publications/Education-Training/Performance-Solutions-for-Plumbing>>

⁸ <<https://www.abcb.gov.au/Resources/Publications/Education-Training/Vacuum-Toilet-Systems>>

⁹ <<https://www.abcb.gov.au/Resources/Publications/Education-Training/Siphonic-Roofwater-Systems>>

- **High rise apartment stack** – Demonstrates a Performance Solution for the design of a single stack plumbing system for a 12 storey residential apartment building.¹⁰
- **Press fit jointing methods** – Demonstrates a Performance Solution for the installation of a cold water service in a building where metallic pipework has been specified by the hydraulic consultant.¹¹
- **Macerating toilet system** - Demonstrates a Performance Solution for the installation of an additional bathroom in the basement of a building, where the bathroom facilities are located below the sewer connection point.¹²

4. Registration and licensing of plumbing practitioners in Victoria

Victoria's *Plumbing Regulations 2018* define ten main classes and five specialised classes of plumbing work. Part 6 of the Regulations, outlines the eligibility requirements for licencing or registration including requirements for qualifications and experience in each class and specialised class of plumbing work. The *Plumbing Regulations 2018* provide that the VBA may from time to time approve one or more competency units required to be completed in order to be eligible to apply for a license or registration to carry out a class of plumbing work or a class of specialised plumbing work.¹³

The VBA is also authorised to amend the competency units with respect to a class of plumbing work or a class of specialised plumbing work.¹⁴ The VBA must publish in the Victorian Government Gazette an up to date list of approved competency units.¹⁵ The current approved units of competency were published in the Victorian Government Gazette of 16 November 2018.

4.1 Registration in the main classes of plumbing work

To be able to be registered to carry out a class of plumbing work, a person must either:

- have the relevant qualifications and experience required by the Regulations; **or**
- satisfy the VBA that they have knowledge and competence at least equal to that that a person who has the qualifications and experience required by the Regulations would have.¹⁶

¹⁰ <<https://www.abcb.gov.au/Resources/Publications/Education-Training/High-Rise-Apartment-Stack>>

¹¹ <<https://www.abcb.gov.au/Resources/Publications/Education-Training/Press-Fit-Jointing-Methods>>

¹² <<https://www.abcb.gov.au/Resources/Publications/Education-Training/Macerating-Toilet-System>>

¹³ *Plumbing Regulations 2018*, Reg 45(1) Authority may approve competency units.

¹⁴ Ibid. Reg 45(3).

¹⁵ Ibid. Reg 45(4).

¹⁶ *Building Act 1993*, section 221O(1).

The qualification requirements for registration in the classes of plumbing work are:

- successful completion of a Certificate III course relating to plumbing work that includes the approved competency units for that class of plumbing work; **or**
- for *Drainage work* and *Irrigation (Non-agricultural) work* - successful completion of a Certificate II course relating to plumbing work that includes the approved competency units for that class of plumbing work;

and

- successful completion of the VBA's examination of competencies for that class of plumbing work.¹⁷

Table 1 lists the 10 main classes of plumbing work and the approved units of competency that must be demonstrated for each class before a person can be registered to carry out that class of plumbing work. For each class, applicants must demonstrate competency in the first 8 units which are common to each of the 10 main classes of plumbing work **PLUS** competency in the relevant class specific units.

Table 1 Units of competency required for registration in each main class of plumbing work

Units common to all main classes of plumbing	
Unit Code	Unit Title
CPCPCM2039A	Carry out interactive workplace communication
CPCPCM2040A	Read plans and calculate plumbing quantities
CPCPCM2041A	Work effectively in the plumbing and services sector
CPCPCM2043A	Carry out WHS requirements
CPCPCM2045A	Handle and store plumbing materials
CPCPCM2046A	Use plumbing hand and power tools
CPCPCM2047A	Carry out levelling ¹⁸
HLTFA211A	Provide basic emergency life support
PLUS the relevant class specific units of competency as follows:	
Drainage (class specific units)	
CPCPCM2054A	Carry out simple concreting and rendering
CPCPDR2021A	Locate and clear blockages
CPCPDR2022A	Install domestic treatment plants
CPCPDR2023A	Maintain effluent disinfection systems

¹⁷ *Plumbing Regulations* 2018, Part 1 of Schedule 4.

¹⁸ Carry out levelling is not required for registration in Type B Gasfitting class of plumbing.

CPCPDR2024A	Install stormwater and sub-soil drainage systems
CPCPDR2025A	Drain work site
CPCPDR2026A	Install prefabricated inspection openings and enclosures
CPCPDR3021A	Plan layout of a residential sanitary drainage system
CPCPDR3022A	Install below ground sanitary drainage systems
CPCPDR3023A	Install on-site disposal systems
RIICCM210A	Install trench support
CPCPSN3025A	Install pre-treatment facilities
Gasfitting work (class specific units)	
CPCPCM2055A	Work safely on roofs
CPCPCM2054A	Carry out simple concreting and rendering
CPCPCM3021A	Flash penetrations through roofs and walls
CPCPCM2048A	Cut and join sheet metal
CPCPCM2050A	Mark out materials
CPCPCM2052A	Weld using oxy-acetylene equipment
CPCPCM2049A	Cut with Oxy-LPG / Acetylene equipment
CPCPCM3023A	Fabricate and install non-ferrous pressure piping
RIICCM210A	Install trench support
CPCPGS3046A	Install LPG systems in caravans, mobile homes and mobile workplaces
CPCPGS3047A	Install LPG systems in marine craft
CPCPGS3048A	Install gas pressure control equipment
CPCPGS3049A	Install Type A appliance flues
CPCPGS3050A	Install Type B gas appliance flues
CPCPGS3051A	Purge consumer piping
CPCPGS3052A	Maintain Type A gas appliances
CPCPGS3053A	Disconnect and reconnect Type A gas appliances
CPCPGS3054A	Calculate and install natural ventilation for Type A gas appliances
CPCPGS3056A	Install gas piping systems
CPCPGS3057A	Size consumer gas piping systems
CPCPGS3059A	Install LPG storage of aggregate storage capacity up to 500 litres
CPCPGS3060A	Install LPG storage of aggregate storage capacity exceeding 500 litres and less than 8 KL
CPCPGS3061A	Install and commission Type A gas appliances
Mechanical services work (class specific units)	
CPCPCM2055A	Work safely on roofs
CPCPCM2048A	Cut and join sheet metal
CPCPCM2050A	Mark out materials
CPCPCM2052A	Weld using oxy-acetylene equipment

CPCPCM2049A	Cut with Oxy-LPG / Acetylene equipment
CPCPCM3023A	Fabricate and install non-ferrous pressure piping
CPCPCM2053A	Weld using manual metal arc welding equipment
CPCPCM3021A	Flash penetrations through roofs and walls
CPCPMS2021A	Assemble mechanical services components
CPCPMS3031A	Fabricate and install steel pressure piping
CPCPMS3032A	Select and fit insulation and sheathing
CPCPMS3033A	Install small bore heating systems
CPCPMS3034A	Install medical gas pipeline systems
CPCPMS3035A	Install and test ducting systems
CPCPMS3036A	Install air handling units
CPCPMS3038A	Install air conditioning control equipment
CPCPMS3039A	Maintain mechanical services equipment
CPCPMS3040A	Install and maintain evaporative air cooling systems
UEENEEJ102A	Prepare and connect refrigerant tubing and fittings
UEENEEJ105A	Position, assemble and start up single head split air conditioning and water heating heat pump systems
UEENEEJ172A	Recover, pressure test, evacuate, charge and leak test refrigerants – split systems
Roofing (Stormwater) work (class specific units)	
CPCPCM2055A	Work safely on roofs
CPCPCM3021A	Flash penetrations through roofs and walls
CPCPCM3022A	Weld polyethylene and polypropylene pipes using fusion method
CPCPCM2048A	Cut and join sheet metal
CPCPCM2050A	Mark out materials
CPCPCM2054A	Carry out simple concreting and rendering
CPCPRF2022A	Select and install roof sheeting and wall cladding
CPCPRF2023A	Collect and store roof water
CPCPRF3021A	Receive roofing materials
CPCPRF3022A	Fabricate and install roof drainage components
CPCPRF3023A	Fabricate and install external flashings
CPCPRF3024A	Install roof components
CPCPRF3025A	Install roof coverings to curved roof structures
CPCPRF3026A	Install composite roof systems
CPCCCM3001C	Operate elevated work platforms
Sanitary work (class specific units)	
CPCPCM2055A	Work safely on roofs
CPCPCM2054A	Carry out simple concreting and rendering

CPCPCM3021A	Flash penetrations through roofs and walls
CPCPCM2048A	Cut and join sheet metal
CPCPCM3022A	Weld polyethylene and polypropylene pipes using fusion method
CPCPDR2021A	Locate and clear blockages
CPCPSN3011B	Plan the layout of a residential sanitary plumbing system
CPCPSN3022A	Install discharge pipes
CPCPSN3023A	Fabricate and install sanitary stacks
CPCPSN3024A	Install and fit off sanitary fixtures
CPCPSN3025A	Install pre-treatment facilities
CPCPSN3026A	Install sewerage pumpsets
CPCPCM2052A	Weld using oxy-acetylene equipment
Type B Gasfitting work (class specific units)	
CPCPGS4023B	Install, commission and service Type B gas appliances
Water supply work (class specific units)	
CPCPCM2055A	Work safely on roofs
CPCPCM2054A	Carry out simple concreting and rendering
CPCPCM3021A	Flash penetrations through roofs and walls
CPCPCM2050A	Mark out materials
CPCPCM2052A	Weld using oxy-acetylene equipment
CPCPCM3022A	Weld polyethylene and polypropylene pipes using fusion method
CPCPCM3023A	Fabricate and install non-ferrous pressure piping
CPCPFS3031A	Fabricate and install fire hydrant and hose reel systems
CPCPFS3037A	Install domestic and residential life safety sprinkler systems
CPCPIG2021A	Design domestic urban irrigation systems
CPCPIG3021A	Set out, install and commission irrigation systems
CPCPIG3022A	Install and commission domestic irrigation pumps
CPCPWT3020A	Connect and install storage tanks to a domestic water supply
CPCPWT3021A	Set out and install water services
CPCPWT3022A	Install and adjust water service controls and devices
CPCPWT3023A	Install and commission water heating systems
CPCPWT3024A	Install & maintain domestic water treatment equipment
CPCPWT3025A	Install water pumpsets
CPCPWT3026A	Fit off and commission heated and cold water services
CPCPWT3027A	Connect irrigation systems from drinking water supply
CPCPWT3028A	Install water service
CPCPWT3029A	Install water pipe systems
RIICCM210A	Install trench support

CPCPCM2049A	Cut with Oxy-LPG / Acetylene equipment
Irrigation (non-agricultural) work (class specific units)	
CPCPCM2054A	Carry out simple concreting and rendering
CPCPCM2050A	Mark out materials
CPCPCM2052A	Weld using oxy-acetylene equipment
RIICCM210A	Install trench support
CPCPIG2021A	Design domestic urban irrigation systems
CPCPIG3021A	Set out, install and commission irrigation systems
CPCPIG3022A	Install and commission domestic irrigation pumps
CPCPWT3027A	Connect irrigation systems from drinking water supply
Fire protection work (class specific units)	
CPCPCM2048A	Cut and join sheet metal
CPCPCM2049A	Cut with Oxy-LPG / Acetylene equipment
CPCPCM2052A	Weld using oxy-acetylene equipment
CPCPCM2053A	Weld using manual metal arc welding equipment
CPCPCM3023A	Fabricate and install non-ferrous pressure piping
CPCPFS2021A	Connect static storage tanks for fixed fire protection systems
CPCPFS3030A	Design pre-calculated fire sprinkler systems
CPCPFS3031A	Fabricate and install fire hydrant and hose reel systems
CPCPFS3034A	Install control valve assemblies, actuating devices and local alarms
CPCPFS3036A	Install special hazard systems
CPCPFS3037A	Install domestic and residential life safety sprinkler systems
CPCPFS3038A	Test and maintain fire hydrant and hose reel installations
CPCPFS3039A	Test and maintain automatic fire sprinklers
CPCPFS3040A	Conduct basic functional testing of water-based fire suppression systems
CPCPFS3041A	Inspect and test fire pumpsets
CPCPFS3042A	Conduct annual functional testing of complex water-based fire suppression systems
CPCPFS3043A	Conduct functional water flow testing
CPCPFS3044A	Install distribution and range pipes
CPCPFS3045A	Fit-off sprinkler heads, controls and ancillary equipment
CPCPFS3046A	Test the integrity of water-based fire protection systems using pressure
CPCPMS3031A	Fabricate and install steel pressure piping
CPCPWT3025A	Install water pumpsets
CPCPWT3028A	Install water service
CPPFES2025A	Inspect, test and maintain gaseous fire suppression systems
CPPFES2043A	Prevent ozone depleting substance and synthetic greenhouse gas emissions
CPPFES2047A	Inspect and test control and indicating equipment

CPCPFS3048A	Install fixed fire pumpsets
Refrigerated air-conditioning work (class specific units)	
This class requires evidence of competency against 28 units from the UEE Training Package. The units are not listed here as they are not from the Construction and Plumbing Services Training Package nor the Property Services Training Package and were therefore not within the scope of research for this paper.	

4.2 Registration in the specialised classes of plumbing work

To be able to be registered to carry out a specialised class of plumbing work, a person must:

- be a registered plumber in respect of a class or classes of plumbing work or specialised plumbing work required by the regulations; **and**

either:

- have the relevant qualifications and experience required by the regulations; **or**
- satisfy the VBA that s/he has knowledge and competence at least equal to that that a person who has the qualifications and experience required by the regulations would have.¹⁹

The qualifications required to be eligible to be registered in a class of specialised plumbing work are generally:

- the successful completion of the approved competency units for registration for that class of plumbing work, **and**
- the successful completion of the VBA's examination of registration competencies for that specialised class of plumbing work.²⁰

Table 2 lists the 5 specialised classes of plumbing work with the required units of competency that must be demonstrated before a person can be registered to carry out that class of plumbing work.

¹⁹ *Building Act 1993*, section 221OA(1)

²⁰ *Plumbing Regulations 2018*, reg 41(2) and Part 2 of Schedule 4

Table 2 Units of competency required for registration in each specialised class of plumbing work

Backflow prevention work	
To meet the requirements for registration in Backflow Prevention work, applicants must be registered in the class of Water Supply work, successfully complete the VBA's examination of registration competencies for Backflow Prevention work and have completed or demonstrated knowledge and competence equivalent to:	
CPCPWT4022A	Commission and maintain backflow prevention services
Thermostatic mixing valve work (commencing 18 November 2019)	
CPCPWT4023A	Commission and maintain hot and heated water temperature control devices
Type A Appliance Conversion Work	
To meet the requirements for registration in Type A Appliance Conversion Work, applicants must hold registration in the Gasfitting class, successfully complete the VBA's examination of registration competencies for Type A Appliance Conversion work.	
n/a	No units gazetted
Type A Appliance Servicing Work	
CPCPGS4022A	Service Type A gas appliances
Type B Gasfitting Advanced Work	
n/a	No units gazetted

4.3 Licensing in the main classes of plumbing work

To be able to be licensed to carry out a class of plumbing work, a person must:

- be eligible for registration in that class of plumbing work; **and**

either:

- have the relevant qualifications and experience required by the regulations; **or**
- satisfy the VBA that he or she has knowledge and competence at least equal to that that a person who has the qualifications and experience required by the regulations would have; **and**
- be covered by the required insurance.²¹

The qualifications required to be eligible to be licensed in a class of plumbing work are generally:

- the successful completion of the approved competency units for that class of plumbing work; **and**
- the successful completion of the VBA's licensing examination for that class of plumbing work.²²

²¹ *Building Act 1993*, section 221M(1)

²² *Plumbing Regulations 2018*, reg 40(1) and Part 1 of Division 4

Table 3 lists the main classes of plumbing work and the units of competency that must be demonstrated for each class before a license to carry out that class of plumbing can be granted. For each class, an applicant must demonstrate competency in the first three units which are common to each of the 10 main classes of plumbing work **PLUS** the relevant class specific units.

Table 3 Units of competency required for licensing in each main class of plumbing work

Units common to all main classes of plumbing	
Unit Code	Unit Title
BSBSMB401A	Establish legal and risk management requirements of small business
CPCPCM4011A	Carry out work based risk control processes
CPCPCM4012A	Estimate and cost work
PLUS the relevant class specific units of competency as follows:	
Drainage (class specific units)	
CPCPDR4011B	Design and size sanitary drainage systems
CPCPDR4012B	Design and size stormwater drainage systems
CPCPDR4013B	Design and size domestic treatment plant disposal systems
Gasfitting work (class specific units)	
CPCPGS4011C	Design and size consumer gas installations
Mechanical services work (class specific units)	
CPCPMS4011B	Design, size and lay out heating and cooling systems
Roofing (Stormwater) work (class specific units)	
CPCPRF4011B	Design and size roof drainage systems
Sanitary work (class specific units)	
CPCPSN4011B	Design and size sanitary plumbing systems
Type B Gasfitting work (class specific units)	
CPCPGS4023B	Install, commission and service Type B gas appliances
Water supply work (class specific units)	
CPCPWTS4011B	Design & size heated and cold water services and systems
Fire protection work (class specific units)	
CPCPFS4024A	Design residential and domestic fire sprinkler systems
CPCPFS4021A	Commission domestic and residential fire suppression sprinkler systems
Irrigation (non-agricultural) work (class specific units)	
NB There are no class specific units for this class of plumbing work, therefore only the 3 common units listed at the top of this table apply for licensing in this class of plumbing.	

Refrigerated air-conditioning work (class specific units)
NB There are no class specific units for this class of plumbing work, therefore only the 3 common units listed at the top of this table apply for licensing in this class of plumbing.

4.4 Licensing in the specialised classes of plumbing

To be able to be licensed to carry out a particular class of specialised plumbing work, a person must:

- be a licensed plumber in respect of a class or classes of plumbing work or specialised plumbing work required by the regulations; **and**

either:

- have the relevant qualifications and experience required by the regulations; **or**
 - satisfy the VBA that he or she has knowledge and competence at least equal to that that a person who has the qualifications and experience required by the regulations would have; **and**
- be covered by the required insurance.²³

The qualifications required to be eligible to be licensed in a class of specialised plumbing work are generally:

- the successful completion of the approved competency units for licensing for that specialised class of plumbing work; **and**
- the successful completion of the VBA's examination of licensing competencies for that specialised class of plumbing work.²⁴

Table 4 lists the specialised classes of plumbing work and the units of competency that must be demonstrated for each class before a license to carry out that class of plumbing work can be granted. For each class, an applicant must demonstrate competency in the first three units **PLUS** the relevant class specific units.

²³ *Building Act 1993*, section 221N(1)

²⁴ *Plumbing Regulations 2018*, reg 41(1) and Part 2 of Schedule 4

Table 4 Units of competency required for licensing in each specialised class of plumbing work

Units common to all specialised classes of plumbing	
Unit Code	Unit Title
BSBSMB401A	Establish legal and risk management requirements of small business
CPCPCM4011A	Carry out work based risk control processes
CPCPCM4012A	Estimate and cost work
PLUS the relevant class specific units of competency as follows:	
Backflow prevention work	
CPCPGS4022A	Service Type A gas appliances
Thermostatic mixing valve work (commencing 18 November 2019)	
CPCPWT4023A	Commission and maintain hot and heated water temperature control devices
Type A Appliance Conversion Work	
n/a	No units gazetted
Type A Appliance Servicing Work	
CPCPGS4022A	Service Type A gas appliances
Type B Gasfitting Advanced Work	
n/a	No units gazetted

Each of the above approved gazetted units of competency was reviewed and analysed for its stand-alone capacity to deliver and assess against the general skill and knowledge required to develop performance solutions. The result of the analysis is shown in **Appendix B**.

5. Summary of findings

Language around compliance

The analysis of qualifications and units of competency provided in the Appendices of this report, reveals that the terms ‘performance-based’ or ‘alternative solutions’ are frequently found in Building and Construction units and qualifications, and in higher level qualifications in Building Surveying, Access Consulting and Fire Systems Design. Conversely however, in the Plumbing specific units and qualifications, at all qualification levels, these terms are not found. In the plumbing units and qualifications, whilst it is clear that plumbing work must be ‘compliant’, the terminology around compliance is broad (e.g. ‘comply with standards, codes and legislation’). Given the performance-based nature of the NCC, and the different pathways to compliance, the use of broad terminology around compliance raises a very real risk that Registered Training Organisations (RTOs) may not train and assess on both DtS and performance-based solutions as methods of compliance.²⁵

It is suggested that in the absence of explicit language requiring an RTO address the various pathways to compliance, the development and documentation of Performance Solutions may not be delivered and assessed. By default, a practitioner may not even realise that their work could be deemed non-compliant at audit, in the absence of documentation showing the use of an approved Performance Solution.

Variations in the quality of training provided in the Australian VET system particularly for trade occupations, have been well documented in the media and within the VET sector itself.

Notwithstanding this, there are many RTOs in the Australian VET system which deliver training and assessment to a consistently high standard and who may well address ‘compliance’ in terms of both DtS and Performance Solutions, in their training. This report was not commissioned to look into the quality of plumbing education and training but rather the capacity of the training package in relation to delivering skills and knowledge of Performance Solutions. In the absence of reviewing the training resources and products used by RTOs to deliver the plumbing qualifications, it cannot be said that RTOs do not deliver and assess on Performance Solutions. What can be said however is that in the absence of explicit and consistent language in the relevant units of competency requiring evidence of a person’s capacity to identify the need for a Performance Solution and/or develop and document the Performance Solution, an RTO may very well not cover Performance Solutions.

²⁵ For historical context, it is worth noting that the PCA Performance Requirements were developed prior to being adopted as Volume 3 of the NCC. It was not until 2011 that the PCA became part of the NCC suite. In addition, the current plumbing qualifications and units of competency were endorsed prior to amendments to the NCC in 2016 which resulted in simplifying and clarifying the performance-based nature of the PCA.

Indeed, there would be no incentive for an RTO to develop resources and tasks that assess a person's capacity to develop a Performance Solution as the findings of this paper reveal that many units of competency do not explicitly require that they do.

It is entirely possible that a regulatory audit of an RTO delivering plumbing qualifications would fail to identify the absence of training and assessment on DtS and Performance Solutions as a means towards meeting compliance with the NCC. These observations are not intended to criticise the delivery of training and audit processes but rather to highlight the importance of language in units of competency which is explicit rather than inherently implicit in relation to compliance with the PCA.

Practitioner responsibilities for Performance Solutions

The national plumbing qualifications and units of competency, reflect the diversity of roles in the plumbing and services sector including systems design, installation, fabrication, testing, commissioning and maintenance, however, this report also raises questions about the role of plumbing practitioners at different stages of work. As will be seen in the unit analysis, there is a need to clarify with industry, the extent of the knowledge each practitioner requires in relation to Performance Solutions even if they are not in a design role. Is there, for example, a type of Performance Solution which an installer might need to be able to develop on-site, in order to ensure their work complies with the PCA? The qualifications and units of competency certainly provide the practitioner with the technical skills to do the work – but what of a situation where, in applying their trade, the practitioner in effect, implements a Performance Solution, either because they followed a plan which they were instructed to follow or because they could not fulfil what was on the plan without implementing some modification? Should the practitioner be aware that their work now does not meet DtS provisions, but rather a Performance Solutions approach and that there is an evidentiary process they must follow to ensure the work, should it be audited, is found to be compliant, and not non-compliant? Are there in fact 'simple' Performance Solutions and 'complex' Performance Solutions which could be encountered in plumbing work – if so, what would define 'simple' or 'complex'?

Similarly, if a person is engaged to test and maintain fire protection equipment, should they first ensure the system was installed to meet a DtS or Performance Solution? Might the testing and maintenance of the system require consideration of a design or installation that was not DtS?

6. Options

This paper has focused solely on education and training as a contributing factor to non-compliance in plumbing work. The VBA is aware however that there could be a variety of reasons (training and non-training specific) as to why plumbing work across any of the classes is non-compliant, including but not limited to work that fails to meet a DtS solution yet is not supported by documentation evidencing the use of an approved Performance Solution.

Table 5 presents a range of options available to the VBA to identify and redress any actual or perceived gaps in the skill and knowledge of plumbers in developing Performance Solutions. They are designed to:

- verify the skill and knowledge of the **current** accredited (registered and licensed) and active plumbers
- prepare **future** graduates of plumbing qualifications

It is acknowledged that the VBA will need to weigh up the benefits of each option. In light of the current review of the national plumbing qualification framework, Options 1 and 2 should be given immediate consideration. Of these two, Option 1 is the preferred option. In any case, national consultation via the Skills Service Organisation (SSO) with responsibility for CPC, CPC08 and CPP Training Packages (in this case, Artibus Innovation) will be required to progress either option with industry. Training Package qualification development is itself a regulated activity and Artibus Innovation must adhere to rules and processes around consultation and the development of qualifications and units of competency.

Whilst such consultative processes are engaged in, it is highly recommended that the VBA also commence progress towards Options 3, 4 and 5 in that order. If indeed a class or classes of registered and licensed practitioners lack competencies in developing Performance Solutions, then whilst revising national qualifications and units of competency ensures future graduates develop the required skills in Performance Solutions, it does not, on its own, redress possible skill and knowledge gaps of a current active and accredited plumbing workforce.

Table 5 Proposed options

Options	Benefits	Issues for consideration
1. Engage with Artibus Innovation, to enhance a select group of existing units to improve language around 'compliance' so that the units explicitly require evidence: - that those who engage in <u>design</u> work can develop and document Performance Solutions in their field of work. The focus would be at units within the Certificate IV in Plumbing and Services and the Diploma of Plumbing and Services. - that those who undertake <u>installations</u>, can identify the use of a Performance Solution in the plans and specifications provided; and refer to relevant personnel any installation work that will not comply with the DtS provisions of the PCA. The focus would be at units within the Certificate II and III qualifications.	- Ensures future graduates of plumbing qualifications gain required skill and knowledge around Performance Solutions. - Could be focused on units currently gazetted for registration or licensing. - Ensures all plumbing streams cover Performance Solutions explicitly and to the level of responsibility required by the practitioner. For example, the unit CPCPRF4011B Design and size roof drainage systems would be enhanced to require a person develop a roof drainage system that is compliant under both a DtS solution and a Performance Solution. The unit CPCPDR4011B Design and size sanitary drainage systems, would similarly require evidence a person can design a sanitary drainage system that is compliant under both a DtS solution and a Performance Solution. - At the time of writing, the plumbing qualifications and units of competency are under providing a timely opportunity for national consultation on ways to strengthen the evidence requirements of units to ensure coverage of Performance Solutions.	- As this option would be subject to a national consultation process it could take time to be realised. It may also not be possible to reach national agreement depending on industry advice and therefore may not result in national endorsement. - Does not redress possible skill and knowledge gaps of existing practitioners currently undertaking plumbing work.
2. Engage with Artibus Innovation, to: develop a new unit of competency designed to deliver the skills and knowledge required by practitioners for developing and documenting Performance Solutions.	- Recognises that developing Performance Solutions is a discrete job task undertaken by some plumbing practitioners, in some situations, most likely at the design stage. - Written to appropriate AQF level based on consultation with industry, but where appropriate, imported under training package rules into higher or lower level qualifications as required by RTOs and students. - Could be added to the list of approved units of competency required for registration and/or licensing of practitioners as appropriate to specific classes of plumbing work.	- As this option would be subject to a national consultation process it could take time to be realised. It may also not be possible to reach national agreement depending on industry advice and therefore may not result in national endorsement. - Does not redress possible skill and knowledge gaps of existing practitioners currently undertaking plumbing work. - Risk of poor take-up unless the unit is added either as a core to relevant qualifications or

Options	Benefits	Issues for consideration
	- The existing unit <i>CPCCB4034A Apply codes and standards to building trade and services contracting</i> could either be used as a model for the development of a new unit or contextualised to plumbing. Although referencing the BCA and building work throughout the unit it does allow for application to all trades including plumbing. One of the evidence requirements for the unit is: <i>demonstrate understanding of the assessment methods available to determine whether a building solution complies with performance requirements or DTS provisions of the BCA</i>. - At the time of writing, the plumbing qualifications and units of competency are under review providing an opportunity for national consultation on the merits of introducing a new unit of competency.	to the approved list of gazetted units of competency required for registration or licensing in specific classes of plumbing work. A single new unit on Performance Solutions runs the risk of being written, delivered and assessed too broadly for application across diverse types of plumbing work. In reality, Performance Solutions may be more complex in certain fields of plumbing work than others. This paper has focused only the extent to which Performance Solutions are reflected in the current Training Packages, but it has not considered the potential breadth of Performance Solutions which may be required across a range of plumbing work. Some solutions may require simple solutions, others more complex solutions and a single unit of competency may not reflect different levels of complexity.
3. Introduce a mandatory learning module and assessment on Performance Solutions that must be undertaken by relevant practitioners before accreditation will be renewed.	This model for addressing sector-wide knowledge gaps, was successfully used by the VBA in its 'Carbon Monoxide Safety Program'. The VBA advises that this program included a series of videos and assessment questions which were mandatory for all practitioners registered or licensed in the main class of Gasfitting work or one of the two specialised classes of Type A Gasfitting. The program resulted in over 16,000 gasfitting practitioners successfully completing the module between September 2018 and February 2019. A summary video posted on the VBA YouTube channel has had nearly 3,000 views between September 2018 and February 2019.²⁶ By contrast, the VBA <i>video Developing a Performance Solution (Plumbing)</i>, posted on YouTube in July 2016 has only	- Requires time and resources to develop a learning tool and associated knowledge-based questions. - Requires practitioners have access to a computer, tablet or smart phone. Of note, the VBA advised that through the Carbon Monoxide Safety Testing Program it was identified that a small number of practitioners had limited computer literacy. The current VBA video is intended for information purposes rather than training purposes. It is suggested that a new video be developed for the purposes of learning and

²⁶ The VBA also advise that TAFEs have requested this module be made available for inclusion in their curriculum.

Options	Benefits	Issues for consideration
	had 546 views.²⁷ This video is not required to be watched prior to renewal of registration or licence. This could suggest that linking the need to view the instructional video as a pre-requisite for license renewal, is effective. • There are a range of existing resources including fact sheets and videos published by the VBA and the ABCB which would support this program, requiring very little additional or new resource development and investment. • Cost effective as it can be disseminated electronically to existing registered and licensed practitioners. • Capacity to tailor modules to suit either registered or licensed practitioners. • Short implementation time required, therefore providing timely response to the identified need.	an assessment component be included. The new video should be designed to align with adult learning principles, perhaps be spread across a series of smaller bite-sized modules with practical case studies and where possible, cater for every class of plumbing
4. Work with industry associations such as Master Plumbers, to develop and deliver a CPD program for: • plumbers and/or • RTO trainers and assessors delivering plumbing qualifications. This would include providing a suite of activities such as seminars, webinars, online and face-to-face training covering key topics such as Performance Solutions. In future, consider requiring engagement in the CPD program as a pre-requisite to renewal of registration and licenses.	• CPD programs can be a way of ensuring practitioners and trainers have access to ongoing education and keep up to date with innovations in an industry. • Implementation costs borne by the provider of the CPD program. • Likely good uptake by RTOs as trainers of VET qualifications are required to demonstrate currency of their skill and knowledge. Active participation in CPD can be a means to demonstrating currency. Advice on the ASQA website²⁸ about ways to maintain the currency of industry skills of trainers, includes documentation related to attendance at relevant professional development activities, participation in networks etc.	• If the aim of this option were to only enhance training of Performance Solutions in plumbing work, then in the absence of explicit criteria in nationally accredited units of competency requiring such training and assessment, trainers and assessors may not provide such content. • Unless compulsory, such a scheme may take time to be accepted by industry and could initially receive poor subscription. • Requires significant time and resources to develop and implement. • Given the time to coordinate and implement, does not satisfy current issues of practitioner awareness about Performance Solutions.

²⁷ < <https://www.youtube.com/watch?v=tBZKirxPTIM> > accessed 21st February 2019.

²⁸ < <https://www.asqa.gov.au/faqs/how-can-i-demonstrate-i-have-maintained-currency-my-industry-skills-and-my-trainer-assessor> > accessed 22nd February 2019.

Options	Benefits	Issues for consideration
5. Develop and disseminate a suite of educational tools for RTO network with scope to deliver plumbing qualifications, addressing Performance Solutions as a means of achieving PCA compliance.	• Can be disseminated electronically to minimise costs. • Would appeal to RTOs with limited budgets for resource development.	• If the aim of this option were to only enhance training of Performance Solutions in plumbing work, then in the absence of explicit criteria in nationally accredited units of competency requiring such training and assessment, trainers and assessors may not provide such content. • Time and cost to develop. • No guarantee of take-up. • Hard to measure success rate.

Appendix A - Technical review of qualifications

This review of plumbing qualifications included:

- review of the scope and content of each qualification
- observations on occupational outcomes
- relevance of the qualification to registration and licensing of plumbing practitioners in Victoria

The following qualifications were reviewed:

- CPC20712 Certificate II in Drainage²⁹
- CPC20812 Certificate II in Metal Roofing and Cladding
- CPC32413 Certificate III in Plumbing
- CPC32513 Certificate III in Plumbing (Mechanical Services)
- CPC32713 Certificate III in Gas Fitting
- CPC32612 Certificate III in Roof Plumbing
- CPC32813 Certificate III in Fire Protection
- CPC40912 Certificate IV in Plumbing and Services
- CPC50412 Diploma of Plumbing and Services
- CPC50612 Diploma of Hydraulic Services Design

²⁹ Originally not specified for review, the Certificate III in Drainage and Certificate III in Gas Fitting qualifications are included because of their relevance to registration and licensing.

CPC20712 Certificate II in Drainage

Qualification:	CPC20712 Certificate II in Drainage	
Packaging rules:	22 units in total; 18 core and 4 electives	
Relevance to registration or licensing	To be registered in Drainage work, an applicant must have knowledge equivalent to the competencies for Drainage work of Certificate II or higher PLUS at least two years of experience while working under the supervision of a plumber who is licensed in Drainage work. ³⁰ The 18 core units in the qualification are gazetted units of competency required for registration in Drainage work. The remaining 2 units required for registration in Drainage work are in the general electives of the qualification.	
Occupational outcome:	This qualification provides an occupational outcome in draining. Occupational titles may include: Drainer	
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: - understand, interpret and apply information as required from...regulatory, legislative requirements...codes and standards - identify typical faults and problems and take remedial actions and/or report to supervisor.	
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
- Each of the core units in the qualification are required for registration in Drainage work. - The remaining gazetted units required for registration in Drainage work are available as electives in the general electives of the qualification.	4 electives required. 2 of the gazetted units of competency required for registration in Drainage work, are contained within the general electives of this qualification.	A graduate of this qualification will hold the gazetted units of competency required for registration in Drainage work if their elective choice includes the following 2 units: - CPCPDR2023A Maintain effluent disinfection systems - CPCPSN3025A Install pre-treatment facilities

³⁰ *Plumbing Regulations 2018*, Schedule 4, Part 1, Division 1 Drainage work.

CPC20812 Certificate II in Metal Roofing and Cladding

Qualification:	CPC20812 Certificate II in Metal roofing and cladding	
Packaging rules:	24 units in total; 15 core and 9 electives	
Relevance to registration or licensing	To be registered in Roofing (Stormwater) work, an applicant must have knowledge equivalent to the competencies for Roofing (Stormwater) work of Certificate III PLUS at least four years of experience while working under the supervision of a plumber who is licensed in Roofing (Stormwater) work.³¹ 14 out of the 15 core units in this qualification are gazetted units of competency required for registration in Roofing (Stormwater) work. Within the general electives of the qualification, all but one of the remaining gazetted units required for registration in Roofing (Stormwater) work are found. The gazetted unit CPCPCM2054A Carry out simple concreting and rendering, is not listed as an elective available for this qualification but could be undertaken as an imported unit.	
Occupational outcome:	This qualification provides an occupational outcome in metal roofing and cladding. Occupational titles may include: Roofer.	
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: • Design and fabricate roof coverings • Fabricate, set out, install and test as required metal roofing and cladding components and systems • Identify typical faults and problems and take remedial actions and/or report to supervisor • Understand, interpret and apply information as required from...regulatory, legislative requirements...codes and standards.	
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
• All 8 common units required for registration in Roofing (Stormwater) work are covered in the core of the qualification. 6 other gazetted units required for registration in Roofing (Stormwater) work are in the core of the qualification.	• 9 electives required. 8 of the gazetted units of competency required for registration in Roofing (Stormwater) work, are contained within the general electives of this qualification. The remaining unit may be imported.	Nested in the Certificate III in Plumbing for those selecting 'Roofing' as one of the two elective streams. A graduate of this qualification will hold the gazetted units of competency required for registration in

³¹ *Plumbing Regulations 2018*, Schedule 4, Part 1 Division 7 Roofing (Stormwater) work.

		Roofing (Stormwater) work if they undertake the following 5 units as electives: • CPCPCM3022A Weld polyethylene and polypropylene pipes using fusion method • CPCPRF2023A Collect and store roof water • CPCPRF3021A Receive roofing materials • CPCPRF3022A Fabricate and install roof drainage components • CPCPRF3023A Fabricate and install external flashings • CPCPRF3024A Install roof components • CPCPRF3025A Install roof coverings to curved roof structures • CPCPRF3026A Install composite roof systems And import: • CPCPCM2054A Carry out simple concreting and rendering No explicit reference to Performance Solutions. Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.
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CPC32413 Certificate III in Plumbing

Qualification:	CPC32413 Certificate III in Plumbing
Relevance to registration or licensing	This qualification has six possible streams and students must complete a minimum of four streams. Depending on the choice of streams, the qualification can contribute to application for registration in:. • Water services • Sanitary work • Drainage • Mechanical services • Roofing (Stormwater) • Gasfitting
Packaging rules:	Students undertake a minimum of four out of a total of six possible streams. There are 2 mandatory streams (water and sanitary), leaving students to undertake at least a further two streams. The number of units to be undertaken in each stream is: Water: 24 core, 5 electives and Sanitary: 6 core, 4 electives <u>A minimum of 2 other complete streams to be selected from:</u> Drainage: 9 core, 3 electives Mechanical services: 4 core, 11 electives Roofing: 8 core, 4 electives Gas services: 12 core, 5 electives
Occupational outcome:	This qualification provides a trade outcome in plumbing. Occupational titles may include: Plumber; Plumber and drainer; Plumber and gasfitter; Gasfitter; Roof plumber.
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: • Design and fabricate roof coverings • Fabricate, set out, install and test as required metal roofing and cladding components and systems • Fabricate, set out, install and commission components, equipment and systems • identify typical faults and problems and take remedial actions and/or report to supervisor • Understand, interpret and apply information as required from...regulatory, legislative requirements...codes and standards.
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.

Analysis – core	Analysis – electives	Comment
• Minimum of 4 streams required. Water and Sanitary are mandatory streams. All 8 common units required for registration across all main classes of plumbing are covered in the core of the qualification in the mandatory Water stream. • All core units of the mandatory Water stream, are required for registration in Water Supply Work however the person would need to undertake a further 2 units as electives to address all units required for Registration. • All core units of the mandatory Sanitary stream are required for registration in Sanitary work. Some core units in the Water stream contribute to registration in Sanitary work, leaving only a further 2 units to be undertaken as electives to be eligible for registration in Sanitary work.	• As noted, a minimum number of carefully selected electives, will provide required competencies for registration in Water Supply work and Sanitary work.	• A graduate of this qualification will hold the gazetted units of competency required for Water Supply work and Sanitary work assuming appropriate selection of electives. • No explicit reference to Performance Solutions. Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.

CPC32513 Certificate III in Plumbing (Mechanical Services)

Qualification:	CPC32513 Certificate III in Plumbing (Mechanical Services)
Relevance to registration or licensing	Depending on the stream completed, can contribute to application for registration in: • Water services • Sanitary work • Drainage • Mechanical services • Roofing (Stormwater) • Gasfitting
Packaging rules:	<u>2 mandatory streams:</u> Mechanical services: 4 core, 11 electives and Water: 24 core, 5 electives <u>2 other complete streams to be selected from:</u> Drainage: 9 core, 3 electives Sanitary: 6 core, 4 electives Roofing: 8 core, 4 electives Gas services: 12 core, 5 electives
Occupational outcome:	This qualification provides a trade outcome in plumbing, specialising in mechanical services. Occupational titles may include: Plumber.
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: • Design and fabricate roof coverings • Fabricate, set out, install and commission components, equipment and systems • Determine requirements for heating system installations, roof water storage, medical gas pipeline systems, appliance installations, flue installations and gas piping system • Rectify incorrect roofing installations • Identify typical faults and problems and take remedial actions and/or report to supervisor • Understand, interpret and apply information as required from...regulatory, legislative requirements...codes and standards.
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.

Analysis – core	Analysis – electives	Comment
All 4 core units in the mandatory mechanical services stream are required for registration in Mechanical Services work. All 8 common units required for registration across all main classes of plumbing are covered in the core of the qualification in the mandatory Water stream.	Depending on the 2 elective streams chosen, the number of electives required differs. Many of the elective units are required for registration in the associated stream.	- This qualification mirrors the Certificate III in Plumbing, except that the mechanical stream replaces the sanitary stream as a mandatory stream. - No explicit reference to Performance Solutions. Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.

CPC32713 Certificate III in Gas Fitting

Qualification:	CPC32713 Certificate III in Gas fitting	
Packaging rules:	32 units in total: 26 core units and 6 elective units	
Relevance to registration or licensing	To be registered in Gasfitting work, an applicant must have knowledge equivalent to the competencies of Certificate III for Gasfitting work PLUS at least four years of experience while working under the supervision of a plumber who is licensed in Gasfitting work.³² 25 out of 26 core units in this qualification are gazetted units of competency required for registration in Gasfitting work. The remaining gazetted units required for registration in Gasfitting work are contained in the electives of the qualification.	
Occupational outcome:	This qualification provides a trade outcome in gas fitting. Occupational titles may include: Gas fitter.	
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: - Identify typical faults and problems and take remedial actions and/or report to supervisor - Understand, interpret and apply information as required from...regulatory, legislative requirements...codes and standards.	
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
25 of the required 26 Core units are gazetted units required for registration in Gasfitting work.	6 electives required. 5 of the gazetted units of competency required for registration in Gasfitting work, are contained within the general electives of this qualification.	A graduate of this qualification will hold the gazetted units of competency required for registration in Gasfitting work if they undertake the following 5 units as electives: - CPCPCM2049A Cut using oxy-LPG-acetylene equipment - CPCPCM2054A Carry out simple concreting and rendering - CPCPCM3023A Fabricate and install non-ferrous pressure piping

³² *Plumbing Regulations 2018*, Schedule 4, Part 1 Division 3 Gasfitting work.

		• CPCPGS3050A Install Type B gas appliance flues • RIICCM210D Install trench support No explicit reference to Performance Solutions. Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.
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CPC32612 Certificate III in Roof Plumbing

Qualification:	CPC32612 Certificate III in Roof Plumbing	
Packaging rules:	25 units in total: 22 core units and 3 elective units	
Relevance to registration or licensing	To be registered in Roofing (Stormwater) work, an applicant must have knowledge equivalent to the competencies for Roofing (Stormwater) work of Certificate III PLUS at least four years of experience while working under the supervision of a plumber who is licensed in Roofing (Stormwater) work.³³ The gazetted units of competency required for registration in Roofing (Stormwater) work, are all in the Core of this qualification. There are however, 2 further core units in the qualification that are not gazetted units required for registration: • CPCCCM2008B Erect and dismantle restricted height scaffolding • CPCCCM2010B Work safely at heights	
Occupational outcome:	This qualification provides a trade outcome in roof plumbing. Occupational titles may include: Roof plumber.	
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: • Design and fabricate roof coverings • Fabricate, set out and install metal roofing and cladding, systems and pipe systems • Install and operate drainage systems • Identify typical faults and problems and take remedial actions and/or report to supervisor • Understand, interpret and apply information as required from codes and standards.	
Summary of analysis:	Whilst the qualification aims to provide skills of fabrication, installation and the application of appropriate standards to the work, there is no explicit reference in the qualification indicating that graduates will develop the skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
• 20 of the required 22 Core units are gazetted units required for registration in Roofing (Stormwater) work.	3 electives required. The gazetted units of competency required for registration in Roofing (Stormwater) work, include the following 3 electives: • CPCPCM2054A Carry out simple concreting and rendering	• A graduate of this qualification will hold the gazetted units of competency required for registration in Roofing (Stormwater) work if they undertake all gazetted electives. • Despite the employability skills of this qualification covering the ability to design,

³³ *Plumbing Regulations 2018*, Schedule 4, Part 1 Division 7 Roofing (Stormwater) work.

	• CPCPCM3022A Weld polyethylene and polypropylene pipes using fusion method • CPCPRF2023A Collect and store roof water	fabricate and install, there is no explicit reference to Performance Solutions. • Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.
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CPC32813 Certificate III in Fire Protection

Qualification:	CPC32813 Certificate III in Fire Protection	
Packaging rules:	37 units in total. 31 core units and 6 elective units	
Relevance to registration or licensing	To be registered in Fire Protection work, an applicant must have knowledge equivalent to the competencies for fire protection work of Certificate III PLUS at least four years of experience while working under the supervision of a plumber who is licensed in fire protection work.³⁴ All but five of the gazetted units of competency required for registration in fire protection work, are in the Core of this qualification. The gazetted unit CPCPFS30394 Test and maintain automatic fire sprinklers, has since been superseded by non-equivalent unit CPCPFS3047A Test and maintain automatic fire sprinklers.	
Occupational outcome:	This qualification provides a trade outcome in installing, testing and maintaining fire protection systems. Occupational titles may include: Fire protection systems technician.	
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: • Design pre-fabricated fire sprinkler systems • Identify typical faults and problems and take remedial actions and/or report to supervisor • Determine requirements for installations • Fabricate and install systems and components	
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
All core units are required for registration in Fire protection work. Core unit: CPCPFS3047A Test and maintain automatic fire sprinklers, is the superseded but non-equivalent unit replacing the gazetted unit CPCPFS3039A Test and maintain automatic fire sprinklers.	Six electives required. The gazetted units of competency required for registration in Fire protection work, include the following five electives: • CPCPFS3040A Conduct basic functional testing of water-based fire-suppression systems • CPCPFS3041A Inspect and test fire pumpsets	• Possible need for gazetted units to be revised to reflect change in the core unit noted in column 1. • A graduate of this qualification will hold the gazetted units of competency required for registration in fire protection work if they also undertake the remaining five gazetted units as electives. They will also need to

³⁴ *Plumbing Regulations 2018*, Schedule 4, Part 1 Division 7 Fire protection work.

	• CPCPFS3042A Conduct annual functional testing of complex water-based fire-suppression systems • CPCPFS3043A Conduct functional water flow testing • CPCPFS3048A Install fixed fire pumpsets	address any gaps between CPCPFS3047A and CPCPFS3039A. • Despite the employability skills of this qualification covering the ability to design, fabricate and install, there is no explicit reference to Performance Solutions. • Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.
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CPC40912 Certificate IV in Plumbing and Services

Qualification:	CPC40912 Certificate IV in Plumbing and Services
Packaging rules:	There are 5 possible streams in this qualification, each requiring completion of 15 units – 4 of which are common to all streams. The remaining 11 units differ for each stream. <i>Fire services stream:</i> 8 core units, 7 elective units <i>Air conditioning and mechanical services stream:</i> 8 core, 7 electives <i>Plumbing and services – Management stream:</i> 10 core, 5 electives <i>Plumbing and services – Operations stream:</i> 12 core, 3 electives <i>Hydraulic services design stream:</i> 10 core, 5 electives.
Relevance to registration or licensing	<i>Fire services stream:</i> • Two electives are required for licensing in Fire Protection: ○ CPCPFS4021A Commission domestic and residential fire suppression sprinkler systems ○ CPCPFS4024A Design residential and domestic fire sprinkler systems <i>Air conditioning and mechanical services stream:</i> None of the core units contribute to registration or licensing. <i>Plumbing and services – Management stream:</i> • 2 common core plus core of this stream, provide the 3 common licensing units required • 3 of the elective units align with required units for licensing in Drainage • 1 of the elective units aligns with required units for licensing in Fire Protection • 1 of the elective units aligns with required units for licensing in Gasfitting • 1 of the elective units aligns with required units for registration in Type B Gasfitting <i>Plumbing and services – Operations stream:</i> The core units contribute to the requirements for licensing in drainage, gasfitting, water supply, sanitary and roofing. <i>Hydraulic services design stream:</i> The core units contribute to the requirements for licensing in drainage, sanitary and water supply.
Occupational outcome:	Depending on the stream of core and electives selected, the qualification provides an outcome for: • Experienced fire operators with responsibility for project design and supervision (Fire services stream)

	- Experienced plumbing service operators with responsibility for project design and supervision (Air conditioning and mechanical services stream) - Plumbers who manage a plumbing business (Plumbing and services – Management stream) - Specialist plumbing services tradespersons and operators seeking to deepen their technical skills (Plumbing and services – Operations stream) - specialist hydraulic consultants (Hydraulic services design stream). Occupational titles may include: Plumbing contractor, Fire services supervisor, Air conditioning technician, Specialist hydraulic designer	
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: - Identify and rectify faults - Supervise others' work - Interpret a range of complex documents, including relevant regulatory, legislative, licensing and registration requirements; codes and standards; drawings and specifications - Review design solutions for effectiveness and compliance - Use creative design and drafting skills - Commission fire alarm and detection systems and gas appliances.	
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
There are four core units required in each of the five streams. Two are used for licensing in the main classes of plumbing: - CPCPCM4011A Carry out work-based risk control processes - CPCPCM4012A Estimate and cost work The other licensing unit (BSBSMB401A Establish legal and risk management requirements for small business) is in the core of the Management stream and Operations stream and in the electives for Fire Services and Air Conditioning and Mechanical Services streams.	Depending on the selection of electives, a person could attain many if not all of the units required for registration and / or licensing in Drainage, Gasfitting, Water supply, Sanitary, Roofing, Fire protection, and Mechanical services.	- A streamed qualification which represents five different Certificate IV qualifications – with 4 core units in common. - Despite the employability skills of this qualification covering the ability to design and review solutions for compliance, there is no explicit reference to Performance Solutions. Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.

CPC50412 Diploma of Plumbing and Services

Qualification:	CPC50412 Diploma of Plumbing and Services
Packaging rules:	Each stream of this qualification requires completion of 12 units – 2 of which are common to all streams and from BSB. The remaining 10 units could be completely different for each stream. And one stream in either of the following: • <i>Fire Services</i>: 4 Group A core units + 6 elective units • <i>Plumbing and Services Management</i>: 5 Group B core units + 5 elective units • <i>Air conditioning and mechanical services</i>: 4 Group C core units + 6 elective units.
Relevance to registration or licensing	• None of the units in the common core of the qualification are required for registration or licensing purposes • None of the core stream units in Fire Services, Plumbing and Services Management or Air conditioning and Mechanical Services streams, are required for registration or licensing purposes.
Occupational outcome:	The qualification provides an outcome for: • specialist and senior plumbers, fire services professionals and air conditioning and mechanical services professionals with advanced technical skill requirements; experienced professionals who are pursuing management roles within the plumbing and services industry Occupational titles may include: Senior plumber, Fire services technician, Air conditioning and mechanical services technician, Plumbing manager.
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: • Identify typical faults and take corrective action • Interpret a range of complex documents, including plans and specifications, ...legislative and regulatory requirements, industry codes and standards • Research documentation relevant to systems' design • Draft detailed system specifications, including... installation requirements; testing and commissioning schedules; operations and maintenance manuals... compliance reports • Supervise sewerage system installation • Rectify service clashes through design modification • Design complex sanitary plumbing and drainage systems; cold water systems; stormwater and roof drainage systems; hot water systems; sewerage systems; rising mains systems; pump stations; fire compliant ducting systems and hydraulic services; water storage and sprinkler systems; smoke alarm systems; fire hydrant and hose reel systems; hydronic heating and cooling systems; gas bulk storage systems; industrial gas systems; gas reticulation systems; solar water heating systems; grey water use

	systems; rainwater collection, storage, distribution and re-use systems; irrigation systems; trade waste pre-treatment systems; pump systems; siphonic stormwater drainage systems; vacuum sewerage systems • Ensure current building codes and standards are applied.	
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.	
Analysis – core	Analysis – electives	Comment
• No core units contribute to registration or licensing.	• No electives contribute to registration or licensing.	• The qualification is not aligned with registration or licensing of practitioners in Victoria, regardless of which stream is selected. One qualification with three streams, resulting in three different Diploma qualifications depending on stream chosen. • Despite the employability skills of this qualification covering the ability to design complex sanitary systems, there is no explicit reference to Performance Solutions. Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.

CPC50612 Diploma of Hydraulic Services and Design

Qualification:	CPC50412 Diploma of Hydraulic Services and Design
Packaging rules:	34 units in total: 31 core units and 3 elective units
Relevance to registration or licensing	7 of the core units contribute to licensing in different classes of plumbing. 3 are required for licensing in drainage work; 1 unit is required for licensing in water supply work; 1 unit is required for licensing in fire protection work; 1 unit is required for licensing in gasfitting and 1 unit is required for licensing in sanitary work. - None of the listed elective units contributes to registration or licensing
Occupational outcome:	The qualification provides an outcome for: specialist hydraulic design consultants who design plumbing and services systems for residential and commercial buildings. Occupational titles may include: Hydraulic design consultant
Scope and content:	The Employability Skills for this qualification, include (among other skills) the ability to: - Draft detailed system specifications - Resolve problems relating to project design issues - Identify typical design faults and takes corrective action - Rectify service clashes through design modifications - Design complex sanitary plumbing and drainage systems; cold water systems; stormwater and roof drainage systems; hot water systems; sewerage systems; rising mains systems; pump stations; fire compliant ducting systems and hydraulic services; water storage and sprinkler systems; smoke alarm systems; fire hydrant and hose reel systems; hydronic heating and cooling systems; gas bulk storage systems; industrial gas systems; gas reticulation systems... - Ensure current building codes and standards are applied
Summary of analysis:	There is no explicit reference in the qualification to skills and knowledge required to identify the need for, nor develop, Performance Solutions.

Analysis – core	Analysis – electives	Comment
7 units contribute to licensing requirements but across different classes of plumbing work therefore the qualification does not in itself contribute to a license in any one class of plumbing work.	No electives contribute to registration or licensing.	- The qualification is not aligned with registration or licensing of practitioners in Victoria. Despite the employability skills of this qualification covering the ability to design complex sanitary and drainage systems, and ensure building codes and standards are applied, there is no explicit reference to Performance Solutions. - Detailed analysis of units required to confirm if Performance Solutions is addressed at the individual unit level.

Appendix B - Technical review of gazetted units of competency for registration and licensing of plumbing practitioners

This review of the gazetted units of competency required for the registration and licensing of plumbing practitioners, included:

- reviewing the ‘unit descriptor’ and ‘application of the unit’ sections of each unit to understand the scope of the unit and whether the work it addresses could give rise to the need to apply knowledge of DtS and Performance Solutions to the work being undertaken; identify, develop or document a Performance Solution
- reviewing the language of the units to identify explicit and implicit references to Performance Solutions. This included reviewing in detail:
 - Elements and Performance Criteria
 - Required skills and required knowledge
 - Evidence guide, particularly the ‘critical aspects for assessment and evidence required to demonstrate competency in this unit’, and
 - Range statements.
- performing a key word search of each unit to identify if (and in what context) the following words, are present:
 - performance solution
 - performance-based, and
 - alternative solution.

Only those gazetted units of competency that are from the Construction and Plumbing Services Training Package were reviewed. These units are identified by their individual unit code which commences with either CPC (for the Construction Training Package) or CPP (for the Property Services Training Package). The majority of gazetted units of competency required for registration and licensing of plumbing practitioners come from these two training packages. Other training packages from which gazetted units are drawn include the:

- Business Services Training Package – units commence with the code BSB
- Electrotechnology Training Package – units commence with the code UEE
- Resources and Infrastructure Training Package - units commence with the code RII, and
- Health Training Package - units commence with the code HLT.

The review of units used for the registration and licensing of plumbers focussed only on units from the CPC or CPP training packages, for the following reasons:

- Units of competency whose ‘home’ training package is not related to construction or plumbing work, are unlikely to reference Performance Solutions. This can be illustrated using the unit ‘BSBSMB401A Establish legal and risk management requirements of small business’ by way of example. This unit of competency is from the Business Services Training Package, yet it is also a common unit required for licensing of plumbing practitioners. Being a business-related unit, the unit is written to suit a generic and varied audience. It is not written specifically for those engaged in running plumbing business, nor is it designed to deliver the technical skill and knowledge requirements of plumbers. It would therefore not be expected to contain explicit nor implicit references to the development of Performance Solutions.
- For the purposes of this report, the VBA was primarily concerned with plumbing specific technical units of competency.

General observations about the units:

- The units consistently require work to comply with relevant regulations and standards including building codes and legislation. Frequently, units included dedicated performance criteria or range statements covering the need for relevant standards, codes and symbols to be interpreted and applied. Notwithstanding these references to the need for the work to be compliant with standards and codes, the language of the units does not explicitly refer to the performance-based nature of the PCA; nor cover the need to identify nor refer to an appropriate person the need to identify or develop a DtS or Performance Solution for the work being undertaken. The units do not address contingency measures to be taken in cases where the work as specified, will not satisfy DtS requirements of the relevant code and for which a Performance Solution should either be identified and referred to a relevant person or developed and documented. Without this explicit wording, there is a risk that such knowledge surrounding compliance could be at best delivered but not assessed or at worse, neither delivered nor assessed during training.
- The range statement in many units specifies that ‘*information*’ may include regulatory and legislative requirements, particularly those pertaining to:
 - building codes
 - WHS and environmental requirements, and
 - plumbing and gasfitting authority.

The reference to ‘building codes’ could be better expressed as either the PCA, or, to encompass both the building and plumbing codes, the National Construction Code.

Use of the term 'building code' without expressly referencing the plumbing code, could (in theory) be interpreted by an RTO to exclude the plumbing code, and consequently result in excluding key compliance performance requirements of plumbing work. It is worth noting that units of competency are often a product of their time and the generic term 'building codes' which is frequently used in the plumbing units, is likely to reflect what was, at the time the units were written, commonly accepted terminology in the industry. As the plumbing units have not been subject to thorough review and revision by industry for some time this language should be revised.

The following tables B1 - B4 present the outcomes of the review of gazetted units of competency approved for the registration and licensing of plumbing practitioners. The units are listed alphabetically and indicate which class(es) of plumbing each unit of competency is required for registration or licensing.

The column headed 'Under Review' indicates if a unit of competency is currently under review by Artibus Innovation. Units under review are likely to be revised and updated to comply with current Standards for Training Packages and aspects of content may change slightly during the revision.

Table B1 Technical review of approved units required for registration in the main classes of plumbing work

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPCM2039A	Carry out interactive workplace communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2040A	Read plans and calculate plumbing quantities	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2041A	Work effectively in the plumbing and services sector	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	- Covers participation in a plumbing and services workplace. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2043A	Carry out WHS requirements	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	- Covers working safely through awareness of risks, work requirements and the planning and performance of safe work practices. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2045A	Handle and store plumbing materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	- Unit addresses handling and storing plumbing materials, identifying and addressing environmental and associated hazards, including the disposal of waste. - Not directly relevant to the use of Performance Solutions.	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPCM2046A	Use plumbing hand and power tools	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	- Covers the use of commonly used hand and power tools in plumbing work applications. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2047A	Carry out levelling	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	- Covers planning and using levelling equipment. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCCCM3001C	Operate elevated work platforms	-	-	-	-	-	✓	-	-	-	NO	- Superseded by and equivalent to CPCCCM3001 - Operate elevated work platforms up to 11 metres - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2048A	Cut and join sheet metal	-	-	✓	-	✓	✓	✓	-	✓	YES	Not directly relevant to the use of performance solutions.	No recommendation
CPCPCM2049A	Cut with Oxy-LPG / Acetylene equipment	✓	-	✓	-	✓	-	-	-	✓	NO	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2050A	Mark out materials	✓	-	✓	✓	✓	✓	-	-	✓	NO	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2052A	Weld using oxy-acetylene equipment	✓	-	✓	✓	✓	-	✓	-	✓	YES	Unit develops skills for welding/brazing metals associated with the	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												fabrication, installation and repair of plumbing components and systems. Not directly relevant to the use of Performance Solutions.	
CPCPCM2053A	Weld using manual metal arc welding equipment	-	-	-	-	✓	-	-	-	✓	YES	- Unit develops arc welding skills used in plumbing work. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2054A	Carry out simple concreting and rendering	✓	✓	✓	✓	-	✓	✓	-	-	YES	- Unit develops basic concreting skills. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM2055A	Work safely on roofs	✓	-	✓	-	✓	✓	✓	-	-	YES	- Unit develops skills for working safely on roofs. - Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM3021A	Flash penetrations through roofs and walls	✓	-	✓	-	✓	✓	✓	-	-	YES	Unit develops skills for set out, cutting and flashing a roof and wall penetration.	More information required: industry should be consulted to identify if this work could give rise to a performance solution.
CPCPCM3022A	Weld polyethylene and polypropylene pipes using fusion method	✓	-	-	-	-	✓	✓	-	-	YES	Unit develops skills for polymer pipe welding.	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												Not directly relevant to the use of Performance Solutions.	
CPCPCM3023A	Fabricate and install non-ferrous pressure piping	✓	-	✓	-	✓	-	-	-	✓	YES	- Unit develops skills for fabricating and installing non-ferrous pressure piping in commercial or domestic situations.³⁵ - It specifies that work must comply with regulations and standards but does not cover processes for undertaking work when specifications do not comply with standards. - E1.2 of PCA specifies that: The design, construction, installation, replacement, repair, alteration and maintenance of pressure equipment and piping must be in accordance with AS/NZS 1200, AS 1271, AS 1358 and AS 4041 - The outcomes of this unit could involve fabricating and installing under a	Revise the unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.

³⁵ The PCA does not use the word 'fabricate' however AS 4041 Pressure Piping, which is called up in the PCA, does use the term 'fabricate'. A question arises therefore, what the role of the installer is, where, in the course of following plans and specifications, the fabrication required cannot or will not comply with DtS provisions for the work.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												Performance Solution yet the unit does not explicitly address this	
CPCPDR2021A	Locate and clear blockages	-	✓	-	-	-	-	✓	-	-	YES	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPDR2022A	Install domestic treatment plants	-	✓	-	-	-	-	-	-	-	?	- Section F of the PCA specifies performance requirements for the installation of wastewater treatment systems. - The unit requires work must comply with regulations and Australian standards. It specifies knowledge is required of regulations and requirements...of effluent disposal and the installation of domestic treatment plants. - The outcomes of this unit could involve installing treatment plants under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.
CPCPDR2023A	Maintain effluent disinfection systems	-	✓	-	-	-	-	-	-	-	?	Section F of the PCA specifies performance requirements for the maintenance of onsite	Revise the unit to improve knowledge content around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												waste water management systems. - Unit requires work to be compliant with regulations and standards. - The outcomes of this unit could involve maintaining a system which was installed under a Performance Solution yet the unit does not explicitly address this.	
CPCPDR2024A	Install stormwater and sub-soil drainage systems	-	✓	-	-	-	-	-	-	-	YES	- Section D of the PCA specifies performance requirements for stormwater drainage systems. - Unit requires work to be compliant with regulations and standards. - The outcomes of this unit could involve installing systems under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.
CPCPDR2025A	Drain work site	-	✓	-	-	-	-	-	-	-	YES	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPDR2026A	Install prefabricated inspection openings and enclosures	-	✓	-	-	-	-	-	-	-	YES	Not directly relevant to the use of Performance Solutions.	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPDR3021A	Plan layout of a residential sanitary drainage system	-	✓	-	-	-	-	-	-	-	?	- Part C2 of the PCA specifies performance requirements for sanitary drainage systems - The unit specifies work must comply with regulations, relevant Australian standards - The outcomes of this unit could involve planning the layout of a sanitary drainage system under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.
CPCPDR3022A	Install below ground sanitary drainage systems	-	✓	-	-	-	-	-	-	-	YES	- The unit requires work must comply with regulatory or Australian standards. It requires knowledge of Australian standards applicable to the installation. It also makes reference to fixtures as identified in AS/NZS3500 National plumbing and drainage. - The outcomes of this unit could involve installing under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPDR3023A	Install on-site disposal systems	-	✓	-	-	-	-	-	-	-	YES	- Section F of the PCA specifies performance requirements for the installation of wastewater treatment systems. - The unit requires work must comply with regulations and Australian standards. It specifies knowledge is required of regulations and requirements...of effluent disposal and the installation of on-site disposal systems; it requires technical skills to install perforated pipe in an absorption trench to act as an on-site effluent disposal system from a septic sewerage tank. - The outcomes of this unit could involve installing a disposal system under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.
CPCPFS2021A	Connect static storage tanks for fixed fire protection systems	-	-	-	-	-	-	-	-	✓	YES	- Unit requires compliance with regulations and standards - Part B4 of the PCA specifies the performance	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												requirements for fire-fighting water services The outcomes of this unit could involve connecting storage tanks under a Performance Solution yet the unit does not explicitly address this.	
CPCPFS3030A	Design pre-calculated fire sprinkler systems	-	-	-	-	-	-	-	-	✓	YES	- The design of fire sprinkler systems must comply with the performance requirements of the BCA and PCA - The outcomes of this unit could give rise to the need to design a Performance Solution yet the unit does not explicitly address this.	Revise unit to include explicit skill and knowledge addressing the development of Performance Solutions in the design process
CPCPFS3031A	Fabricate and install fire hydrant and hose reel systems	✓	-	-	-	-	-	-	-	✓	YES	- Unit specifies that work must comply with regulations and standards. - PCA specifies at B4.2 that: The installation of a fire-fighting water service must be in accordance with AS/NZS 3500.1 - The outcomes of this unit could involve installing fire hydrant and hose reels under a Performance	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												Solution yet the unit does not explicitly address this.	
CPCPFS3034A	Install control valve assemblies, actuating devices and local alarms	-	-	-	-	-	-	-	-	✓	YES	- Unit specifies materials and equipment to be checked for compliance with standards; jointing systems to be installed in compliance with standards; and work to comply with regulations and standards - The outcomes of this unit could involve installing systems under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.
CPCPFS3036A	Install special hazard systems	-	-	-	-	-	-	-	-	✓	YES	Unit requires knowledge of National Fire Protection Association (NFPA) and Factory Mutual performance-based codes of practice; compliance with regulations, standards...procedures and processes, including ozone depleting substances (ODS) and synthetic greenhouse gases (SGG) regulations; and for components to be checked for compliance with standards	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The outcomes of this unit could involve installing special hazard systems under a Performance Solution yet the unit does not explicitly address this.	
CPCPFS3037A	Install domestic and residential life safety sprinkler systems	✓	-	-	-	-	-	-	-	✓	YES	- Unit covers installation of fire sprinkler systems. Fire sprinklers are covered by AS 2118 - The unit specifies that installation and testing must comply with relevant standards and that work must comply with regulations and standards - Required knowledge includes National Fire Protection Association (NFPA) and Factory Mutual performance-based codes of practice - The outcomes of this unit could involve installation under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertake is to meet DtS provisions or an approved Performance Solution.
CPCPFS3038A	Test and maintain fire hydrant and hose reel installations	-	-	-	-	-	-	-	-	✓	YES	- A post-installation unit - Required knowledge includes National Fire Protection Association	Industry advice required - unit may need to be revised to incorporate the need to identify the use of

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												(NFPA) and Factory Mutual performance-based codes of practice The outcomes of this unit could involve identifying if the system had been installed under a Performance Solution yet the unit does not explicitly address this.³⁶	a Performance Solution in the design and installation of the system prior to undertaking testing and maintenance.
CPCPFS3039A	Test and maintain automatic fire sprinklers	-	-	-	-	-	-	-	-	✓	YES	- Unit has been superseded by non-equivalent unit CPCPFS3047A - Test and maintain automatic fire sprinklers. CPCPFS3039A is listed here as it is a gazetted competency for registration in fire protection work and there may be practitioners who only hold the superseded unit. - A post-installation unit - Required knowledge includes National Fire Protection Association (NFPA) and Factory Mutual	As the unit is superseded, no change required. Regarding new unit: Industry advice required and if appropriate, revise the unit to incorporate the need to identify the use of a Performance Solution prior to testing and maintaining the automatic fire sprinkler system.

³⁶ This unit raises a broader question of what competency is required to maintain hydrants and hose reels and does the practitioner need to know or understand if a Performance Solution had been incorporated in the design and installation of the system? Does the use of a Performance Solution materially impact testing and maintenance work?

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												performance-based codes of practice. The new unit CPCPFS3039A Test and maintain automatic fire sprinklers, is also a post-installation unit and requires knowledge of NFPA and Factory Mutual performance-based codes of practice. The work could involve identifying if installation of sprinkler system was subject to a Performance Solution however the unit does not explicitly address this.	
CPCPFS3040A	Conduct basic functional testing of water-based fire suppression systems	-	-	-	-	-	-	-	-	✓	YES	- Unit has compliance requirements including in relation to AS 2118 Automatic fire sprinkler systems and AS 1851 Maintenance of fire protection systems and equipment - The work could involve identifying if a water-based fire suppression system was installed under a Performance Solution prior to testing, however the unit does not explicitly address this.	Industry advice required and if appropriate, revise the unit to incorporate the need to identify the use of a Performance Solution prior to conducting testing.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPFS3041A	Inspect and test fire pumpsets	-	-	-	-	-	-	-	-	✓	?	- Unit has compliance requirements including: AS 1851 Maintenance of fire protection systems and equipment; AS 2118 Automatic fire sprinkler systems; AS 2419 Fire hydrant installations; AS 2941 Fixed fire protection installations – Pumpset systems; AS CA-1962 Automatic sprinkler installations; NFPA 20 Standard for the installation of stationary fire pumps for fire protection (US) and AS 1851 Maintenance of fire protection systems and equipment - The work could involve identifying if a pumpset was installed under a Performance Solution however the unit does not explicitly address this.	Industry advice required and if appropriate, revise the unit to incorporate the need to identify the use of a Performance Solution prior to inspecting and testing.
CPCPFS3042A	Conduct annual functional testing of complex water-based fire suppression systems	-	-	-	-	-	-	-	-	✓	YES	Unit requires knowledge of water-based fire-suppression system applications as defined in AS 2118 Automatic fire sprinkler systems or AS 2419 Fire hydrant	Revise unit to incorporate the need to identify the use of a Performance Solution prior to testing.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												installations; it requires candidates to undertake installation and design surveys required by AS 1851 Maintenance of fire protection systems and equipment to determine that water-based fire-suppression system's design and installation are not impaired and provide inspection reports in relation to key compliance features. It does not necessarily require the development of a Performance Solution. The work could require identification of a non-compliance due to the use of a Performance Solution however the unit does not explicitly address this.	
CPCPFS3043A	Conduct functional water flow testing	-	-	-	-	-	-	-	-	✓	YES	Unit requires testing of water flow to ensure compliance with AS 2118 Automatic fire sprinkler systems and AS 2419 Fire hydrant installations, AS 1851 Maintenance of fire protection systems and equipment, and legislative	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												requirements. It specifies a range of compliance checks required and specifies action could include documenting any non-compliance. It does not necessarily require the identification nor development of a Performance Solution.	
CPCPFS3044A	Install distribution and range pipes	-	-	-	-	-	-	-	-	✓	YES	- This installation unit covers distribution and range pipes for all commonly used fire extinguishing agents, above and below ground. It requires compliance with relevant codes and standards. - The outcomes of this unit could involve installing distribution and range pipes under a Performance Solution yet the unit does not explicitly address this	Revise unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.
CPCPFS3045A	Fit-off sprinkler heads, controls and ancillary equipment	-	-	-	-	-	-	-	-	✓	YES	Unit requires knowledge of relevant statutory and authority requirements relating to installing sprinkler heads, system controls and ancillary equipment; and an ability	Revise unit to explicitly address expectations on a person in situations where the work does not comply with regulations or standards

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												to complete work in compliance with regulations, standards The outcomes of this unit could involve installing sprinkler heads under a Performance Solution yet the unit does not explicitly address this.	
CPCPFS3046A	Test the integrity of water-based fire protection systems using pressure	-	-	-	-	-	-	-	-	✓	YES	- A post-installation unit - It requires work be in compliance with regulations, standards; testing is to be in reference to Australian standards - It does not necessarily require the identification nor development of a Performance Solution.	No recommendation
CPCPFS3048A	Install fixed fire pumpsets	-	-	-	-	-	-	-	-	✓	YES	- Unit requires fixed fire pumpsets be installed according to relevant Australian standards, drawings, specifications and manufacturer instructions - The outcomes of this unit could involve installing fixed fire pumpsets under a Performance Solution yet the unit does not explicitly address this.	Revise unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPGS3046A	Install LPG systems in caravans, mobile homes and mobile workplaces	-	-	✓	-	-	-	-	-	-	YES	- Unit requires compliance with relevant Australian standards and regulations; - The outcome of this unit could involve installing LPG systems under a Performance Solution yet the unit does not explicitly address this.	Revise unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.
CPCPGS3047A	Install LPG systems in marine craft	-	-	✓	-	-	-	-	-	-	YES	- Unit requires compliance with relevant Australian standards and regulations; and ventilation requirements are to be determined and installed according to relevant Australian standards. - The outcomes of this unit could involve installing LPG systems under a Performance Solution yet the unit does not explicitly address this.	Revise unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.
CPCPGS3048A	Install gas pressure control equipment	-	-	✓	-	-	-	-	-	-	YES	Unit requires that: gas pressure controls and regulator, locations and venting requirements are checked for compliance against standards; materials, pipe fittings and components are selected to	Revise unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												comply with standards; gas control and regulating equipment is installed in compliance with standards and statutory and regulatory authorities' requirements; pressure is correctly adjusted to comply with standards; all work is to comply with regulations and standards The outcomes of this unit could involve installing gas pressure control equipment under a Performance Solution yet the unit does not explicitly address this.	
CPCPGS3049A	Install Type A appliance flues	-	-	✓	-	-	-	-	-	-	YES	Unit specifies a range of requirements to comply with relevant Australian standards including ventilation calculations, size and material of flue, flue installation; all work is to comply with regulations and standards. This may require the practitioner to be aware of different pathways to achieving compliance: Dts or Performance Solution or a combination of both. The	Improve knowledge content of the unit around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												unit does not explicitly specify that a Performance Solution may be incorporated in the design. The outcomes of this unit could involve installing Type A appliance flues under a Performance Solution yet the unit does not explicitly address this.	
CPCPGS3050A	Install Type B gas appliance flues	-	-	✓	-	-	-	-	-	-	YES	Unit specifies that: - Approval of system design is obtained according to statutory and regulatory authority and workplace requirements. This could imply that the design incorporates an approved Performance Solution, however the wording is not explicit and there is a risk that the possibility of a Performance Solution in the design will not be delivered in this unit. - Unit requires a range of requirements to comply with relevant Australian standards including selection of flue and installation of flue	Improve knowledge content of the unit around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The outcomes of this unit could involve installing Type B gas appliance flues under a Performance Solution yet the unit does not explicitly address this.	
CPCPGS3051A	Purge consumer piping	-	-	✓	-	-	-	-	-	-	YES	Unit specifies that installation of piping must be checked to ensure compliance with standards	No recommendation
CPCPGS3052A	Maintain Type A gas appliances	-	-	✓	-	-	-	-	-	-	YES	- Unit specifies that appliance is to be checked to ensure installation complies with standards prior to carrying out maintenance. Importantly, this will require the practitioner is aware of different pathways to achieving compliance: DtS or Performance Solution or a combination of both. - Whilst the practitioner undertaking this work may not be required to develop a Performance Solution, their work may require they identify if a Performance Solution had been incorporated into the design or installation.	Improve knowledge content of the unit around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The outcomes of this unit could involve maintenance of an appliance that was installed under a Performance Solution exists or is required, yet the unit does not explicitly address this.	
CPCPGS3053A	Disconnect and reconnect Type A gas appliances	-	-	✓	-	-	-	-	-	-	YES	- Unit specifies that appliance installation to be checked to ensure it complies with standards prior to disconnecting and reconnecting appliance. This may require the practitioner to be aware of different pathways to achieving compliance: DtS or Performance Solution or a combination of both. - Whilst the practitioner undertaking this work may not be required to develop a Performance Solution, their work may require they identify if a Performance Solution had been incorporated into the design or installation. - The outcomes of this unit could involve identifying	Improve knowledge content of the unit around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												that a Performance Solution exists or is required, yet the unit does not explicitly address this.	
CPCPGS3054A	Calculate and install natural ventilation for Type A gas appliances	-	-	✓	-	-	-	-	-	-	YES	- Unit requires ventilation is installed in compliance with building codes and standards; and knowledge of relevant statutory requirements related to natural ventilation requirements for Type A gas appliances - The outcomes of this unit could involve installing ventilation under a Performance Solution yet the unit does not explicitly address this.	Improve knowledge content of the unit around DtS and approved Performance Solutions.
CPCPGS3056A	Install gas piping systems	-	-	✓	-	-	-	-	-	-	?	Unit requires that set out of piping systems is according to design drawing or instruction and complies with relevant Australian standards; Support system and installation method, including fixings, are selected to comply with manufacturer instructions, relevant Australian standards; Pipe system is	Improve knowledge content of the unit around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												installed and jointed according to design drawing or instruction and complies with relevant Australian standards The outcomes of this unit could involve installing gas piping systems under a Performance Solution yet the unit does not explicitly address this.	
CPCPGS3057A	Size consumer gas piping systems	-	-	✓	-	-	-	-	-	-	NO	Unit requires that gas loads and pipe lengths or instructions are calculated and determined from design drawings, instructions or site inspection. It is possible the design is Performance Based yet the unit does not explicitly address this.	Improve knowledge content of the unit around DtS and approved Performance Solutions.
CPCPGS3059A	Install LPG storage of aggregate storage capacity up to 500 litres	-	-	✓	-	-	-	-	-	-	YES	- Unit requires practitioner determine the LPG storage facility requirements and install and test two LPG storage facilities up to 500 litre capacity, with operating pressures not exceeding 200kPa - Gasfitting is not included in the NCC/PCA	Industry advice required to confirm the role of the practitioner and if they are to identify the need for a Performance Solution. If required, the unit should be revised to include this.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												It is unlikely a practitioner would need to identify if a Performance Solution exists or is required.	
CPCPGS3060A	Install LPG storage of aggregate storage capacity exceeding 500 litres and less than 8 KL	-	-	✓	-	-	-	-	-	-	YES	- Unit requires practitioner to determine the LPG storage requirements, installing and testing first and second stage piping installation from an LPG storage container located and installed to specifications - Gasfitting is not included in the NCC/PCA - It is unlikely a practitioner would need to identify if a Performance Solution exists or is required.	Industry advice required to confirm the role of the practitioner and if they are to identify the need for a Performance Solution. If required, the unit should be revised to include this.
CPCPGS3061A	Install and commission Type A gas appliances	-	-	✓	-	-	-	-	-	-	YES	- The unit covers installing and commissioning Type A gas appliances approved for use with natural gas (NG) or liquefied petroleum gas (LPG) up to 200kPa - Gasfitting is not included in the NCC/PCA - It is unlikely a practitioner would need to identify if a Performance Solution exists or is required.	Industry advice required to confirm the role of the practitioner and if they are to identify the need for a Performance Solution. If required, the unit should be revised to include this.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPGS4023B	Install, commission and service Type B gas appliances	-	-	-	-	-	-	-	✓	-	YES	- Unit covers installing, commissioning and servicing Type B gas appliances, from the gas isolation valve and electrical isolation switch to the flue spigot on the appliance, according to current and relevant standards. - Unit requires person interpret and apply pre-existing design specifications - Gasfitting is not included in the NCC/PCA - A practitioner may need to identify if a performance solution has been incorporated into the design.	Industry advice required to confirm the role of the practitioner and if they are to: - identify a Performance Solution has been incorporated into the existing design If required, revise unit to explicitly include this. Revisions could include but not be limited to: - enhancing 'Element 1 Obtain authority to undertake work on Type B gas appliances' - adding to the required skills - adding to the required knowledge to include reference to performance requirements of the PCA - requiring additional assessment evidence to demonstrate capacity to complete required documentation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
													evidencing a Performance Solution was incorporated into the installation of the Type B gas appliance.
CPCPIG2021A	Design domestic urban irrigation systems	✓	-	-	✓	-	-	-	-	-	?	Unit covers skills required to prepare basic designs and irrigation drawings. As a basic drafting unit, it is unlikely a practitioner would be required to identify the need for a Performance Solution.	No recommendation
CPCPIG3021A	Set out, install and commission irrigation systems	✓	-	-	✓	-	-	-	-	-	?	- Unit covers skills required to set out, install and commission irrigation systems - The outcomes of this unit could involve installation of irrigation systems under a Performance Solution, yet the unit does not explicitly address this.	Industry advice required to confirm the role of the practitioner and if they are to: - identify a Performance Solution has been incorporated into the existing design - If required, the unit should be revised to explicitly include this
CPCPIG3022A	Install and commission domestic irrigation pumps	✓	-	-	✓	-	-	-	-	-	?	Unit requires the person install and commission for operation, a centrifugal pump (25mm suction and 25mm delivery) ...in	Industry advice required to confirm the role of the practitioner and if they are to: identify a Performance Solution

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												compliance with regulations, standards... The outcomes of this unit could involve installing and commissioning domestic irrigation pumps under a Performance Solution yet the unit does not explicitly address this.	has been incorporated into the existing design If required, the unit should be revised to explicitly include this
CPCPMS2021A	Assemble mechanical services components	-	-	-	-	✓	-	-	-	-	?	Unit requires a person to assemble and connect a heating coil to a boiler and a fan and duct work for a warm air heating system, ensuring compliance with regulations and standards. The work is unlikely to require knowledge of DtS or Performance Solutions.	No recommendation
CPCPMS3031A	Fabricate and install steel pressure piping	-	-	-	-	✓	-	-	-	✓	YES	- The PCA specifies that: the design, construction, installation, replacement, repair, alteration and maintenance of pressure equipment and piping must be in accordance with AS/NZS 1200, AS 1271, AS 1358 and AS 4041. - The unit specifies knowledge of relevant statutory authorities'	Revise the unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												requirements and Australian standards related to fabricating, installing and testing pressure pipe systems is required The outcomes of this unit could involve fabricating and installing under a Performance Solution yet the unit does not explicitly address this.	
CPCPMS3032A	Select and fit insulation and sheathing	-	-	-	-	✓	-	-	-	-	NO	- The unit requires the person to insulate 2 metres of small bore heating line with at least one change in direction; 2 metres of refrigeration line with at least one change in direction, and metal sheath at least 2 metres of pipework with at least one change in direction...ensuring compliance with regulations, standards. - PCA calls up AS4426 Thermal insulation of pipework, ductwork and equipment – selection, installation and finish	Revise the unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The outcomes of this unit could involve insulating under a Performance Solution yet the unit does not explicitly address this.	
CPCPMS3033A	Install small bore heating systems	-	-	-	-	✓	-	-	-	-	YES	- Unit requires the person check the configuration of pipework for compliance with plans, specifications, authorities' requirements and other relevant <i>information</i>. The range statement for 'information' may include: - regulatory and legislative requirements, particularly those pertaining to: - building codes - WHS and environmental requirements - plumbing regulations - relevant Australian standards - The outcomes of this unit could involve installing small bore heating systems under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.
CPCPMS3034A	Install medical gas pipeline systems	-	-	-	-	✓	-	-	-	-	YES	Unit requires the person check the configuration of	As installation of medical gas pipelines

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												system for compliance with plans, specifications, standards, authorities' requirements and relevant information; and that medical gas pipeline system is set out to comply with plans, specifications, standards and authorities' requirements. The <i>Plumbing Regulations</i> provide that Mechanical Services work includes work involving medical gas pipelines.³⁷ Medical gas work however is outside the scope of the PCA.	is outside the scope of the PCA, this unit does not require coverage of developing Performance solutions. No change required to unit.
CPCPMS3035A	Install and test ducting systems	-	-	-	-	✓	-	-	-	-	NO	- Unit covers installation and testing of ducting systems used for ventilation systems, heating and/or cooling systems, and exhaust systems. - It requires knowledge of Australian standards although none are specified. - The outcomes of this unit could involve installing	Revise the unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.

³⁷ *Plumbing Regulations 2018* (Vic) s25(1)(b)

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												ducting systems under a Performance Solution yet the unit does not explicitly address this.	
CPCPMS3036A	Install air handling units	-	-	-	-	✓	-	-	-	-	NO	- Unit covers installation and testing of air heating, cooling and ventilation plenums or enclosures. Work is required to be compliant with regulations, standards - The outcomes of this unit could involve installing air handling units under a Performance Solution yet the unit does not explicitly address this.	Revise the unit to require identification of whether the work being undertaken is to meet DtS provisions or an approved Performance Solution.
CPCPMS3038A	Install air conditioning control equipment	-	-	-	-	✓	-	-	-	-	NO	- The unit covers installation of air conditioning control equipment including control switches, control valves, damper motors, flow switches, limit switches, pressure switches, solenoid valves, thermostats. - The PCA does not provide performance requirements for air conditioning control equipment therefore the unit does not provide	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												outcomes that could require identification of a Performance Solution.	
CPCPMS3039A	Maintain mechanical services equipment	-	-	-	-	✓	-	-	-	-	NO	- The unit covers skills required to perform general / routine maintenance of heating, ventilating and air conditioning systems and associated mechanical equipment (air distribution systems, hydronic systems and control systems) - It requires work comply with regulations, standards and organisational quality procedures and processes - Part E1 of the PCA provides performance requirements for the 'design, construction, installation, replacement, repair, alteration and maintenance of mechanical heating, cooling and ventilation systems' - The outcomes of this unit could involve maintenance on equipment that was designed and installed under a Performance	Improve knowledge content of the unit around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												Solution, yet the unit does not explicitly state this.	
CPCPMS3040A	Install and maintain evaporative air cooling systems	-	-	-	-	✓	-	-	-	-	YES	- Unit covers skills required to install and maintain evaporative air cooling systems - It requires work comply with regulations, standards and organisational quality procedures and processes - Part E1 of the PCA provides performance requirements for the 'design, construction, installation, replacement, repair, alteration and maintenance of mechanical heating, cooling and ventilation systems' - The outcomes of this unit could involve installing and maintaining evaporative air cooling systems under a Performance Solution yet the unit does not explicitly address this.	Improve knowledge content of the unit around DtS and approved Performance Solutions.
CPCPRF2022A	Select and install roof sheeting and wall cladding	-	-	-	-	-	✓	-	-	-	NO	The unit provides skills required to select and install roof sheeting, steel battens and wall cladding for roofs. It includes the	Improve knowledge content of the unit around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												selection and installation of non-metallic roof materials associated with metal roofing (excluding roof tiles and slate) and of insulation materials - It requires the person identify insulation requirements, and make decisions regarding roof sheeting based on the design. - The outcomes of this unit could involve installing roof sheeting and wall cladding under a Performance Solution yet the unit does not explicitly address this. .	
CPCPRF2023A	Collect and store roof water	-	-	-	-	-	✓	-	-	-	YES	The unit provides skills required to determine storage requirements and to plan, prepare and install storage tanks and related piping for the collection and storage of roof water. It requires the installation of water storage tanks of at least 1000 litres capacity. The range statement specifies that roof water may be stored for drinking or non-drinking purposes.	Improve knowledge content of the unit around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												- Part B3 of the PCA provides performance requirements for non-drinking water services. - The outcomes of this unit could give rise to the need to identify that a Performance Solution is required yet the unit does not explicitly address this.	
CPCPRF3021A	Receive roofing materials	-	-	-	-	-	✓	-	-	-	NO	- The unit covers coordinating the delivery, receipt and handling of roofing materials on a site - The outcomes of this unit do not give rise to the need to consider the identification of a Performance Solution.	No Recommendation
CPCPRF3022A	Fabricate and install roof drainage components	-	-	-	-	-	✓	-	-	-	YES	- The unit provides skills for fabricating and installing roof drainage components and rainwater goods for commercial and residential roof systems - It requires the box gutter support system be fabricated according to relevant Australian standard and that roof drainage components are	Improve knowledge content of the unit around DtS and approved Performance Solutions.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												fabricated in compliance with relevant Australian standards, drawings, specifications and site measurements - It requires work comply with regulations, relevant Australian standards - The outcomes of this unit could involve fabrication and installation under a Performance Solution yet the unit does not explicitly address this.	
CPCPRF3023A	Fabricate and install external flashings	-	-	-	-	-	✓	-	-	-	YES	- The unit provides skills required to fabricate and install external flashings for roof and ceiling installations - Installation of flashing is not addressed by the PCA but may be covered by the BCA - The outcomes of this unit could involve fabricating and installing external flashings under a Performance Solution yet the unit does not explicitly address this.	Improve knowledge content of the unit around DtS and approved Performance Solutions
CPCPRF3024A	Install roof components	-	-	-	-	-	✓	-	-	-	YES	The unit covers selecting and installing industrial type roofing components in roofs. It requires	Improve knowledge content of the unit around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												installation be performance tested and remedied as required – however the unit does not specify what is meant by ‘performance tested’ and whether this includes meeting performance requirements of the NCC The outcomes of this unit could involve installing roof components under a Performance Solution yet the unit does not explicitly address this.	
CPCPRF3025A	Install roof coverings to curved roof structures	-	-	-	-	-	✓	-	-	-	YES	- Unit covers skills required to set out and install roofing to hyperbolic, paraboloid, barrel vault roof, curved roof and bull-nosed roof structures - It requires roof covering be performance tested and remedied - however the unit does not specify what is meant by ‘performance tested’ and whether this includes meeting performance requirements of the NCC	Improve knowledge content of the unit around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The outcomes of this unit could involve installing roof coverings under a Performance Solution yet the unit does not explicitly address this.	
CPCPRF3026A	Install composite roof systems	-	-	-	-	-	✓	-	-	-	YES	- Unit covers skills required to install roof sheets for composite roof systems. It requires that the 'quantity and type of manufactured roof covering and fittings required are calculated from design drawings and specifications in compliance with relevant Australian standards and regulatory requirements' - The NCC covers installation of roofing systems however the unit does not address measures to be taken if design does not meet DtS requirements - The outcomes of this unit could involve installing under a Performance Solution yet the unit does not explicitly address this.	Improve knowledge content of the unit around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPSN3011B	Plan the layout of a residential sanitary plumbing system	-	-	-	-	-	-	✓	-	-	NO	- The unit provides the skills required to plan the layout, size and install a sanitary plumbing system for residential buildings - Part C2 of the PCA provides performance requirements for ‘the design, construction, installation, replacement, repair, alteration and maintenance of any part of a sanitary <i>plumbing</i> system of a property including from sanitary fixtures and appliances to an <i>approved disposal system</i>’ - It requires work comply with regulations, relevant Australian standards - The outcomes of this unit could involve laying out a sanitary system under a Performance Solution yet the unit does not explicitly address this.	Revise unit to provide relevant knowledge and skill to identify and report on Performance Solutions as appropriate to the role.
CPCPSN3022A	Install discharge pipes	-	-	-	-	-	-	✓	-	-	YES	Unit requires the ‘Position of discharge pipes is determined according to plans and specifications, relevant Australian	Revise unit to provide relevant knowledge and skill to identify and report on Performance Solutions as appropriate to the role.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												standards, site requirements and other relevant information'; that the pipe system is set out to comply with plans, specifications and relevant Australian standards; As discharge pipes form part of the sanitary drainage system, the outcomes of this unit could involve installing under a Performance Solution, yet the unit does not explicitly address this.	
CPCPSN3023A	Fabricate and install sanitary stacks	-	-	-	-	-	-	✓	-	-	NO	- Unit requires that Stack design and branch positions are checked for compliance with relevant Australian standards, authorities' requirements, job plans and specifications, and relevant information - The outcomes of this unit could involve fabricating and installing sanitary stacks under a Performance Solution, yet the unit does not explicitly address this.	Revise unit to provide relevant knowledge and skill to identify and report on Performance Solutions as appropriate to the role.
CPCPSN3024A	Install and fit off sanitary fixtures	-	-	-	-	-	-	✓	-	-	YES	Unit provides skills required to set out, install and fit off	Revise unit to provide relevant knowledge and

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												a water closet, shower base, sink, bath, basin, dishwashing machine, and a wall hung urinal, ensuring... compliance with regulations, relevant Australian standards. It requires fixtures, components and pipework are assembled, installed and tested to manufacturer requirements, job specification and relevant Australian standards The outcomes of this unit could involve installing sanitary stacks under a Performance Solution yet the unit does not explicitly address this.	skill to identify and report on Performance Solutions as appropriate to the role.
CPCPSN3025A	Install pre-treatment facilities	-	✓	-	-	-	-	✓	-	-	YES	- The unit provides skills required to install pre-treatment facilities designed to intercept and retain prohibited discharges to the sanitary plumbing and drainage system - The unit specifies that 'Existing or required pipework is verified as compliant with relevant Australian standards, and	Revise unit to Improve knowledge content around DtS and approved Performance Solutions as appropriate to the role.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												manufacturer and authorities' requirements'. This will require the practitioner to be aware of different pathways to achieving compliance: Dts or Performance Solution or a combination of both, however the unit does not explicitly refer to DtS or Performance solutions.	
CPCPSN3026A	Install sewerage pumpsets	-	-	-	-	-	-	✓	-	-	YES	As sewage pumps form part of the sanitary drainage system, the outcomes of this unit could involve installing under a Performance Solution yet the unit does not explicitly address this.	Revise unit to Improve knowledge content around DtS and approved Performance Solutions
CPCPWT3020A	Connect and install storage tanks to a domestic water supply	✓	-	-	-	-	-	-	-	-	YES	- Unit specifies connection and installation to be compliant with regulations and relevant Australian standards. - The outcomes of this unit could involve installing storage tanks under a Performance Solution yet the unit does not explicitly address this.	Revise unit to Improve knowledge content around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
CPCPWT3021A	Set out and install water services	✓	-	-	-	-	-	-	-	-	YES	- Unit develops skills required to install heated, cold and tempered water services from the water supply to the fixture or points of discharge and storage. - The PCA contains requirements for the installation of water services. - The outcomes of this unit could involve setting out and installing water services under a Performance Solution yet the unit does not explicitly address this.	Revise unit to Improve knowledge content around DtS and approved Performance Solutions
CPCPWT3022A	Install and adjust water service controls and devices	✓	-	-	-	-	-	-	-	-	NO	- Unit specifies that materials and equipment are checked for compliance with relevant Australian standards; and that work must be compliant with regulations and Australian standards. - The unit addresses pressure, valve sizes, installation of cold water and heated/tempered water services.	Revise unit to Improve knowledge content around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The outcomes of the unit could involve installing and adjusting water service controls under a Performance Solution yet the unit does not explicitly address this.	
CPCPWT3023A	Install and commission water heating systems	✓	-	-	-	-	-	-	-	-	YES	- The unit requires that water heating system is installed according to relevant Australian standards, job specifications and manufacturer recommendations, and complies with authorities' requirements. - The outcomes of this unit could involve installing water heating systems under a Performance Solution yet the unit does not explicitly address this.	Revise unit to Improve knowledge content around DtS and approved Performance Solutions
CPCPWT3024A	Install and maintain domestic water treatment equipment	✓	-	-	-	-	-	-	-	-	YES	- Unit relates to water softeners, water coolers and water filtering equipment - The unit requires work must comply with regulatory or Australian standards. It requires	Revise unit to Improve knowledge content around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												knowledge of Australian standards applicable to the installation. The outcomes of this unit could involve installing domestic water treatment equipment under a Performance Solution yet the unit does not explicitly address this.	
CPCPWT3025A	Install water pumpsets	✓	-	-	-	-	-	-	-	✓	YES	- Unit covers the installation and testing of water pumpsets. - It specifies that materials and equipment must comply with relevant Australian standards and work must comply with regulations, Australian standards. - The outcomes of this unit could involve installing water pumpsets under a Performance Solution yet the unit does not explicitly address this.	Revise unit to improve knowledge content around DtS and approved Performance Solutions
CPCPWT3026A	Fit off and commission heated and cold water services	✓	-	-	-	-	-	-	-	-	NO	- This unit covers non-drinkable water services. - It requires materials and equipment be checked for compliance with relevant	Revise unit to improve knowledge content around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												Australian standards; that final connections are made to heated and cold water services ensuring fixtures, jointing methods and appliances comply with relevant Australian standards. - Part B3 of the PCA specifies requirements for the design, construction, installation, replacement, repair, alteration and maintenance of a <i>non-drinking water</i> service. - The outcomes of this unit could involve work on a service that was designed and installed under a Performance Solution yet the unit does not explicitly address this.	
CPCPWT3027A	Connect irrigation systems from drinking water supply	✓	-	-	✓	-	-	-	-	-	YES	- Unit covers connections from drinking water supply. - It requires materials and equipment be checked for compliance with relevant Australian standards; and that work comply with regulations and Australian standards.	Revise unit to improve knowledge content around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												- Part A2.1(d) of the PCA specifies that: A material or product intended for use in contact with drinking water must comply with AS/NZS 4020, and be supported by evidence of suitability in accordance with A2.2. - The outcomes of this unit could involve work subject to a Performance Solution yet the unit does not explicitly address this.	
CPCPWT3028A	Install water service	✓	-	-	-	-	-	-	-	✓	YES	- Section B of the PCA specifies the performance requirements for water services - The unit requires materials and equipment are checked for compliance with relevant Australian standards; and that work comply with regulations and Australian standards; and requires knowledge of Australian standards applicable to the installation - The outcomes of this unit could involve installing water services under a	Revise unit to improve knowledge content around DtS and approved Performance Solutions

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												Performance Solution yet the unit does not explicitly address this.	
CPCPWT3029A	Install water pipe systems	✓	-	-	-	-	-	-	-	-	YES	- Unit develops skills in installing and testing water pipes larger than DN65, or large water services. Such work is subject to the compliance requirements specified in the PCA - Unit requires work comply with relevant regulatory or Australian standards - The outcomes of this unit could involve installing water pipe systems under a Performance Solution yet the unit does not explicitly address this.	Revise unit to improve knowledge content around DtS and approved Performance Solutions
CPPFES2025A	Inspect, test and maintain gaseous fire suppression systems	-	-	-	-	-	-	-	-	✓	NO	- A post-installation unit - Unit requires practitioner to check compliance requirements and take action for non-compliance. Range statement for 'checking system compliance' specifies 'may include': - applying inspection, test and survey requirements	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												according to Australian standards ○ reviewing documentation to verify that installed systems comply with relevant rules and regulations. ● The VBA advise that in considering the routine servicing of fire systems and equipment requirements, there is no potential for a tradesperson to develop a performance solution, because after the system has been installed (and then certified by a Fire Engineer), the Building Surveyor will issue a Certificate of Occupancy (COO). The COO contains specific details of which testing regime must be followed e.g. AS1851.x Accordingly any alteration to the building, fire system(s) or fire equipment would require a change to the occupancy permit.	
CPPFES2043A	Prevent ozone depleting substance and synthetic greenhouse gas emissions	-	-	-	-	-	-	-	-	✓	NO	● The unit is focused on identifying and describing agreements, protocols,	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												legislation, regulations, codes of practice and handling licences developed to reduce ozone layer depletion and global warming Outcomes of this unit are not relevant to the identification or development of Performance Solutions.	
CPPFES2047A	Inspect and test control and indicating equipment	-	-	-	-	-	-	-	-	✓	NO	- The unit covers routine monthly and six-monthly inspect and test procedures to verify that control and indicating equipment (CIE) for a fire alarm system functions as intended. The unit involves... conducting compliance tests, visually inspecting, identifying non-compliance defects, and fulfilling mandatory reporting requirements - Tests must be according to requirements of AS1851; it includes visually inspecting fire suppression systems and identifying and reporting non-compliance defects.	No recommendation

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Under review	Analysis	Recommendations
												The unit clearly specifies that the practitioner's role is to test against the standard and report non-compliance.	

Table B2 Technical review of approved units required for registration in the specialised classes of plumbing

Unit code	Unit title	Backflow Prevention	Thermostatic Mixing Valve	Type A Appliance Conversion	Type A Appliance Servicing	Type B Gasfitting Advanced	Analysis	Recommendations
CPCPGS4022A	Service Type A gas appliances	-	-	-	✓	-	Unit requires appliance be assessed to ensure it complies with relevant standards before commissioning and returning to service. This may require identifying or knowing if a Performance Solution was used in the design and installation of the appliance; requires knowledge of <i>AS5601 Gas installations</i>; servicing activities and function required to comply with regulations and standards; materials are to comply with standards for maintenance of Type A gas appliances	Industry advice required to identify if the plumber servicing the Type A gas appliances must identify if a Performance Solution has been used in the design and installation of the Type A gas appliance, prior to disassembling and diagnosing gas system faults. If answer to above is yes, revise the unit to improve knowledge content around DtS and approved Performance Solutions.
CPCPWT4022A	Commission and maintain backflow prevention devices	✓	-	-	-	-	- Unit requires work comply with regulations, standards; knowledge of relevant Australian standards, including: - AS/NZS3500 National plumbing and drainage - AS/NZS2845.1:2010 – Water Supply – Backflow prevention devices - Part B1 Cold Water Services of the PCA covers the installation of backflow prevention devices. The commissioning and maintenance of such devices must comply with the PCA which could therefore involve work under a Performance Solution,	Revise unit to improve knowledge content around DtS and approved Performance Solutions.

Unit code	Unit title	Backflow Prevention	Thermostatic Mixing Valve	Type A Appliance Conversion	Type A Appliance Servicing	Type B Gasfitting Advanced	Analysis	Recommendations
							yet the unit does not explicitly address this.	
CPCPWT4023A	Commission and maintain hot and heated water temperature control devices	-	✓	-	-	-	- Unit requires work comply with regulations, standards; knowledge of relevant Australian standards, including AS/NZS3500 National plumbing and drainage - Unit requires practitioner check service and system are installed according to standards etc. This may require identifying or knowing if a Performance Solution was used in the design and installation of the device yet the unit does not explicitly address this.	Industry advice required to identify if plumber commissioning and maintaining hot and heated water temperature control devices must identify if a Performance Solution has been used in the design and installation process. If answer to above is yes, revise unit to incorporate identification of whether a Performance Solution had been employed in the design and installation of the hot and/or heated water temperature control device. This could include but not be limited to: - enhancing 'Element 3 Test and commission device' - adding to the required skills - adding to the required knowledge

Table B3 Technical review of approved units required for licensing in the main classes of plumbing

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
BSBSMB401A	Establish legal and risk management requirements of small business	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM4011A	Carry out work based risk control processes	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPCM4012A	Estimate and cost work	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	Not directly relevant to the use of Performance Solutions.	No recommendation
CPCPDR4011B	Design and size sanitary drainage systems	-	✓	-	-	-	-	-	-	-	YES	- The range of variables specifies 'information may include': relevant Australian standards, including AS/NZS3500 National plumbing and drainage: Part 2 Sanitary plumbing and drainage – Acceptable solutions. This is a reference to Appendix A of the standard which lists acceptable pipes and fittings that are deemed to be acceptable solutions, subject to the limitations of Clause 2.4 of the standard. This does not necessarily lead to an understanding of what to do in the event that a solution contrary to the acceptable solution of the standard is required. - There is repeated reference in the unit, to the need for the	Revise unit to provide explicit coverage of developing and documenting performance solutions. This could include but not be limited to: - enhancing 'Element 3 Design system layout' - adding to the required skills - adding to /enhancing the required knowledge to include reference to performance

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												design of the system to be according to <i>relevant Australian standards and statutory and regulatory requirements</i>. Again, this does not necessarily lead to an understanding of contingency requirements in the event a design cannot comply with the relevant standard etc. Whilst the PCA is a performance-based code, in the absence of explicit language about ensuring the performance outcome of the design, there is a risk an RTO could deliver and assess against this unit and not cover the design, development and documentation of Performance Solutions. • Knowledge requirement in the unit includes 'design concepts and performance measures for sanitary drainage'. It is not clear if this is a reference to Performance Solutions • Unit specifies work is to comply with regulations and Australian standards and that regulations and Australian standards relevant to the work are consulted and applied to all	requirements of the PCA • requiring additional assessment evidence to demonstrate having identified, designed and documented a performance solution for one residential (Class 1 building) sanitary drainage system and one commercial (Class 6 building) sanitary drainage system as part of the critical aspects of evidence.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												aspects of the work – however this does not explicitly mean the training will include identification of or development of a Performance Solution.	
CPCPDR4012B	Design and size stormwater drainage systems	-	✓	-	-	-		-	-	-	YES	- Section D of the PCA provides performance requirements for stormwater drainage systems - PC 2.2 of the unit requires that 'Regulations and Australian standards relevant to the work are consulted and applied to all aspects of the work'; - Range statement for 'information' lists that this 'may include: relevant Australian standards, including AS/NZS3500 National plumbing and drainage: Part 3 Stormwater drainage - Required knowledge specifies: 'design concepts and performance measures for stormwater and sub-soil drainage systems' however the term 'performance measures' could be more explicitly linked to the performance requirements of the PCA by using the term 'performance	Revise unit to provide explicit coverage of developing and documenting Performance Solutions. This could include but not be limited to: - enhancing 'Element 3 Design system layout' - adding to the required skills - adding to /enhancing the required knowledge to include reference to performance requirements of the PCA - requiring additional

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												requirements' and associating this to the PCA. - Repeated reference in the unit, to the need for the design of the system to be according to <i>relevant Australian standards and statutory and regulatory requirements</i>. Again, this does not necessarily lead to an understanding of contingency requirements in the event a design cannot comply with the relevant standard etc. Whilst the PCA is a performance-based code, in the absence of explicit language about ensuring the performance outcome of the design, there is a risk an RTO could deliver and assess against this unit and not cover the design, development and documentation of Performance Solutions. - This is a design unit which should explicitly refer to both DtS and Performance Solutions.	assessment evidence to demonstrate having identified, designed and documented a Performance Solution for a residential unit development comprising at least five two-storey (Class 1) units; and a commercial (Class 6) building.
CPCPDR4013B	Design and size domestic treatment plant disposal systems	-	✓	-	-	-	-	-	-	-	YES	PC 2.2 of the unit requires: Regulations and Australian standards relevant to work are consulted and applied to all aspects of the work	Revise unit to provide explicit coverage of developing and documenting Performance

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												- The assessment for the unit requires designing, sizing and documenting the layout of a treatment system for a domestic dwelling, which is compliant with current and relevant environmental and legislative requirements. - Range statement for 'information' lists that this 'may include: relevant Australian standards, including: AS/NZS3500 National plumbing and drainage: Part 2 Sanitary plumbing and drainage; AS/NZ1547 On-site domestic wastewater - Repeated reference to the need for the design to be according to 'Australian standards, regulatory authorities' requirements' (in performance criteria) and 'relevant statutory and authorities' requirements related to designing domestic treatment plant disposal systems' (in required knowledge), and 'compliance with regulations, relevant Australian standards...' (in critical aspects of evidence),	Solutions. This could include but not be limited to: - enhancing 'Element 3 Design system layout' - adding to the required skills - adding to /enhancing the required knowledge to include reference to performance requirements of the PCA - requiring additional assessment evidence to demonstrate having identified, designed and documented a Performance Solution for a domestic treatment plant disposal system.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												however this does not lead to an awareness nor understanding of contingency requirements in the event a design cannot comply with the relevant standard etc. The design related performance criteria refer to need for compliance but lack explicit reference to what to do if design won't comply and need to develop and document a Performance Solution. It could be argued that this implies knowledge that the PCA is a performance-based code however in the absence of explicit language about ensuring the performance outcome of the design, there is a risk an RTO could deliver and assess against this unit and not cover the design, development and documentation of Performance Solutions. Required knowledge specifies: <i>'design concepts and performance measures for domestic treatment plant disposal systems'</i> however the term 'performance measures' could be more explicitly linked	

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												to the performance requirements of the PCA by using the term 'performance requirements' and associating this to the PCA. This is a design unit which should explicitly refer to both DtS and Performance Solutions.	
CPCPFS4021A	Commission domestic and residential fire suppression sprinkler systems	-	-	-	-	-	-	-	-	✓	NO	- This unit covers the testing and commissioning of domestic and residential fire suppression sprinkler systems in buildings up to four storeys in height. It covers post installation processes. It requires systems be checked to ensure type and installation conform to standards and that the system is commissioned and maintained to ensure correct operation according to standards... - Information is specified in the range statement to 'may include: relevant Australian standards, including AS2118 Automatic fire sprinkler systems' - Between performance criteria 3.2 'Operation of system is	Consult with industry to identify role of the practitioner and if necessary, enhance unit to address identified gap in performance criteria relating to what steps a practitioner must take if the installed system does not satisfy testing requirements.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												tested...' and 3.3 'System is commissioned...', the unit lacks coverage of what to do if the system fails testing. Confirm whether this is relevant for ensuring that the system design and installation meet the performance requirements of the PCA and if so, the need to fail the installation and ensure rectification of either the design or installation be undertaken. This is a design unit which should explicitly refer to both DtS and Performance Solutions.	
CPCPFS4024A	Design residential and domestic fire sprinkler systems	-	-	-	-	-	-	-	-	✓	YES	- PC 2.2 requires: Regulations and standards relevant to the work are consulted and applied to all aspects of the work - PC 3.3 specifies the need for the system to meet 'plans, specifications, standards, manufacturer recommendations and water supply data'. - PC 3.5 specifies the 'Sprinklers are spaced according to manufacturer specifications, standards and relevant	Revise unit to provide explicit coverage of developing and documenting Performance Solutions. This could include but not be limited to: - enhancing 'Element 3 Design sprinkler system' - adding to the required skills

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												<i>statutory and regulatory authority</i> regulations’. - The range of variables for <i>statutory and regulatory authority</i> regulations includes ‘commonwealth, state or territory, and local authorities administering applicable Acts, regulations and codes of practice’. - Range of variables for ‘information’: may include: regulatory and legislative requirements, particularly those pertaining to: - building codes - WHS and environmental requirements - Plumbing regulations - No explicit reference to the PCA. Rather, it references National Fire Protection Association (NFPA) and Factory Mutual performance-based codes of practice - The critical aspects of evidence require a person to provide evidence of having designed a compliant fire sprinkler system using hydraulic calculations however it does not explicitly	- adding to the required knowledge - requiring additional assessment evidence to demonstrate having identified, designed and documented a Performance Solution for a domestic fire sprinkler system.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												require a person demonstrate their capacity to identify when and how to develop a performance solution as a means to achieving compliance This is a design unit which should explicitly refer to both DtS and Performance Solutions.	
CPCPGS4011C	Design and size consumer gas installations	-	-	✓	-	-	-	-	-	-	YES	- Unit requires that all plans and documentation should ensure compliance with regulations, relevant Australian standards... - Information is specified in the range statement to 'may include: relevant Australian standards, including AS5601 Gas installations - Performance criteria contain frequent reference to the need for the system to meet regulations and Australian standards. For example: PC 2.4: 'Gas installations are sized according to relevant Australian standards, and <i>statutory and regulatory authority...</i>' These and other performance criteria however, do not require the person to demonstrate their	Revise unit to provide explicit coverage of developing and documenting performance solutions when designing and sizing consumer gas installations. This could include but not be limited to: - enhancing 'Element 3 Plan system layout' - adding to the required skills - adding to /enhancing the required knowledge to include reference to

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												capacity to identify the need for nor develop a performance solution as a means to compliance. - The critical aspects of evidence require evidence of ‘...designing, sizing and documenting the layout of three gas installations...where the plans and documentation should ensure compliance with regulations, relevant Australian standards...’. There is no requirement however, for the person to be assessed as being able to identify when and how to develop a performance solution as a means to achieving compliance. - This is a design unit which should explicitly refer to both DtS and Performance Solutions.	performance requirements of the PCA requiring additional assessment evidence to demonstrate having identified, designed and documented a performance solution for a consumer gas installation.
CPCPGS4023B	Install, commission and service Type B gas appliances	-	-	-	-	-	-	-	✓	-	YES	See earlier analysis and recommendation page 76.	
CPCPMS4011B	Design, size and lay out heating and cooling systems	-	-	-	-	✓	-	-	-	-	YES	Performance criteria contain frequent reference to the need for the system to meet regulations and Australian standards. For example:	Revise unit to provide explicit coverage of developing and documenting performance solutions when designing and sizing

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												- PC 2.2 <i>Statutory and regulatory authorities'</i> requirements relevant to work are consulted and applied to all aspects of the work... - PC 2.4 <i>Air conditioning or small bore heating system</i> is sized to provide for required heating and cooling load and to provide required piping and ducting according to standards, regulatory authorities' and workplace requirements. These and other performance criteria however, do not require the person to demonstrate their capacity to identify the need for nor develop a performance solution as a means to compliance. - The critical aspects of evidence require evidence of designing, sizing and documenting the layout details of a domestic heating and cooling system... ...ensuring compliance with regulations, standards and organisational quality procedures...There is no requirement however, for the	heating and cooling systems. This could include but not be limited to: - enhancing 'Element 3 Design system layout' - adding to the required skills - adding to /enhancing the required knowledge to include reference to performance requirements of the PCA - requiring additional assessment evidence to demonstrate having identified, designed and documented a performance solution for the design of heating and cooling systems for a

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												person to be assessed as being able to identify the need for and develop a performance solution when designing and sizing heating and cooling systems. - Required knowledge includes: relevant statutory requirements related to designing, sizing and documenting the layout of heating and cooling systems - This is a design unit which should explicitly refer to both DtS and Performance Solutions.	domestic heating and cooling system requiring a minimum heat load of 150 megajoules (MJ) per hour plus a commercial heating and cooling system for a structure with at least four floors.
CPCPRF4011B	Design and size roof drainage systems	-	-	-	-	-	✓	-	-	-	YES	- Performance criteria contain frequent reference to the need for the system to meet regulations and Australian standards. For example: - PC 2.2 Regulations and Australian standards relevant to the work are consulted and applied... - PC 2.4 Quantity and size of gutters, sumps, rain heads and downpipes are determined according to relevant Australian standards...	Revise unit to provide explicit coverage of developing and documenting performance solutions when designing and sizing roof drainage systems. This could include but not be limited to: enhancing 'Element 3 Plan system layout'

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												- PC 3.1 Layout of roof drainage system is planned according to development plans, specifications, relevant Australian standards and workplace procedures. These and other performance criteria however, do not require the person to demonstrate their capacity to identify the need for nor develop a performance solution as a means to compliance. - Required knowledge specifies: 'design concepts and performance measures for 'various roof draining components for all types of roof' however the term 'performance measures' could be more explicitly linked to the performance requirements of the PCA by using the term 'performance requirements' and associating this to the PCA. - The critical aspects of evidence require evidence a person can...design, size and document the layout of a roof drainage system for three varied roof types, including at	- adding to the required skills - adding to /enhancing the required knowledge to include reference to performance requirements of the PCA - requiring additional assessment evidence to demonstrate having identified, designed and documented a performance solution for the design of roof drainage systems for three varied roof types, including at least one type incorporating eaves gutter and one type for a commercial building

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												least one type incorporating eaves gutter and one type for a commercial building incorporating box gutters, sumps or rain heads, ensuring... compliance with regulations, relevant Australian standards and organisational quality procedures and processes. There is no requirement however, for the person to be assessed as being able to identify the need for and develop a performance solution when designing and sizing roof drainage systems • Range statement for Information, may include: relevant Australian standards, including: AS/NZS3500 National plumbing and drainage: Part 3.2 Stormwater drainage; SAA and SNZ HB 114:1998 Guidelines for design of eaves and box gutters • This is a design unit which should explicitly refer to both DtS and Performance Solutions.	incorporating box gutters, sumps or rain heads.
CPCPSN4011B	Design and size sanitary plumbing systems	-	-	-	-	-	✓	✓	-	-	YES	• Unit covers skills required to design, size and document the layout of sanitary plumbing	Revise unit to provide explicit coverage of developing and

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												systems for multi-floor buildings - Performance criteria contain frequent reference to the need for the system to meet regulations and Australian standards. For example: - PC 2.2 Regulations and Australian standards relevant to the work are consulted and applied to all aspects of the work - PC 2.4 Fixture unit loading is determined according to relevant Australian standards and regulatory authorities' requirements - PC 2.5 System is sized according to relevant Australian standards, and regulatory authorities' and workplace requirements - PC 3.1 Layout of sanitary pipework and fixtures is planned according to building plans, relevant Australian standards and workplace procedures These and other performance criteria however, do not require the person to demonstrate their	documenting performance solutions when designing and sizing sanitary plumbing systems. This could include but not be limited to: - enhancing 'Element 3 Plan system layout' - adding to the required skills - adding to the required knowledge to include reference to performance requirements of the PCA - requiring additional assessment evidence to demonstrate having identified, designed and documented a performance solution for the design of

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												capacity to identify the need for nor develop a performance solution as a means to compliance. - Critical aspects of evidence require evidence a person can...'design, size and document the layout details for a commercial (Class 6) and residential building; using two approved sanitary plumbing systems to a minimum of six floors, inclusive of a basement, to include fixtures on each floor level (excluding the basement), ensuring: compliance with regulations, relevant Australian standards and organisational quality procedures and processes. There is no requirement however, for the person to be assessed as being able to identify the need for and develop a performance solution when designing and sizing sanitary plumbing systems. - This is a design unit which should explicitly refer to both DtS and Performance Solutions	sanitary plumbing systems for a commercial (Class 6) and a residential building.

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
CPCPWT4011B	Design and size heated and cold-water services and systems	✓	-	-	-	-	✓	-	-	-	YES	- Unit provides the skills required to design, size and document the layout of heated, tempered and cold water services, flushing systems, and hydrant and hose reel systems for multi-floor buildings - Performance criteria contain frequent reference to the need for the system to meet regulations and Australian standards. For example: - PC 2.2 Regulations and Australian standards relevant to the work are consulted and applied to all aspects of the work - PC 2.4 Heated, tempered and cold <i>water services and systems</i> are sized according to relevant Australian standards and regulatory authorities' and workplace requirements - PC 3.1 Layout of heated, tempered and cold water services and systems to <i>point of discharge</i> are planned according to building plans, relevant	Revise unit to provide explicit coverage of developing and documenting performance solutions when designing and sizing heated and cold water systems. This could include but not be limited to: - enhancing 'Element 3 Plan service and system layout' - adding to the required skills - adding to the required knowledge to include reference to performance requirements of the PCA - requiring additional assessment evidence to demonstrate having identified, designed and

Unit code	Unit title	Water Supply	Drainage	Gasfitting	Irrigation	Mech Svs	Roofing	Sanitary	Type B Gas	Fire Protection	Currently under review	Analysis	Recommendations
												Australian standards and workplace procedures. These and other performance criteria however, do not require the person to demonstrate their capacity to identify the need for nor develop a performance solution as a means to compliance. • The critical aspects of evidence do not require a person to be assessed as being able to identify the need for and develop a performance solution when designing and sizing heated and cold water services and systems. • Work is required to comply with regulations, standards... • This is a design unit which should explicitly refer to both DtS and Performance Solutions	documented a performance solution for at least one of the water systems currently specified in the evidence requirements for the unit.

Table B4 Technical review of approved units required for licensing in the specialised classes of plumbing

Unit code	Unit title	Backflow Prevention	Thermostatic Mixing Valve	Type A Appliance Conversion	Type A Appliance Servicing	Type B Gasfitting Advanced	Analysis	Recommendations
BSBSMB401A	Establish legal and risk management requirements of small business	✓	✓	✓	✓	✓	Unit is a general business unit from the BSB training package	No recommendation
CPCPCM4011A	Carry out work based risk control processes	✓	✓	✓	✓	✓	Not relevant to performance solutions	No recommendation
CPCPCM4012A	Estimate and cost work	✓	✓	✓	✓	✓	Not relevant to performance solutions	No recommendation
CPCPGS4022A	Service Type A gas appliances	-	-	-	✓	-	See analysis and recommendations earlier, page 103.	
CPCPWT4023A	Commission and maintain hot and heated water temperature control devices	-	✓	-	-	-	See analysis and recommendations earlier, page 104.	
CPCPWT4022A	Commission and maintain backflow prevention devices	✓	-	-	-	-	- Unit requires work comply with regulations, standards; knowledge of relevant Australian standards, including: - AS/NZS3500 National plumbing and drainage - AS/NZS2845.1:2010 – Water Supply – Backflow prevention devices - Part B1 Cold Water Services of the PCA covers the installation of backflow prevention devices. The commissioning and maintenance of such	Revise unit to include: identifying if a Performance Solution has been used in the design or installation of the backflow prevention device

Unit code	Unit title	Backflow Prevention	Thermostatic Mixing Valve	Type A Appliance Conversion	Type A Appliance Servicing	Type B Gasfitting Advanced	Analysis	Recommendations
							devices must comply with the PCA. The outcomes of this unit could give rise to the need to identify that a Performance Solution is required yet the unit does not explicitly address this.	

Appendix C - Technical review of CPC, CPC08, CPP and CPP07 units

A key word scan was undertaken across each of the three Training Packages to identify the use of the following words in qualifications and units of competency:

- alternative solutions, and
- performance-based.

The results are shown in the following tables.

CPC08 (Release 9.4)

The employability skills for 10 qualifications specify the need to either evaluate or develop compliant, alternative solutions. These include:

Qualification code and title	Employability Skill
CPC40110 Certificate IV in Building and Construction (Building)	Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems
CPC40208 Certificate IV in Building and Construction (Contract Administration)	Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems
CPC40308 Certificate IV in Building and Construction (Estimating)	Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems
CPC40508 Certificate IV in Building and Construction (Site Management)	Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems
CPC40708 Certificate IV in Building and Construction (Trade Contracting)	Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems
CPC40808 Certificate IV in Building and Construction (Swimming Pool and Spa Building)	Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems
CPC50412 Diploma of Plumbing Services	Employability skills for initiative and enterprise: Evaluates alternative solutions to improve plumbing systems and makes appropriate recommendations
CPC50509 Diploma of Fire Systems Design	Qualification description: The fire systems designs covered in this Diploma are those that meet the requirements of the Building Code of Australia or detailed designs prepared for alternative solutions designed or specified by a fire safety engineer.

CPC50612 Diploma of Hydraulic Services Design	Employability skill for initiative and enterprise: Evaluates alternative solutions to improve plumbing systems and makes appropriate recommendations
CPC60108 Advanced Diploma of Building Surveying	Employability skill for problem solving: Applies problem solving strategies across a range of areas, including evaluating materials and determining alternative solutions to construction problems. Employability skill for initiative and enterprise: Develops compliant, alternative solutions to construction problems.

There are 25 units of competency containing the words ‘alternative solutions’ or ‘performance-based’ in the content of the unit (including 3 superseded units). The units are within various Building and Construction qualifications as well as Building Surveying, Access Consulting, Fire Systems Design, Hydraulic Services Design and Plumbing and Services qualifications. Some of the units contain references to the BCA, some to NCC.³⁸

CPCCB4034A Apply codes and standards to building trade and services contracting

It is worth noting that the unit *CPCCB4034A Apply codes and standards to building trade and services contracting*, supports trade contractors and building service sector practitioners responsible for ensuring compliance with the building and plumbing codes and standards relevant to their industry sector. The Overview of Assessment states:

This unit of competency could be assessed by the application of design principles and solutions specified in the DTS and performance-based concept of BCA criteria applied to building projects or the PCA criteria applied to plumbing and services projects.

The Critical Aspects for Assessment and Evidence required to demonstrate competency in this unit, state:

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

- comply with organisational quality procedures and processes
- apply and interpret relevant documentation and codes

³⁸ References to the Factory Mutual performance-based codes of practice have not been counted in this analysis.

- accurately apply relevant BCA or PCA codes and standards relating to performance and compliance of building project work, and
- demonstrate understanding of the assessment methods available to determine whether a building solution complies with performance requirements or DTS provisions of the BCA.

The vocational outcomes of this unit are aimed at ensuring a person understands and can apply knowledge of DtS and Performance Solutions. The unit can be applied to different trades including those in the plumbing and services industry and this capacity to contextualise the unit for plumbing work is found in various parts of the unit including overview of assessment, critical aspects of evidence and is confirmed in the range statement for 'relevant trade areas' which specifically lists 'plumbing and services'. This unit is a core unit within the Skill Set: CPCSS00003 Undertake Trade Contracting, a skill set designed to address the needs of experienced tradespersons operating as sole traders or with limited staff.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCCB4001A Apply building codes and standards to the construction process for low rise building projects	• CPC50210 Diploma of Building and Construction (Building) • CPC40508 Certificate IV in Building and Construction (Site Management) • CPC40308 Certificate IV in Building and Construction (Estimating) • CPC40208 Certificate IV in Building and Construction (Contract Administration) • CPC40110 Certificate IV in Building and Construction (Building) And others... none plumbing specific	PC 3.2. Alternative solutions to a design or construction problem that will comply with BCA requirements are discussed and proposed in accordance with company policies and procedures. PC 3.3. Performance-based solutions are identified and documented in accordance with BCA requirements. PC 3.4. Assessment methods referenced in the BCA to determine whether a building solution complies with performance requirements or DtS provision of the BCA are analysed and applied. Required skills: communication skills to discuss and propose alternative solutions
CPCCB4048A Apply building codes and standards to the construction process for swimming pools and spas	• CPC40808 Certificate IV in Swimming Pool and Spa Building	As above

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCCB5001B Apply building codes and standards to the construction process for medium rise building projects	• CPC50308 Diploma of Building and Construction (Management) • CPC50210 Diploma of Building and Construction (Building)	As above
CPCCB4034A Apply codes and standards to building trade and services contracting	Skill Set: • CPCSS00003 Undertake trade contracting	Overview of assessment: This unit of competency could be assessed by the application of design principles and solutions specified in the DtS and performance-based concept of BCA criteria applied to building projects or the PCA criteria applied to plumbing and services projects. PC 2.3: <i>Assessment methods</i> are put in place to ensure compliance with relevant codes and standards Range statement for <i>Assessment methods</i> to include: • comparison with deemed-to-satisfy (DtS) provisions of the BCA • evidence of suitability • expert judgement • verification method. Critical aspects of evidence require a person be able to provide evidence of the ability to: • accurately apply relevant BCA or PCA codes and standards relating to performance and compliance of building project work. • demonstrate understanding of the assessment methods available to determine whether a building solution complies with performance requirements or DtS provisions of the BCA

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCBC6001B Apply building codes and standards to the construction process for large building projects	CPC60212 Advanced Diploma of Building and Construction (Management)	Overview of assessment: This unit of competency could be assessed by the application of design principles and solutions specified in the deemed-to-satisfy and performance-based concept of NCC criteria applied to a building project PC: 3.2. Alternative solutions to a construction problem that will comply with NCC performance requirements are discussed and proposed in accordance with company policies and procedures and standard specifications. PC 3.3. Performance-based solutions are identified and documented according to NCC requirements. PC 3.4. Assessment methods used by authorities to determine whether a building solution complies with the NCC are analysed and applied. Required skills: communication skills to discuss and propose alternative solutions
CPCBC6016A Assess construction faults in large building projects	CPC60212 Advanced Diploma of Building and Construction (Management)	PC 4.1 Suitable methods from the available alternative solutions are evaluated and recommended to resolve the problem, in accordance with project aims and objectives and using standard organisational processes.
CPCSV5006A Assess construction faults in residential buildings	- CPC60108 Advanced Diploma of Building Surveying - CPC50108 Diploma of Building Surveying	PC 3.1 Suitable construction methods from available alternative solutions are evaluated and recommended to resolve the problem in accordance with project aims and objectives, the BCA, relevant State and Territory Appendix to the BCA and Australian standard PC 3.3 Evaluation of available alternative forms of construction is carried out in accordance with project aims.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCCSV5011A Apply building codes and standards to residential buildings	• CPC60108 Advanced Diploma of Building Surveying • CPC50108 Diploma of Building Surveying • Plus 8 qualifications across the Local Government Training Package and Forest and Wood Products Training Package	Required skills: innovation skills to develop compliant alternative solutions to construction problems
CPCCSV6003A Assess construction faults in buildings up to three storeys Superseded by CPCCBS6010 Conduct and report on building surveying audits of residential buildings up to three storeys. ³⁹	• Old unit CPCCSV6003A is contained in: CPC60108 Advanced Diploma of Building Surveying • New unit CPCCBS6010 is contained in Skill set: CPCSS00004 Provide building surveying services for residential buildings up to three storeys	Old unit: PC 4.1 Suitable methods from available alternative solutions are evaluated and recommended to resolve the problem in accordance with project aims and objectives. New unit: Does not contain references to 'performance-based' or 'alternative solutions' however does include: PC 2.4 Elements of the building that comply with deemed-to-satisfy provisions of the BCA are noted and documented. Performance evidence: written report on the completed building surveying audit specifying: • items of the building which were compliant or which met deemed-to-satisfy provisions of the BCA • items of the building that did not meet compliance requirements
CPCPPS5009B Analyse and report on technical plumbing systems	• CPC50412 Diploma of Plumbing and Services	PC 2.2 Alternative solutions are trialled and evaluated for suitability. Critical aspects of evidence: trialling and evaluating alternative solutions
CPCSFS5001A Define scope and hazard level of fire systems design projects	• CPC50612 Diploma of Hydraulic Services Design • CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.

³⁹ NB The teachout period for CPCCSV6003A expired in June 2016 and as such the unit can no longer be delivered.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCSF5002A Research and interpret detailed fire systems design project requirements	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.
CPCSF5003A Develop plans and methodology for fire systems design projects	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.
CPCSF5005A Research and evaluate fire system technologies and components	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.
CPCSF5006A Create detailed designs for fire sprinkler systems	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers. Critical aspects of evidence: interpret and apply fire engineer's designs for alternative solutions
CPCSF5007A Create detailed designs for hydrant and hose reel systems	- CPC50612 Diploma of Hydraulic Services Design - CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers. Critical aspects of evidence: interpret and apply fire engineer's designs for alternative solutions
CPCSF5008A Create detailed designs for fire detection and warning systems	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers. Critical aspects of evidence: interpret and apply fire engineer's designs for alternative solutions
CPCSF5009A Create detailed designs for fire systems' water supplies	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
		Critical aspects of evidence: interpret and apply fire engineer's designs for alternative solutions
CPCSF5010A Provide documentation and support for fabrication of fire sprinkler systems	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.
CPCSF5011A Provide design documentation and review and support fire system installation processes	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.
CPCSF5013A Support commissioning processes and finalise fire systems design projects	CPC50509 Diploma of Fire Systems Design	Application of the unit: Fire systems designs are limited to those within the deemed-to-satisfy provisions of the Building Code of Australia or detailed fire systems designs for alternative solutions designed by fire engineers.
CPCSUS4001A Implement and monitor environmentally sustainable work practices	- CPC40912 Certificate IV in Plumbing and Services - CPC40808 Certificate IV in Swimming Pool and Spa Building - CPC40708 Certificate IV in Building and Construction (Trade Contracting) - CPC40611 Certificate IV in Building and Construction (Specialist Trades) - CPC40508 Certificate IV in Building and Construction (Site Management) - CPC40408 Certificate IV in Building and Construction (Sales) - CPC40308 Certificate IV in Building and Construction (Estimating) - CPC40208 Certificate IV in Building and Construction (Contract Administration) - CPC40110 Certificate IV in Building and Construction (Building) - Plus, qualifications from non construction/plumbing Training Packages.	PC 2.3 Alternative solutions to work site environmental issues are evaluated
CPCCSV5013A Apply principles of energy efficient design to buildings	- CPP50911 Diploma of Building Design - CPC60108 Advanced Diploma of Building Surveying	Range statement for <i>Energy Efficient design principles</i> : application and assessment of BCA performance-based solutions

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCCSV6009A Implement performance-based codes and risk management principles for buildings up to three storeys.⁴⁰ NB SUPERSEDED BY: CPCCBS6016 Assess and advise on performance-based solutions for buildings up to three storeys [see analysis for this unit under CPC Release 4]	• CPC50108 Diploma of Building Surveying • CPP50711 Diploma of Access Consulting • CPC60108 Advanced Diploma of Building Surveying	Old unit: 2: Apply the performance-based BCA. PC 2.1 Various assessment methods for performance-based codes, risk assessment and risk management principles contained in the BCA and their application are identified and applied for building projects requiring assessment and management of risk PC 2.5 Assessment report for a performance-based solution is prepared PC 2.6 Importance of documentation and record keeping for performance-based solutions is identified and applied. PC 2.7. Impacts of a performance-based solution on building maintenance and alterations are identified and reported. Critical aspects of evidence: evaluate and report data, findings and recommendations for the implementation of risk management strategies as a result of risk assessment and application of performance-based codes for at least one building development project up to three storeys, and in compliance with the applicable local government authority, relevant legislation and the BCA
CPCSFS7001A Define scope of and initiate special hazard fire systems design projects⁴¹ NB SUPERSEDED BY: CPCSFS8001 - Define scope of and initiate special hazard fire systems design projects [see analysis for this unit under CPC Release 4]	CPC70109 Graduate Certificate in Fire Systems Design Management	Range statement for <i>Fire systems design projects</i>: are defined as those projects that are developed as a fire risk solution to offer protection against business interruption by providing fire protection to specific equipment or facility, whose performance-based principles are often outside the ambit of the Building Code of Australia

⁴⁰ Although now superseded, this unit included explicit language around the performance-based nature of the work undertaken by building surveyors.

⁴¹ Although now superseded, this unit included explicit language around the performance-based nature of the work undertaken by fire systems designers.

CPC (Release 4.0)

There were 19 units of competency containing the words 'alternative solutions' or 'performance-based' in the content of the unit. All but one of these units are from the Building Surveying qualifications. One unit is from the Fire Systems Design qualification.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCCBS6004 Assess and advise on compliance of design documentation for residential buildings to three storeys	• CPC60115 Advanced Diploma of Building Surveying • Skill set: CPCSS00004 Provide building surveying services for residential buildings up to three storeys	PC 2.4 Professional network is consulted, where required, on technically accurate interpretation and application of compliance requirements in relation to alternative solutions. PC 3.5 <i>Solutions to compliance issues</i> are developed in consultation with colleagues and specialist experts as required, and are documented Range statement for Solutions to compliance issues must include: • alternative solutions that meet the performance requirements of the NCC • deemed-to-satisfy NCC solutions
CPCCBS6005 Assess and advise on compliance of design documentation for commercial buildings to three storeys	• CPC60115 Advanced Diploma of Building Surveying	As above for CPCCBS6004
CPCCBS6006 Process planning applications for residential buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying	PC 2.6 Required amendments to plans to ensure compliance and proposed alternative solutions are documented and communicated to client
CPCCBS6007 Process planning applications for commercial buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying	As above for CPCCBS6006
CPCCBS6008 Process building applications for residential buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying • Skill set: CPCSS00004 Provide building surveying services for residential buildings up to three storeys	As above for CPCCBS6006
CPCCBS6009 Process building applications for commercial buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying	As above for CPCCBS6006

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPCCBS6012 Conduct and report on initial construction inspections of residential buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying • Skill set: CPCSS00004 Provide building surveying services for residential buildings up to three storeys	Range statement for Compliance requirements for: site preparation, foundations and footings, sub-floor ventilation, steel framing, structural steel members, timber framing, waterproofing, must include: BCA: • deemed-to-satisfy specifications • performance requirements for alternative solutions
CPCCBS6013 Conduct and report on initial construction inspections of commercial buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying	Range statement for Compliance requirements for: site preparation, foundations and footings, structural provisions, waterproofing, must include: BCA: • deemed-to-satisfy specifications • performance requirements for alternative solutions
CPCCBS6014 Conduct and report on advanced and final inspections of residential buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying	Range statement for Compliance requirements for roof and wall cladding, glazing, fire safety, health and amenity, safe movement and access, energy efficiency must include: BCA: • deemed-to-satisfy specifications • performance requirements for alternative solutions
CPCCBS6015 Conduct and report on advanced and final inspections of commercial buildings up to three storeys	• CPC60115 Advanced Diploma of Building Surveying	Range statement for Compliance requirements for fire resistance, access and egress, services and equipment, health and amenity, ancillary provisions must include: BCA: • deemed-to-satisfy specifications • performance requirements for alternative solutions
CPCCBS6016 Assess and advise on performance-based solutions for buildings up to three storeys	CPC60115 Advanced Diploma of Building Surveying	Application of unit: This unit of competency specifies the outcomes required to advise on the application of National Construction Code (NCC) performance requirements for performance-based solutions for buildings up to three storeys, and to apply approved

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
		assessment methods to determine whether a proposed solution is compliant Performance evidence requires a person must provide advice on three performance-based solutions for the following buildings up to three storeys: - one performance-based fire safety solution - two performance-based solutions for structural safety, health, amenity and sustainability NB Health and amenity in the unit includes sanitary and other facilities
CPCCBS6017 Monitor and advise on construction and compliance upgrade work on buildings up to three storeys	CPC60115 Advanced Diploma of Building Surveying	Options for rectifying construction faults must include: - alternative solutions that meet the performance requirements of the NCC - deemed-to-satisfy NCC solutions Solutions to construction problems must include: - alternative solutions that meet the performance requirements of the NCC - deemed-to-satisfy NCC solutions
CPCCBS8003 Manage information on compliance requirements for a building surveying team	CPC80215 Graduate Diploma of Building Surveying	PC 3.1 Deemed-to-satisfy provisions of the National Construction Code (NCC) are reviewed and their application to the compliance of different classes and types of buildings and project locations is analysed and recorded PC 3.2 Performance requirements underpinning the deemed-to-satisfy provisions of the NCC are reviewed and their application to examples of alternative solutions are analysed and recorded
CPCCBS8004 Advise on compliance of building design documentation	CPC80215 Graduate Diploma of Building Surveying	Range statement for Solutions to compliance issues must include: - alternative solutions that meet the performance requirements of the NCC - deemed-to-satisfy NCC solutions

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CPCCBS8005 Manage planning approval processes for all building types	CPC80215 Graduate Diploma of Building Surveying	PC 2.7 Areas of non-compliance are identified, alternative solutions communicated to client, and revised plans assessed Performance evidence: identify and note areas of non-compliance and produce a range of alternative solutions for client consideration
CPCCBS8006 Manage building approval processes for all building types	CPC80215 Graduate Diploma of Building Surveying	PC 3.5 Reports provided by specialist consultants, including proposed alternative solutions to address areas of non-compliance, are reviewed Performance evidence: identify and note areas of non-compliance and produce a range of alternative solutions for client consideration
CPCCBS8008 Conduct and manage the completion of building inspections and audits	CPC80215 Graduate Diploma of Building Surveying	PC 2.3 NCC performance requirements for alternative solutions are researched and applied to critical stage inspections
CPCCBS8011 Assess and advise on performance-based solutions for all types of buildings	CPC80215 Graduate Diploma of Building Surveying	Application of the unit: This unit of competency specifies the outcomes required to advise on the application of National Construction Code (NCC) performance requirements for performance-based solutions for all types of buildings, and to apply assessment methods to determine whether a proposed solution is compliant. Performance evidence requires a person must provide advice on three performance-based solutions: - one performance-based fire safety solution for a building over four storeys in height - two performance-based solutions for structural safety, health, amenity and sustainability. NB Health and amenity in the unit includes sanitary and other facilities
CPCSFS8001 Define scope of and initiate special hazard fire systems design projects	CPC80115 Graduate Certificate in Fire Systems Design Management	No reference to alternative solutions nor performance-based solutions.

CPP (Release 7)

No units of competency containing the words 'alternative solutions' or 'performance-based' in the content of the unit.

CPP07 (Release 14.5)

There were 15 units of competency containing the words 'alternative solutions' or 'performance-based' in the content of the unit. Of these, 10 units are specific to Access Consulting qualifications. The remaining 5 units are specific to Building Design.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPPACC5004A Apply building codes and standards to accessible large-scale buildings	• CPP50711 Diploma of Access Consulting	PC 4.2 Alternative solutions to building accessibility problems that comply with BCA requirements are identified and documented. PC 4.3 Assessment methods used to determine whether a building solution to an accessibility problem complies with performance requirements or DtS provisions of the BCA are analysed and applied. PC 4.4 Assessment methods are identified and confirmed as appropriate to meet the DtS provisions of the BCA.
CPPACC5017A Provide expert access advice on building renovations	• CPP50711 Diploma of Access Consulting • Skill set: CPPSS00004 Conduct Building Access Audits Skill Set	Required skills: use the BCA as a performance-based document; facilitate the development of performance-based solutions Critical aspects of evidence: interpreting and using the performance-based provisions of the BCA to provide appropriate levels of access and developing effective arguments to demonstrate that performance-based solutions meet or exceed the DtS requirements
CPPACC5020A Undertake research on access issues	• CPP50711 Diploma of Access Consulting	Application of the unit: This unit specifies the competency required to undertake research for the purposes of defining the performance and outcomes of building innovations and alternative solutions as well as investigating a range of other issues concerning access.

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
		Required skills: analytical skills to... analyse and evaluate the performance and outcomes of building innovations and alternative solutions
CPPACC6002A Apply performance-based codes and risk management principles to assessing buildings for access	CPP50711 Diploma of Access Consulting	Unit descriptor: This unit specifies the competency required to apply performance-based codes, and risk assessment and risk management principles to accessibility features of buildings. It covers the comparison of proposed alternative solutions to the prescriptive Deemed-to Satisfy (DtS) requirements of the building legislation for the accessibility of building developments Elements and performance criteria: various Critical aspects of evidence: interpreting and applying the BCA hierarchy and the Objectives, Functional Statements and Performance Requirements when evaluating performance-based designs.
CPPACC6003A Apply unjustifiable hardship principles to Alternative Building Solutions for access	CPP50711 Diploma of Access Consulting	Unit descriptor: This unit specifies the competency required to apply the principles of unjustifiable hardship to the legislative requirements for existing buildings undergoing building work. It requires an assessment of any unjustifiable hardship component of a proposed Building Upgrade Plan, Alternative Building Solution or application for an exception from a requirement of the Building Code of Australia (BCA).... The assessment may result in the preparation of a report describing the processes for reaching approval of the proposed alternative solution or application for exception.
CPPACC8001A Research and analyse access and use requirements for people with diverse disabilities	- CPP80313 Graduate Diploma of Access Consulting - CPP80312 Vocational Graduate Diploma of Access Consulting	Required skills: National Construction Code (NCC) deemed-to-satisfy requirements, performance requirements and alternative solutions
CPPACC8002A Research and analyse access solutions for the built environment	- CPP80313 Graduate Diploma of Access Consulting - CPP80312 Vocational Graduate Diploma of Access Consulting	Required skills: National Construction Code (NCC) deemed-to-satisfy requirements, performance requirements and alternative solutions; analyse access solutions that meet the requirements of

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		codes and standards, including developing deemed-to-satisfy and performance-based solutions in line with the NCC Range statement for legislation, codes and standards may include: NCC, including: - deemed-to-satisfy solutions - formulation of performance-based alternative solutions
CPPACC8003A Provide advice on solutions to access and use issues	- CPP80313 Graduate Diploma of Access Consulting - CPP80312 Vocational Graduate Diploma of Access Consulting	PC 3.2 New ideas for National Construction Code (NCC)-compliant alternative solutions to access and use issues are developed, and costs and practicalities of implementation are explored. PC 3.3 Management plans are developed to support alternative solutions, as required Critical aspects of evidence include: provide alternative solutions to access and use issues where relevant
CPPACC8004A Develop policies and briefs relating to access to and use of the built environment	- CPP80313 Graduate Diploma of Access Consulting - CPP80312 Vocational Graduate Diploma of Access Consulting	Required skills: National Construction Code (NCC) deemed-to-satisfy requirements, performance requirements and alternative solutions
CPPACC8008A Contribute to design of accessible built environment and infrastructure	- CPP80313 Graduate Diploma of Access Consulting - CPP80312 Vocational Graduate Diploma of Access Consulting	Required skills: National Construction Code (NCC) deemed-to-satisfy requirements, performance requirements and alternative solutions Range statement for Access and compliance requirements may include: NCC, including: - deemed-to-satisfy solutions - formulation of performance-based alternative solutions <i>Solutions to access and use issues</i> include...meeting compliance requirements including alternative solutions...

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPPBDN8001A Research and evaluate construction materials and methods for complex building design projects	• CPP80313 Graduate Diploma of Access Consulting • CPP80312 Vocational Graduate Diploma of Access Consulting • CPP80213 Graduate Diploma of Building Design • CPP80211 Vocational Graduate Diploma of Building Design • CPP80113 Graduate Certificate in Building Design • CPP80111 Vocational Graduate Certificate in Building Design	2. Research alternative solutions PC 2.1 BCA requirements for use of alternative and deemed-to-satisfy-solutions are researched and evaluated in relation to the development of design options for the project PC 2.2 Benefits and options for the use of alternative solutions in the development of designs are researched and evaluated PC 2.3 Comparative analysis is undertaken of alternative and deemed-to-satisfy design solutions Required knowledge: • BCA deemed-to-satisfy requirements for construction Type A buildings • BCA alternative solution requirements for construction Type A buildings
CPPBDN8002A Research compliance requirements for complex building design projects	• CPP80313 Graduate Diploma of Access Consulting • CPP80312 Vocational Graduate Diploma of Access Consulting • CPP80213 Graduate Diploma of Building Design • CPP80211 Vocational Graduate Diploma of Building Design • CPP80113 Graduate Certificate in Building Design • CPP80111 Vocational Graduate Certificate in Building Design	3. Analyse impact of alternative solutions on project development Required knowledge: • BCA alternative solutions requirements
CPPBDN8003A Scope and initiate large and complex building design projects	• CPP80213 Graduate Diploma of Building Design • CPP80211 Vocational Graduate Diploma of Building Design • CPP80113 Graduate Certificate in Building Design • CPP80111 Vocational Graduate Certificate in Building Design	Required knowledge: • BCA deemed-to-satisfy and alternative solution requirements
CPPBDN8005A Manage the tendering and construction process for a client	• CPP80213 Graduate Diploma of Building Design • CPP80211 Vocational Graduate Diploma of Building Design	Required knowledge: • BCA deemed-to-satisfy and alternative solution requirements

Unit code and title	Qualifications in which the unit appears	Context in which the words 'alternative solutions' or 'performance-based' appear in the unit
CPPBDN8007A Manage the design of Type A constructions	• CPP80213 Graduate Diploma of Building Design • CPP80211 Vocational Graduate Diploma of Building Design • CPP80113 Graduate Certificate in Building Design • CPP80111 Vocational Graduate Certificate in Building Design	PC 1.3 Analysis is undertaken to determine whether the construction will be designed to meet the performance requirement of the BCA by the use of an alternative solution, a deemed-to-satisfy solution or a blend of solutions. Range statement for <i>Supporting information</i> to supplement the plans and specifications may include: alternative solutions for performance requirements of the BCA.