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# INNOVATION

Developing industry skills

## Construction, Plumbing and Services

IRC Skills Forecast and Proposed Schedule of Work

DRAFT

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# Construction, Plumbing and Services

## IRC Skills Forecast and Proposed Schedule of Work

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# Construction, Plumbing and Services

## IRC Skills Forecast and Proposed Schedule of Work

### Executive Summary

#### Sector Overview

The Construction and Plumbing Services sector is a significant driver of economic activity in Australia and is projected to grow by 2.5% in the next five (5) years. The sector is made up of the following:

- residential building and non-residential building construction
- building structure services
- building installation services
- land development and site preparation; and
- building completion services.

#### Key Skills Needed and Drivers for Change

The Construction Training Package is currently being substantially updated at the trade level. The industry is experiencing a range of skill shortages and workplace changes. Some of the major challenges and opportunities the industry will face include new technologies and increased demand for smart and green construction and an ageing workforce challenge. These will affect jobs, processes, tasks, building materials and potentially exacerbate skill shortages.

This means there is a need to attract new workers, retrain and upskill current workers with skills needed for new technologies, tasks and processes. The priority for training package development is to complete trade level work and then focus on higher-level skills supporting career pathways.

Technologies such as automation, Building Information Modelling (BIM), modular construction and pre-fabrication are having an impact on the many construction processes, methods and jobs. Therefore, there is a need to ensure that our training package prepares both current workers and new entrants with the skills to manage these technologies efficiently and effectively.

#### Proposed Schedule of Work

2018-2019 will see the focus of our work shift from finalising building construction and installation services projects to those qualifications that support the building completion services sectors - plastering, wall and ceiling lining, tiling, painting and decorating etc. Work will also include the review and update of the advanced qualifications including the Certificate IVs and Diplomas, which reflect more the project management and post trade technical sectors of the industry.

2018-2020 will also see work being undertaken on the future and therefore includes the development of cases for change including BIM, off -site construction and pre-fabrication, automation, robotics and digital skills plus environmental sustainability. These issues are cross industry and will effect the current training package and potentially require the development of new components to meet the future.

2016/17	
<p><b>Completed</b></p>	
<p>Installation of Insulation units of competency</p>	
<p>Certificate III in Shopfitting</p>	<p><b>2018/19</b></p>
<p>Certificate III in Signs and Graphics</p>	<p><b>Reviews in Progress</b></p>
	<ul style="list-style-type: none"> <li>• High Risk Work License Units</li> </ul>
	<ul style="list-style-type: none"> <li>• High Risk Work Qualifications</li> </ul>
	<ul style="list-style-type: none"> <li>• Bricklaying, Blocklaying, Stonemasonry &amp; Paving</li> </ul>
	<ul style="list-style-type: none"> <li>• Construction Pathways</li> </ul>
	<ul style="list-style-type: none"> <li>• Certificate III in Concreting</li> </ul>
	<ul style="list-style-type: none"> <li>• Certificate III in Carpentry (Joinery)</li> </ul>
	<ul style="list-style-type: none"> <li>• Prepare to Work Safely in the Construction Industry ('White Card')</li> </ul>
<p><b>2019/20</b></p>	<ul style="list-style-type: none"> <li>• Plumbing &amp; Fire Services Qualifications</li> </ul>
<p><b>Cases for Change</b></p>	<ul style="list-style-type: none"> <li>• Certificate III in Painting and Decorating</li> </ul>
<p>Diploma of Hydraulic Services Design</p>	<ul style="list-style-type: none"> <li>• Certificate III and IV in Demolition</li> </ul>
<p>Advanced Diploma of Building</p>	<ul style="list-style-type: none"> <li>• Certificate III in Solid Plastering</li> </ul>
<p>Surveying</p>	<p><b>Cases for Endorsement</b></p>
<p>Advanced Diploma of Building and Construction (Management)</p>	<ul style="list-style-type: none"> <li>• Certificate III in Roof Tiling</li> </ul>
<p>Graduate Diploma of Building Surveying</p>	<ul style="list-style-type: none"> <li>• Certificate III in Wall and Ceiling Lining</li> </ul>
<p><b>Proposed Cases for Change/Cross-SSO Projects</b></p>	<ul style="list-style-type: none"> <li>• Certificate III in Wall and Floor Tiling</li> </ul>
<p>Robotics and Automation</p>	<ul style="list-style-type: none"> <li>• Certificate III in Construction Waterproofing</li> </ul>
	<ul style="list-style-type: none"> <li>• Building and Construction Qualifications</li> </ul>
	<ul style="list-style-type: none"> <li>• Certificate III in Remote Area Building Repairs and Maintenance</li> </ul>
	<ul style="list-style-type: none"> <li>• Certificate IV in Swimming Pool and Spa Building</li> </ul>
<p><b>2020/21</b></p>	<p><b>Proposed Cases for Change/Cross-SSO Projects</b></p>
<p><b>Cases for Change</b></p>	<ul style="list-style-type: none"> <li>• Building Information Modelling (BIM)</li> </ul>
<p>Certificate II in Metal Roofing and Cladding</p>	<ul style="list-style-type: none"> <li>• Offsite Construction and Pre-fabrication.</li> </ul>
<p>Certificate II in Urban Irrigation</p>	
<p>Certificate III in Formwork/Falsework</p>	

*See proposed schedule of work section of skills forecast for qualification codes*

# Construction, Plumbing and Services

## IRC Skills Forecast and Proposed Schedule of Work

### Skills Forecast

#### Administrative Information

##### Skills Services Organisation (SSO):

Artibus Innovation

Artibus Innovation has been commissioned by the Australian government to support the IRCs for Construction, Plumbing and Services and Property Services. We look at skills training and qualifications for occupations in the building and property industries. We talk to employers, workers, trainers, regulators and other industry stakeholders. We explore current and anticipated skills needs, examine data on enrolments and outcomes, and make recommendations for change.

##### Industry Reference Committee (IRC):

Construction, Plumbing and Services

The Construction, Plumbing and Services IRC is responsible for national training package qualifications relevant to: Engineering and Technical services, building structures, building completion services, residential building construction and non-residential building construction, land development and site preparation, building installation services, architectural and other construction services.

#### Sector Overview

The Construction, Plumbing and Services sector comprises the construction of residential and non-residential buildings and the installation and repairs of plumbing as well as additions, alterations and the maintenance and repair of buildings.<sup>1</sup>

This industry is a significant driver of economic activity in Australia. The construction sector produces around 8% of Australia's Gross Domestic Product,<sup>2</sup> as it generates over \$350 billion in revenue and is projected to grow at an annual rate of 2.5% in the next five years.<sup>3</sup> At end of the financial year 2015-2016, the construction sector had the highest number of businesses operating in Australia, with a count of 358,466.<sup>4</sup>

The Construction, Plumbing and Services industry is largely made up of small-scale businesses that provide specialist construction services to building contractors, property developers and building and

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<sup>1</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

<sup>2</sup> Australian Industry Group, Economics Research, July 2015, *Australia's Construction Industry: Profile and Outlook*

<sup>3</sup> IBISWorld: Industry at a Glance: <http://clients1.ibisworld.com.au/reports/au/industry/ataglance.aspx?entid=306>.

<sup>4</sup> Australian Bureau of Statistics, 8165.0 Counts of Australian Businesses, including entries and exits, Jun 2012 to Jun 2016, table 1: Businesses by industry division

infrastructure owners.<sup>5</sup> The top four companies in the construction sector make up less than 10% of the available market share<sup>6</sup>, and the top four companies in the plumbing sector making up less than 5% of the market share.<sup>7</sup> About 90% of the workforce in the industry is employed in the private sector<sup>8</sup> and most businesses are Australian owned with their sales occurring predominately in the domestic market.<sup>9</sup>

## CPC Construction, Plumbing and Services Industry Sub-Sectors

### Residential Building and Non-Residential Building Construction

The Residential Building and Non-Residential Building Construction sector primarily involves the construction of houses or other residential buildings and non-residential buildings such as hotels, hospitals, prisons, or other buildings. Also involved in this sector is carrying out alterations, additions or renovations to these buildings and managing these tasks.<sup>10</sup>

In residential construction, the four largest home building companies (Metricon, ABN Group, BGC and Simonds Homes) contribute to less than 10% of annual industry revenue and in apartment and townhouse construction, the four largest companies are expected to account for only 21.6% of industry revenue in 2017-18 (Probuild, Multiplex (BHCA), Meriton Apartments, Dylam).<sup>11</sup> Businesses in residential building are location based and service local and regional populations. Most companies are domestically owned, but there is a growing level of foreign ownership in apartment and townhouse construction.<sup>12</sup> Typically, businesses in the industry operate in narrow regional markets.<sup>13</sup>

The non-residential building construction industry operates in areas such as industrial, commercial and institutional building construction. The four largest companies generating less than 10% annual revenue for commercial and industrial building (LendLease, Multiplex, CIMIC Group and Probuild Contractors) and the four largest companies in institutional building generating less than 20% industry revenue (CIMIC Group, Lendlease, CCCI and BHCA Pty Limited).<sup>14</sup> The industry is characterised by

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<sup>5</sup> IBISWorld: Industry at a Glance: <http://clients1.ibisworld.com.au/reports/au/industry/ataglance.aspx?entid=306>.

<sup>6</sup> IBISWorld: Industry at a Glance: <http://clients1.ibisworld.com.au/reports/au/industry/ataglance.aspx?entid=306>.

<sup>7</sup> IBIS World: Australia Industry Reports, Plumbing Services  
<http://clients1.ibisworld.com.au/reports/au/industry/competitivelandscape.aspx?entid=324#BTE>

<sup>8</sup> Australian Bureau of Statistics: 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, November 2017, Table 27. Employed Persons by Sector (public/private) and Industry Division of Main Job.

<sup>9</sup> IBISWorld, October 2017, Australia Industry Reports - Construction: Competitive Landscapes  
<http://clients1.ibisworld.com.au/reports/au/industry/competitivelandscape.aspx?entid=306>, IBISWorld, December 2017, Australia Industry Reports – Plumbing Services: Competitive Landscapes  
<http://clients1.ibisworld.com.au/reports/au/industry/competitivelandscape.aspx?entid=324#BTE>

<sup>10</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

<sup>11</sup> IBISWorld, 2017, Industry Reports on House Construction and Multi-Unit Apartment and Townhouse Construction in Australia

<sup>12</sup> IBISWorld, 2017, Industry Reports on House Construction and Multi-Unit Apartment and Townhouse Construction in Australia

<sup>13</sup> IBISWorld, 2017, Industry Reports on House Construction and Multi-Unit Apartment and Townhouse Construction in Australia

<sup>14</sup> IBISWorld, 2017, Industry Reports on Institutional Building Construction in Australia and Commercial and Industrial Building Construction in Australia

small-scale businesses, though it also contains some of the country's largest building firms.<sup>15</sup> While the industry sector has a significant amount of foreign ownership, the industry is still mostly Australian owned.<sup>16</sup>

This sector operates in a highly regulated environment, which includes licensing and registration requirements for workers, state and local government building standards, approvals and zoning regulations, pollution controls and workplace health and safety standards.<sup>17</sup> Builders must be licenced by the appropriate local authority (typically, government departments or commissions) in their specific state or territory, as each state or territory has different licensing requirements.<sup>18</sup>

### **Land Development and Site Preparation**

Businesses in Land Development and Site Preparation primarily subdivide and amalgamate land into lots as well as prepare and service land for sale, which involves completing excavation work for laying roads and utility lines.<sup>19</sup> Similarly, businesses in Site Preparation services typically conduct earthmoving work in preparation for construction, such as levelling sites, excavating foundations, digging trenches and removing overburden. This sector also includes businesses that hire out earthmoving equipment.<sup>20</sup>

The sector is characterised by small and medium sized businesses, operating in local and regional markets. Many of the businesses working in land development and subdivision are small-scale residential property developers, though there are several large companies which include government land organisations, and private land and property developers.<sup>21</sup> The site preparation industry also includes many small-scale contracting firms and medium-size regional players that specialise in providing site preparation services for construction contractors or local public works authorities.<sup>22</sup>

In contrast to other sectors on the industry, the largest businesses working in site preparation are typically from other industries, such as equipment and material wholesaling or manufacturing, or road and mine construction.<sup>23</sup>

This industry is highly regulated with mandatory licensing and permits for equipment operators and demolition work, as well as land use zoning, treatment of waste, permitted construction materials, population density requirements and minimum property elevation.<sup>24</sup> Both state and local

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<sup>15</sup> IBISWorld, 2017, Industry Reports on Institutional Building Construction in Australia and Commercial and Industrial Building Construction in Australia

<sup>16</sup> IBISWorld, 2017, Industry Reports on Institutional Building Construction in Australia and Commercial and Industrial Building Construction in Australia

<sup>17</sup> IBISWorld, 2017, Industry Reports on House Construction and Multi-Unit Apartment and Townhouse Construction in Australia

<sup>18</sup> Australian Business Licence and Information Service, 2017, custom search 'building,' accessed on 16/01/2017 at <https://ablis.business.gov.au/search/customsearch#>

<sup>19</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>20</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>21</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>22</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>23</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>24</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

governments oversee licensing and regulation, which creates a high degree of difference between localities in planning regulations and restrictions because councils tend to operate independently of one another.<sup>25</sup> In terms of workers licences, the machinery used in site preparation work requires specific certifications in order to be operated, which are set out by state and territory authorities.<sup>26</sup> For demolition work, different licences, permits and notifications are also required in different states and territories.<sup>27</sup>

### **Building Structure Services**

Businesses in the Building Structure Services Industry offer services such as concreting, laying and repairing clay and concrete bricks, blocks and pavers, tiling, slating or shingling rooves, building structural steel components for buildings, bridges, overhead cranes and electricity transmission towers.<sup>28</sup>

The Building Structure Services industry is also characterised by small scale businesses, often with less than 20 employees.<sup>29</sup> There are no major businesses in the industry and few barriers to entering and exiting the industry. This creates high competition amongst operators. The size of many businesses tends to increase and decrease in line with phases in the housing cycle. Many businesses also grow and diversify into providing a broader range of construction services.<sup>30</sup>

The level of regulation and licensing in this sector varies according to the trade involved, with each type of building structure services subject to its own building codes, insurance requirements and operator certifications. For example, there are limited formal qualifications and licensing requirements for concreters, although many hold qualifications in aligned building trades and most concreters begin their careers as builders.<sup>31</sup> On the other hand, the brick and block laying industry is generally regulated through apprenticeship-qualified tradespeople and roofing services are subject to Australian Standards in which businesses can incur legal damages for failures to comply.<sup>32</sup>

### **Building Installation Services**

This sector involves construction work such as plumbing and drainage installation and repair, electrical work installation, air conditioning and heating installation and fire and security alarm installation and maintenance.<sup>33</sup> The are four industries within this sub-sector.

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<sup>25</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>26</sup> IBISWorld, 2017, Australia Industry Reports on Land Division and Subdivision and Site Preparation in Services

<sup>27</sup> Australian Business Licence and Information Service, 2017, custom search 'demolition,' accessed on 16/01/2017 at <https://ablis.business.gov.au/search/customsearch#>

<sup>28</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Stand Industrial Classification (ANZSIC), 2006, and IBISWorld, 2017, Industry Reports on Concreting, Bricklaying, Roofing and Structural Steel Erection Services in Australia

<sup>29</sup> IBISWorld, 2017, Industry Reports on Concreting, Bricklaying, Roofing and Structural Steel Erection Services in Australia

<sup>30</sup> IBISWorld, 2017, Industry Reports on Concreting, Bricklaying, Roofing and Structural Steel Erection Services in Australia

<sup>31</sup> IBISWorld, 2017, Industry Reports on Concreting Services in Australia

<sup>32</sup> IBISWorld, 2017, Industry Reports on Bricklaying and Roofing Services in Australia

<sup>33</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Stand Industrial Classification (ANZSIC), 2006

1. The Plumbing Services industry provides general plumbing or drainage services, including installing and repairing water supply, sewer lines, septic tanks, drainage and gas systems, however it does not construct large-scale sewerage or stormwater drainage systems. The plumbing sector alone generates over \$14 billion in revenue and is expected to have an annual growth rate of 2% in the next five years.<sup>34</sup>
2. The Electrical services industry installs electrical wiring or fittings, as well as repair and maintain existing electrical equipment and fixtures.<sup>35 36</sup>
3. The Air-Conditioning and Heating industry specialises in installing household, industrial and commercial heating equipment, as well as refrigeration and air conditioning equipment.<sup>37</sup>
4. The Fire and Security Alarm industry<sup>38</sup> installs and repairs security systems and fire protection, detection and control systems.<sup>39</sup>

The Building Installation Services is characterised by small-scale businesses that work in local areas.<sup>40</sup> There are large scale businesses in the Fire and Security Alarm Industry, though they only account for the less than 30% of annual industry revenue (Mather & Platt, UTC Australia Commercial Holdings Pty Ltd, Hills Limited and ARA Fire Protection Service).<sup>41</sup>

This industry is heavily regulated, with plumbing, gas and electrical workers being required to hold specific licences to operate. Both plumbers and electricians must be licenced by the appropriate authority (typically, government departments or commissions) in their specific state or territory.<sup>42</sup> Workers in fire and security alarm installation services are required to follow codes of conduct and building code requirements. It is illegal to install security systems or monitoring devices without a licence issued by state and territory police services.<sup>43</sup>

### **Building Completion Services**

The Building Completion Services sector involves work that ‘finishes’ a building such as plastering, carpentry, tiling, painting and decorating and glazing.<sup>44 45</sup>

The Building Completion Services sector is typically low in market share concentration and is characterised by small scale businesses, often with less than 20 employees or consisting of individual

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<sup>34</sup> IBISWorld: Industry at a Glance: <http://clients1.ibisworld.com.au/reports/au/industry/ataglance.aspx?entid=306>.

<sup>35</sup> This subsector is covered by the Electrotechnology Training Package, not the Construction, Plumbing and Services Training Package

<sup>36</sup> IBISWorld, 2017, Industry Reports on Plumbing, Electrical, Air Conditioning and Heating and Fire and Security Alarm Services in Australia

<sup>37</sup> This subsector is covered by the Electrotechnology Training Package, not the Construction, Plumbing and Services Training Package

<sup>38</sup> Coverage of this sub-sector is provided across two training packages, CPC and CPP

<sup>39</sup> IBISWorld, 2017, Industry Reports on Plumbing, Electrical, Air Conditioning and Heating and Fire and Security Alarm Services in Australia

<sup>40</sup> IBISWorld, 2017, Industry Reports on Plumbing, Electrical, Air Conditioning and Heating and Fire and Security Alarm Services in Australia

<sup>41</sup> IBISWorld, 2017, Industry Report on Fire and Security Alarm Services in Australia

<sup>42</sup> Australian Business Licence and Information Service, 2017, custom search ‘plumbing,’ accessed on 16/01/2017 at

<https://ablis.business.gov.au/search/customsearch#>, and [http://www.era.gov.au/index.php?option=com\\_content&view=category&layout=blog&id=79&Itemid=515](http://www.era.gov.au/index.php?option=com_content&view=category&layout=blog&id=79&Itemid=515)

<sup>43</sup> IBISWorld, 2017, Industry Report on Fire and Security Alarm Services in Australia

<sup>44</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

<sup>45</sup> Glazing is covered in the Furnishing Training Package, not Construction, Plumbing and Services Training Package

contractors.<sup>46</sup> Businesses generally work in local or specialised niche markets with few businesses operating in more than one state or territory.<sup>47</sup>

In terms of regulation and licensing, there is a similar regulatory environment to other building and construction trades across the plastering and ceiling services, carpentry, and glazing trades. Trades are all expected to have formal qualifications obtained through an apprenticeship though this is not a legislated requirement in every State and Territory.<sup>48</sup>

### **Other Construction Services**

This sector mainly includes services that are not otherwise classified, such as scaffolding, dogging, rigging, post-tensioning, waterproofing of buildings, and swimming pool and spa building.<sup>49</sup> Landscape Construction Services<sup>50</sup> such as planting, land forming, building retaining walls and paths and installation of garden drainage and watering systems as well as the Hire of Construction Machinery are also classified under Other Construction Services.<sup>51</sup>

These sectors are typically characterised by small-scale businesses that operate at the local level.<sup>52</sup> There are a few large scale businesses operating in the metal cladding, waterproofing and scaffolding services industry, such as SBP Australia, ASKIN Performance Panels, Waco Kwikform, Cape Australia, Polyseal Waterproofing Technologies and AWS Services.<sup>53</sup>

Across this sector, licensing requirements vary depending on the type of work. In the Construction Machinery industry relevant qualifications and licensing are mandatory for equipment operators, project directors and supervisors. National High-risk work licences are also needed for working on all types of cranes.<sup>54</sup>

In the Metal Cladding, Waterproofing and Scaffolding industry, contractors are required to have high risk work licensees for scaffolding and rigging.<sup>55</sup> However, many other services do not require formal qualifications or licensees.<sup>56</sup>

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<sup>46</sup> IBISWorld, 2017, Industry Reports on Plastering and Ceiling, Carpentry, Tiling and Carpeting, Painting and Decorating, and Glazing Services in Australia

<sup>47</sup> IBISWorld, 2017, Industry Reports on Plastering and Ceiling, Carpentry, Tiling and Carpeting, Painting and Decorating, and Glazing Services in Australia

<sup>48</sup> IBISWorld, 2017, Industry Reports on Plastering and Ceiling, Carpentry and Tiling and Carpeting in Australia

<sup>49</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

<sup>50</sup> This is covered by the Agriculture, Horticulture and Conservation and Land Management Training Package, not the Construction, Plumbing and Services Training Package

<sup>51</sup> IBISWorld, 2017, Industry Reports on Landscaping Services, Construction Machinery and Operator Hire and Metal Cladding, Waterproofing and Scaffolding Services in Australia

<sup>52</sup> IBISWorld, 2017, Industry Reports on Landscaping Services, Construction Machinery and Operator Hire and Metal Cladding, Waterproofing and Scaffolding Services in Australia

<sup>53</sup> IBISWorld, 2017, Industry Report on Metal Cladding, Waterproofing and Scaffolding Services in Australia

<sup>54</sup> IBISWorld, 2017, Industry Report on Construction Machinery and Operator Hire in Australia

<sup>55</sup> Australian Business Licence and Information Service, 2017, custom search 'rigging,' accessed on 17/01/2017 at <https://ablis.business.gov.au/search/customsearch#>

<sup>56</sup> IBISWorld, 2017, Industry Report on Metal Cladding, Waterproofing and Scaffolding Services in Australia

## Architectural, Engineering and Technical Services

This sector includes designing buildings and structures, surveying and mapping services and sign writing.<sup>57</sup> The architectural, Engineering and Technical Services sector encompasses a variety of services, including Engineering and Architectural Services, which provide architectural design and drafting services and engineering consulting relating to the design and development of infrastructure projects.<sup>58</sup> The qualifications in the CPC training package however, are in signs and graphics and building surveying.

## Peak Bodies

- Australian Manufacturing Workers' Union (AMWU)
- Australian Workers Union
- Australian Industry Group
- Communications, Electrical and Plumbing Union (CEPU)
- Construction, Forestry, Mining and Energy Union (CFMEU)
- Master Builders Association
- Master Painters Association
- Master Plumbers Association
- National Fire Industry Association

## Construction, Plumbing and Services Qualifications

Table 1: *Qualifications for CPC Training Package by Sub-Sectors*

Residential Building and Non-Residential Building Construction	No. of Enrolments 2016 <sup>59</sup>	No. of Completions 2016 <sup>60</sup>
CPC10111 Certificate I in Construction	44,337	6,067
CPC20112 Certificate II in Construction	2,830	652
CPC20211 Certificate II in Construction Pathways	22,710	3,166
CPC40110 Certificate IV in Building and Construction (Building)	22,590	6,611
CPC40208 Certificate IV in Building and Construction (Contract Administration)	445	120
CPC40308 Certificate IV in Building and Construction (Estimating)	709	113
CPC40408 Certificate IV in Building and Construction (Sales)	0	0

<sup>57</sup> Australian Bureau of Statistics: 129.0 Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

<sup>58</sup> IBISWorld, 2017, Industry Reports on Architectural Services and Engineering Consulting in Australia

<sup>59</sup> NCVET, 2016, Data Product: Total VET students by industry – Total VET program enrolments, accessed online on 20/02/2018 at: <https://www.ncver.edu.au/data/collection/students-and-courses-collection/total-vet-students-and-courses>

<sup>60</sup> NCVET, 2016, Data Product: Total VET students by industry – Total VET program completions, accessed online on 20/02/2018 at: <https://www.ncver.edu.au/data/collection/students-and-courses-collection/total-vet-students-and-courses>

CPC40508 Certificate IV in Building and Construction (Site Management)	510	77
CPC40611 Certificate IV in Building and Construction (Specialist Trades)	49	0
CPC40708 Certificate IV in Building and Construction (Trade Contracting)	23	0
CPC50210 Diploma of Building and Construction (Building)	13,686	2,733
CPC50308 Diploma of Building and Construction (Management)	1,466	572
CPC60212 Advanced Diploma of Building and Construction (Management)	289	138
<b>Land Development and Site Preparation</b>		
CPC10111 Certificate I in Construction	44,337	6,067
CPC20112 Certificate II in Construction	2,830	652
CPC20211 Certificate II in Construction Pathways	22,710	3,166
CPC30413 Certificate III in Demolition	190	4
CPC41013 Certificate IV in Demolition	115	4
<b>Building Structure Services</b>		
CPC10111 Certificate I in Construction	44,337	6,067
CPC20112 Certificate II in Construction	2,830	652
CPC20211 Certificate II in Construction Pathways	22,710	3,166
CPC20812 Certificate II in Metal Roofing and Cladding	202	4
CPC30111 Certificate III in Bricklaying/Blocklaying	3,613	732
CPC32313 Certificate III in Stonemasonry (Monumental/Installation)	348	83
CPC30313 Certificate III in Concreting	2,698	912
CPC30812 Certificate III in Roof Tiling	725	125
CPC31111 Certificate III in Steel Fixing	131	76
CPC31611 Certificate III in Paving	3	0
<b>Building Installation Services</b>		
CPC20712 Certificate II in Drainage	131	76
CPC20912 Certificate II in Urban Irrigation	0	0
CPC32413 Certificate III in Plumbing	14,374	1,710
CPC32513 Certificate III in Plumbing (Mechanical Services)	59	10
CPC32612 Certificate III in Roof Plumbing	1,027	250
CPC32713 Certificate III in Gas Fitting	227	14
CPC40912 Certificate IV in Plumbing and Services	5,341	732
CPC50412 Diploma of Plumbing and Services	0	0

CPC50612 Diploma of Hydraulic Services Design	111	4
CPC32813 Certificate III in Fire Protection	673	102
CPC50509 Diploma of Fire Systems Design	74	0
CPC80115 Graduate Certificate in Fire Systems Design Management	0	0
<b>Building Completion Services</b>		
CPC10111 Certificate I in Construction	44,337	6,067
CPC20112 Certificate II in Construction	2,830	652
CPC20211 Certificate II in Construction Pathways	22,710	3,166
CPC30211 Certificate III in Carpentry	26,024	4,454
CPC30611 Certificate III in Painting and Decorating	4,840	1,296
CPC31011 Certificate III in Solid Plastering	755	168
CPC31211 Certificate III in Wall and Ceiling Lining	2,508	516
CPC31511 Certificate III in Formwork/Falsework	569	194
CPC31311 Certificate III in Wall and Floor Tiling	2,390	629
CPC30116 Certificate III in Shop fitting	0	0
CPC31912 Certificate III in Joinery	426	81
CPC32011 Certificate III in Carpentry and Joinery	2,540	313
CPC32211 Certificate III in Joinery (Stairs)	5	0
<b>Other Construction Services</b>		
CPC30511 Certificate III in Dogging	4,978	35
CPC30711 Certificate III in Rigging	1,689	161
CPC30911 Certificate III in Scaffolding	1,896	220
CPC31411 Certificate III in Construction Waterproofing	1,677	915
CPC31712 Certificate III in Post-Tensioning	0	0
CPC32912 Certificate III in Construction Crane Operations	3	0
CPC40808 Certificate IV in Swimming Pool and Spa Building	6	5
<b>Architectural, Engineering and Technical Services</b>		
CPC30216 Certificate III in Signs and Graphics	0	0
CPC60115 Advanced Diploma of Building Surveying	460	4
CPC80215 Graduate Diploma of Building Surveying	0	0

## Challenges and Opportunities

This section involves a brief overview of the challenges and opportunities to the Construction, Plumbing and Services Sector. For a more detailed discussion, see the Key Drivers for Change and Proposed Responses section below.

### *The Challenges*

The industry will face some major challenges over the next few decades with an increase in older workers, the introduction of new technologies and increased demand for smart and green construction. These challenges will affect jobs, processes, tasks, building materials and have the potential to cause critical skills shortages. These challenges also bring exciting growth opportunities for the industry.

#### **Increase in Older Workers**

The construction industry has aged in the last 20 years. Older workers (50+) now account for 23.6% of the workforce, while in November 1997, they only accounted for 17.5%. This is particularly significant since the percentage of the construction workforce under the age of 30 has only increased by 0.6% and the percentage of those aged 30-49 has decreased 6.7%<sup>61</sup> (see Graph 4).

This means that the skill replacement gap is increasing. Vital skills are at risk of being lost as larger portions of workers retire and there are proportionally fewer younger workers in the industry to replace their skills. This is compounded by an industry that has been growing and is projected to continue to grow.<sup>62</sup> This will drive the need retrain and upskill current workers with skills needed for new technologies and focus training package development priorities on the higher-level skills that will be needed to support career pathways and higher level skills.

#### **The Introduction of New Technology**

The introduction of new technologies such as automation, Building Information Modelling (BIM), modular construction and pre-fabrication will impact and change many construction processes, methods and jobs. The major challenge is that many jobs and tasks currently performed by people will not exist in the next few decades, either completely or partially. The jobs that are projected to be most affected are lower-skilled jobs that are often routine in nature where computers or robotics will be able to perform tasks more efficiently than humans.<sup>63</sup>

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<sup>61</sup> Australian Bureau of Statistics: 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, Data Cube EQ12 - *Employed persons by Age and Industry division of main job (ANZSIC), November 1984 onwards*  
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003Nov%202017?OpenDocument>

<sup>62</sup> Australian Department of Employment, Labour Market Information Portal, *Construction*  
<http://lmip.gov.au/default.aspx?LMIP/GainInsights/IndustryInformation/Construction>

<sup>63</sup> PWC, 2015, *A Smart Move: Future-proofing Australia's workforce by growing skills in science, technology, engineering and maths (STEM)*, accessed online 19/01/2018 at <https://www.pwc.com.au/stem.html>

## The Demand for Smart and Green Construction

With the need for action on climate change and sustainability becoming a focal point globally, so to comes a demand for green and smart buildings. Such buildings have been noted as being lower in operating costs, higher in value, higher in rental and occupancy rates and beneficial for the health and productivity of occupants.<sup>64</sup> The trend is evident and growing in Australia, and with this will come a shift in occupational practices, tasks and processes.<sup>65</sup>

### *The Opportunities*

With these challenges comes opportunities to shift the Australian construction industry into a more streamlined, environmentally friendly and cost-efficient age. For this to occur, not only will these new technologies and smart and green practices need to be adopted, but the workforce will need to be trained, re-trained and upskilled with the skills and knowledge to not only use these new technologies, but for the new jobs and tasks that arise.<sup>66</sup>

The review and development of the Construction, Plumbing and Services training package presents the opportunity to do this. Of relevance to this review and development are three cross-sector projects that are examining these challenges in the Australian workforce; automation, digitisation and environmental sustainability.

The Automation cross-sector project is being led by Skills Impact with the aim to review 241 existing units of competency across 32 training packages in areas where automation has the potential to rapidly transform work tasks or processes. Seven Construction, Plumbing and Services units have been identified for review, however, evidence shows that automation is likely to affect many occupations in the construction industry, both lower-skilled and higher-skilled, in different ways (see Key Drivers for Change section). The Construction, Plumbing and Services IRC believes that Artibus Innovation's involvement is critical in this cross-sector project in order to lead research and reviews on how all construction occupations will be affected by automation.

The Digital skills cross-sector project is being led by IBSA Manufacturing with the aim to review the skill needs for digital literacy, additive manufacturing (3D printing) and programming/coding skills. Digital skills will be critical for all construction workers and professionals with the increase in new technologies due to automation and digital systems like BIM. The Construction, Plumbing and Services IRC proposes Artibus Innovation's involvement in this cross-sector project to lead research and reviews on how all construction occupations will need digital skills.

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<sup>64</sup> Jadhav, NY, 2016, *Green and Smart Buildings*, Springer, Singapore

<sup>65</sup> World Business Council for Sustainable Development, 2009, *Energy Efficiency in Buildings: Transforming the Market*, accessed online 02/02/2018 at <http://www.wbcd.org/Projects/Energy-Efficiency-in-Buildings/Resources/Transforming-the-Market-Energy-Efficiency-in-Buildings>

<sup>66</sup> Construction Training Fund, 2014, *Impact of New Technologies on the Construction Industry*, accessed online 18/01/2018 at <https://bcitf.org/whats-new/research>

In addition, BIM and offsite construction (including prefabrication) have the potential to disrupt and challenge a major part of the construction industry's current processes, tasks and occupations and as a result, Artibus Innovation proposes to conduct cases for change on both to determine how disruption will occur, what occupations will be affected and what implications this has for the training package.

The Environmental Sustainability cross-sector project is being led by Skills Impact with a focus on environmentally sustainable production methods and energy management; natural resource management and waste handling; and consumer/market driven sustainability practices. There are two Construction, Plumbing and Services units that have been identified for review. Environmental sustainability is critical to the construction industry with the increasing demand for green and smart construction and will affect the tasks, processes and materials used in many occupations. The Construction, Plumbing and Services IRC proposes that Artibus Innovation's involvement in this cross-sector project is critical to lead research and reviews on how all construction occupations will be affected by green and smart construction.

## Employment and Skills Outlook

This section explores current and projected employment levels in the Construction, Plumbing and Services sector. Current skills shortages and emerging skills needed in the industry are also discussed.

### Employment Outlook

The construction industry is Australia's largest by number of operating businesses.<sup>67</sup> At end of the 2015-2016 financial year there were 358,466 businesses operating in the industry and throughout the year, there were 47,957 exits and 59,924 entries, showing a 3.5% rate of change.<sup>68</sup>

The construction industry employs approximately 1,154,500 people in both full and part time capacities. This equates to around 9.4% of the total workforce in Australia.<sup>69</sup> Over the past five years, employment in the industry has increased by 19%, and over the next five years, employment is projected to grow 10.9%.<sup>70</sup> The below tables show the sub-sector and occupation employment projections for the next five years in the Construction, Plumbing and Services Sector.

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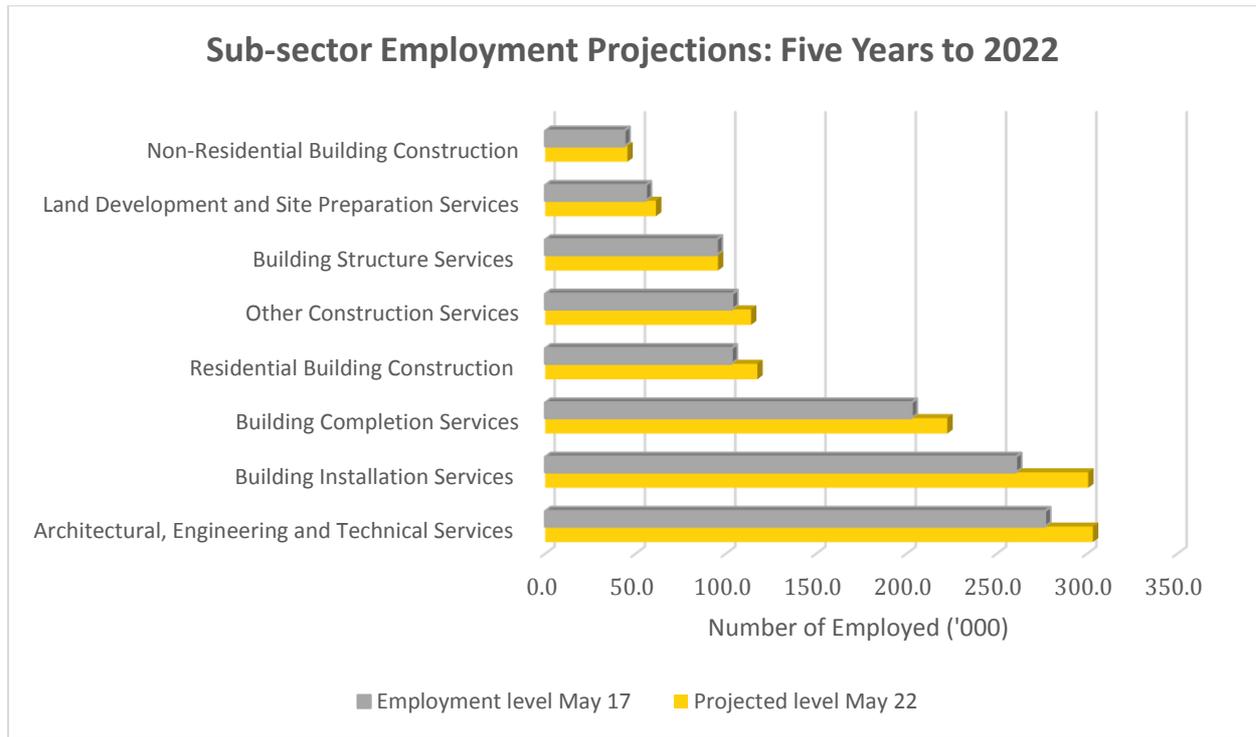
<sup>67</sup> Australian Bureau of Statistics, 8165.0 Counts of Australian Businesses, including entries and exits, Jun 2012 to Jun 2016, Summary of Findings

<sup>68</sup> Australian Bureau of Statistics, 8165.0 Counts of Australian Businesses, including entries and exits, Jun 2012 to Jun 2016, table 1: Businesses by industry division

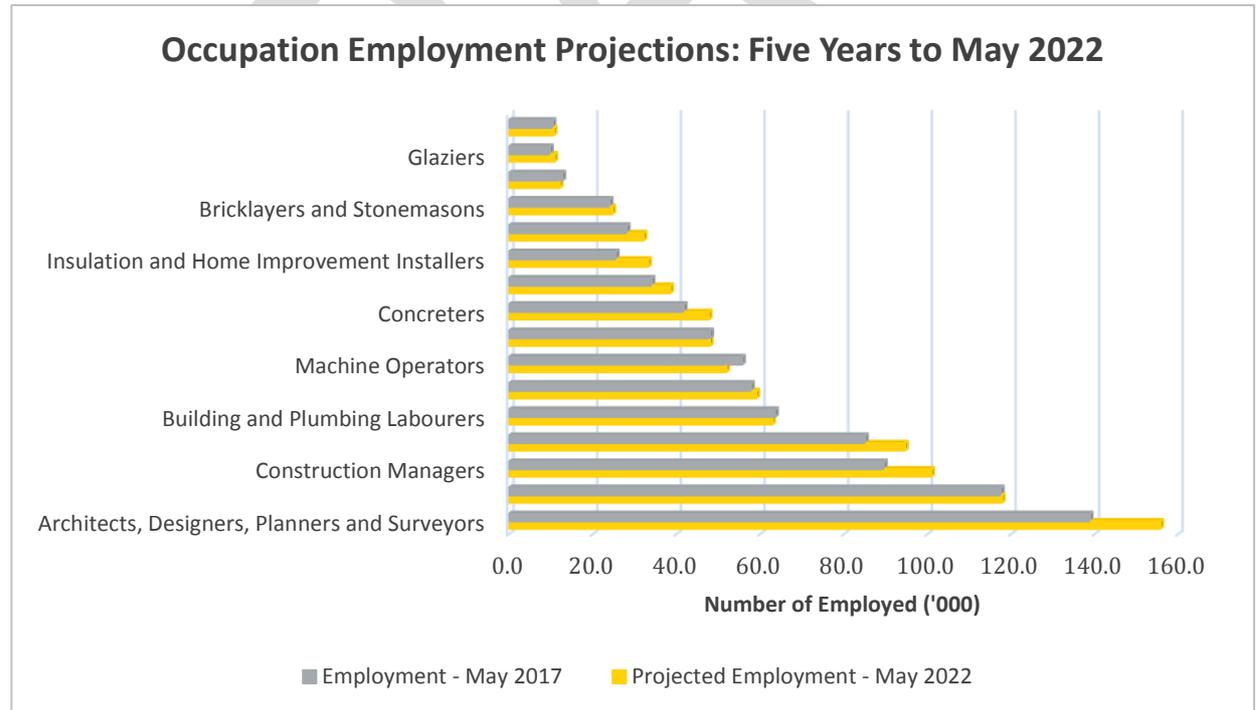
<sup>69</sup> Australian Department of Employment, Labour Market Information Portal, *Construction*  
<http://lmip.gov.au/default.aspx?LMIP/GainInsights/IndustryInformation/Construction>

<sup>70</sup> Labour Market Information Portal, 2017, *2017 Employment Projections, Industry Employment Projections – five years to May 2022 table*, accessed online 12/01/18 at <http://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>

**Graph 1: Sub-Sector Employment Projections - Five Year to May 2022.<sup>71</sup>**



**Graph 2: Occupation Employment Projections: Five Years to 2022.<sup>72</sup>**



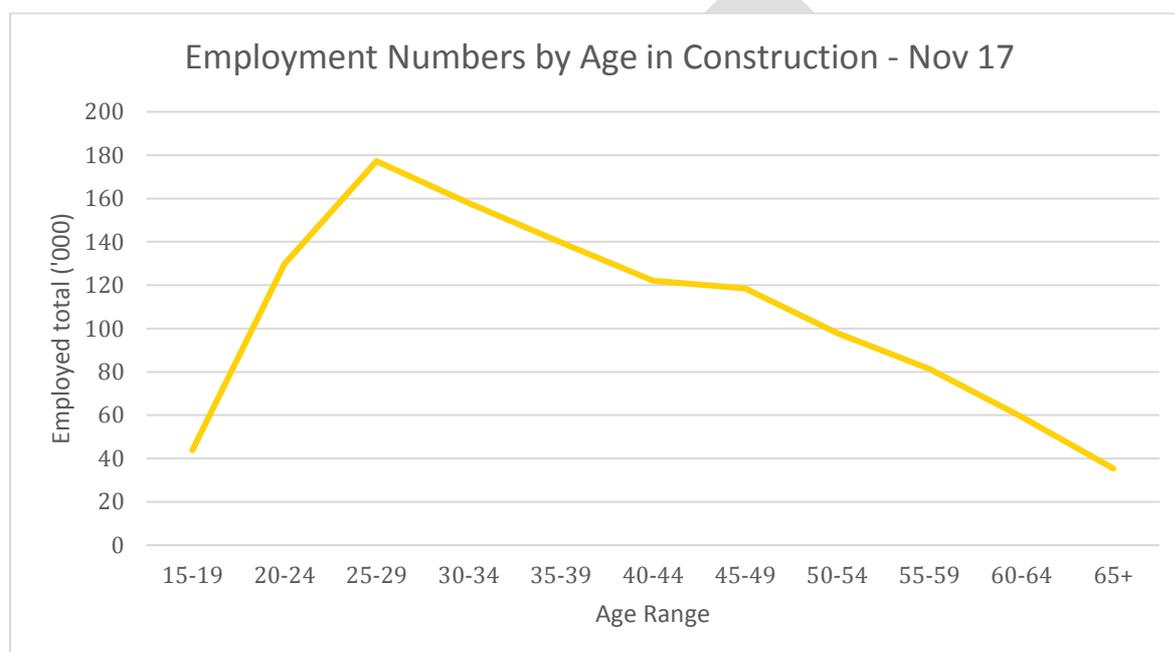
<sup>71</sup> Labour Market Information Portal, 2017, *2017 Employment Projections, Industry Employment Projections – five years to May 2022 table*, accessed online 12/01/18 at <http://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>

<sup>72</sup> Labour market Information Portal, 2017, *Employment Projections, 2017 Occupational Projections – five years to May 2022 table*, accessed online 17/01/2018 at: <http://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>

The median earnings in the construction industry are around \$1,250 gross per week for full time employees, and the industry is predominately male accounting for 88.4% of the workforce.<sup>73</sup>

The construction industry workforce is younger than the national average, with the largest age group being 25–30 years. The graph below shows the age trends of workers in the construction industry as of November 2017.<sup>74</sup>

**Graph 3: Employment Numbers by Age in Construction - Nov 17.**<sup>75</sup>

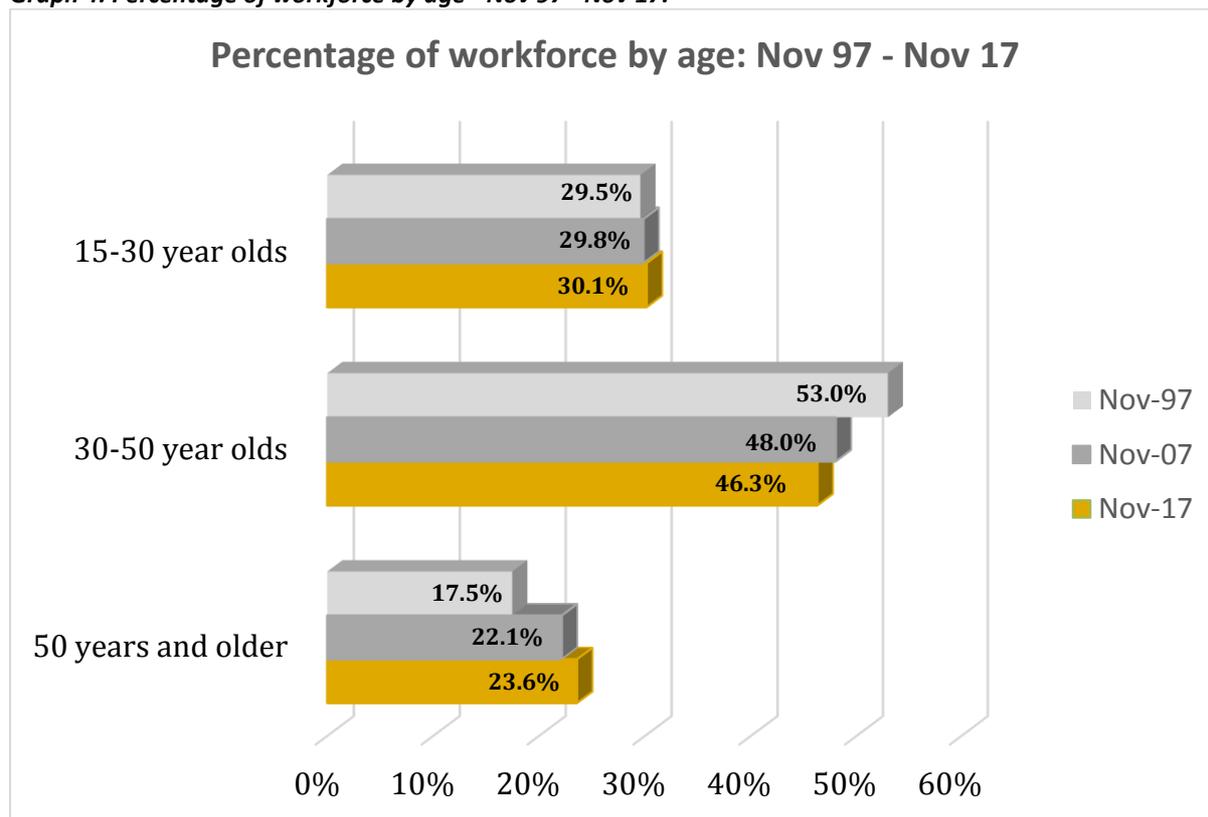


Despite the young demographic of workers, over the last 20 years there has been an increase in the workforce participation rate of workers aged 50 and over. The graph below shows the changes in the age composition of the construction industry over the last 20 years.

<sup>73</sup> Australian Department of Employment, Labour Market Information Portal, *Construction*  
<http://lmip.gov.au/default.aspx?LMIP/GainInsights/IndustryInformation/Construction>

<sup>74</sup> Australian Bureau of Statistics: 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, Data Cube EQ12 - *Employed persons by Age and Industry division of main job (ANZSIC), November 1984 onwards*  
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003Nov%202017?OpenDocument>

<sup>75</sup> Australian Bureau of Statistics: 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, Data Cube EQ12 - *Employed persons by Age and Industry division of main job (ANZSIC), November 1984 onwards*  
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003Nov%202017?OpenDocument>

**Graph 4: Percentage of workforce by age - Nov 97 - Nov 17.<sup>76</sup>**

## Skill Shortages

The Australian Government Department of Employment (now Department of Jobs and Small Business) researches and compiles a list of skills shortages in the labour market. This list captures shortages in skilled occupations using the Survey of Employers who have Recently Advertised (SERA).<sup>77</sup> The below table shows the occupations in the Construction, Plumbing and Services Industry have been identified in this survey as having shortages in 2016-2017.

In addition, as part of the Artibus Innovation CPC Skills Forecast Survey 2018 we asked the question; *in the past 12 months, have you been aware of any skills shortages? If yes, in what occupations?* 59% of respondents said yes to this question and the top five occupational shortages identified through our survey were also identified in the Department of Jobs and Small Business's survey. This is also captured in the table below.

<sup>76</sup> Australian Bureau of Statistics: 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, Data Cube EQ12 - *Employed persons by Age and Industry division of main job (ANZSIC), November 1984 onwards*

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003Nov%202017?OpenDocument>

<sup>77</sup> Australian Government Department of Jobs and Small Business, 2017, *Skill Shortages List - Australia*, accessed online 17/01/2018 at <https://docs.jobs.gov.au/documents/skill-shortage-list-australia>

**Table 4 Skills Shortages for Construction, Plumbing and Services Industry<sup>78</sup>**

Skill	Area of Shortage	Description of Shortage
<b>Top Five Skills Shortages Identified in Artibus Innovation CPC Skills Forecast Survey 2018.</b>		
<b>Bricklayer</b>	National Shortage	Shortages can be seen in all states and territories except NT and WA. Employers find it hard to attract qualified and experienced applicants and fill vacancies.
<b>Carpenter and Joiner</b>	Shortage in some states	The 2016 survey found that there was a shortage of skilled and experienced carpenters and joiners across Victoria and New South Wales with over two thirds of vacancies remaining unfilled in VIC and employers attracting on average less than one suitable applicant per vacancy in NSW.
<b>Solid Plasterer</b>	National Shortage	Employers are facing difficulty in filling vacancies. Shortages can be seen in most states and in metropolitan and regional areas. There are few applicants, and most are considered to be insufficiently skilled or lack the required level of experience.
<b>Plumber</b>	Recruitment difficulties in some states	Employers in most states have trouble recruiting for multi-skilled plumbers, roof plumbers and gas or sprinkler fitters, while there is no shortage in South Australia.
<b>Wall and Floor Tiler</b>	National Shortage	Shortages have persisted after having re-emerging in 2014 – though there are differences in recruitment experiences between locations. For example, shortages tend to be in Victoria and New South Wales, where construction activity is strong, while in other locations there is a surplus of tilers, with multiple applications vying for jobs.
<b>Other Skill Shortages Identified in Occupational Skills Shortages Lists by Department of Jobs and Small Business</b>		
<b>Painting Trades Worker*</b>	National Shortage	Shortages can be seen in QLD, SA, TAS and VIC, while there are recruitment difficulties in NT but no shortages in WA.
<b>Surveyor*</b>	National Shortage	Shortages are mainly for cadastral surveyors in Victoria, New South Wales and Queensland.
<b>Stonemason</b>	National Shortage	Shortages of stonemasons have persisted since 2005. Employers report difficulty hiring stonemasons that have specialist skill sets and, in most states and territories, there are also shortages of those with more generalist stonemasonry skills.

<sup>78</sup> Australian Government Department of Jobs and Small Business, 2017, *Occupational Skills Shortages Information*, accessed online 17/01/2018 at <https://www.jobs.gov.au/occupational-skill-shortages-information>, and Artibus Innovation CPC Skills Forecast Survey 2018.

		However, across Queensland and Western Australia, employers report recruitment is easier.
<b>Fibrous Plasterer</b>	National Shortage	Shortages can be seen in all states and territories except WA and SA. Employers are finding low applicant numbers and very few applicants have the skill level required, vacancies are therefore unfilled.
<b>Roof Tiler</b>	National Shortage	Shortages have been persistent over the past decade, getting worse of the last three years. Employers have a very small number of applicants and few are considered suitable.

\*Skill shortage also identified in the Artibus Innovation CPC Skills Forecast Survey 2018, but not part of top 5.

## Ranking of 13 Generic Workforce Skills

The Department of Education and Training has developed a list of 13 generic workforce skills. Each year, Artibus asks stakeholders to rank these skills in order of importance through the *Artibus Innovation CPC Skills Forecast Survey 2018*. This question received 57 responses, and the results are presented in table 5.

**Table 5 List of 13 Generic Workforce Skills in Order of Importance<sup>79</sup>**

<b>13 GENERIC WORKFORCE SKILLS</b>				
<b>2018</b>		<b>Skill</b>	<b>2017</b>	<b>2016</b>
↑ 1	<b>1</b>	Managerial/Leadership	2	4
↓ 1	<b>2</b>	Language, Literacy and Numeracy (LLN)	1	6
↑ 3	<b>3</b>	Customer service/Marketing	6	7
↓ 1	<b>4</b>	Design mindset/Thinking critically/System thinking/Solving problems	3	5
↓ 1	<b>5</b>	Technology use and application	4	3
↑ 3	<b>6</b>	Financial	9	1
↓ 2	<b>7</b>	Learning agility/Information literacy/Intellectual autonomy and self-management	5	12
↑ 2	<b>8</b>	Entrepreneurial	10	2
↓ 2	<b>9</b>	Communication/Virtual collaboration/Social intelligence	7	11
↑ 2	<b>10</b>	Science, Technology, Engineering & Maths (STEM)	12	8
↓ 3	<b>11</b>	Environmental and Sustainability	8	10
↓ 1	<b>12</b>	Data analysis	11	9
N/A	<b>13</b>	Other (please specify)	N/A	N/A

<sup>79</sup> Artibus Innovation CPC Skills Forecast Survey 2018.

The top responses to the category of 'other' included:

- Life Skills (including money and time management, organisation and planning)
- Adaptability
- Good work ethic (attitude, reliability, desire to work hard)
- Work Health and safety
- Resilience

## Key Drivers for Change and Proposed Responses

This section further explores the challenges and opportunities for the construction, plumbing and services sector through primary data collected through the *Artibus Innovation CPC Skills Forecast Survey and Submissions 2018* and secondary research.

The *Artibus Innovation CPC Skills Forecast Survey 2018* asked participants to 'indicate what Social, Technological, Environment, Educational, Economic and Political (STEEEP) trends will have an impact on their industry in the next 3-5 years' and the answer choices were derived using AISC's *Future Skills and Training Resource*.<sup>80</sup> There were 66 responses for this question and the top 3 trends per category as identified by participants are in table 6.

**Table 6 STEEEP Trend Responses from Artibus Innovation CPC Skills Forecast Survey 2018<sup>81</sup>**

Trend	Rating per category	
<b>Social Trends</b>		
Changing work and career values	1	26%
Ageing population*	2	25%
Global mobility	3	23%
<b>Technological Trends</b>		
Digitisation*	1	33%
Artificial intelligence and machine learning*	2	37%
Augmented reality and virtual reality	3	20%
<b>Economic Trends</b>		
Workforce vulnerability	1	22%
Changing workplace dynamics	2	22%
Empowered customers*	3	15%

<sup>80</sup> Australian Industry and Skills Committee 2016, *Future Skills and Training: A practical resource to help identify future skills and training*, accessed online on 11/01/2018 at: <https://www.aisc.net.au/content/future-skills-and-training-resource>

<sup>81</sup> Artibus Innovation CPC Skills Forecast Survey 2018

Education Trends		
VET uptake and completion rates	1	42%
Skills mismatch*	2	33%
Knowledge-based economy	3	25%
Environmental Trends		
Financial viability	1	34%
Climatic weather shifts	2	22%
International sustainability action	3	22%
Political Trends		
Innovation ahead of regulation	1	37%
Political appetite for reform	2	33%
Political instability & polarisation	3	30%

\*Trend also identified by the IRC and discussed in the key drivers section

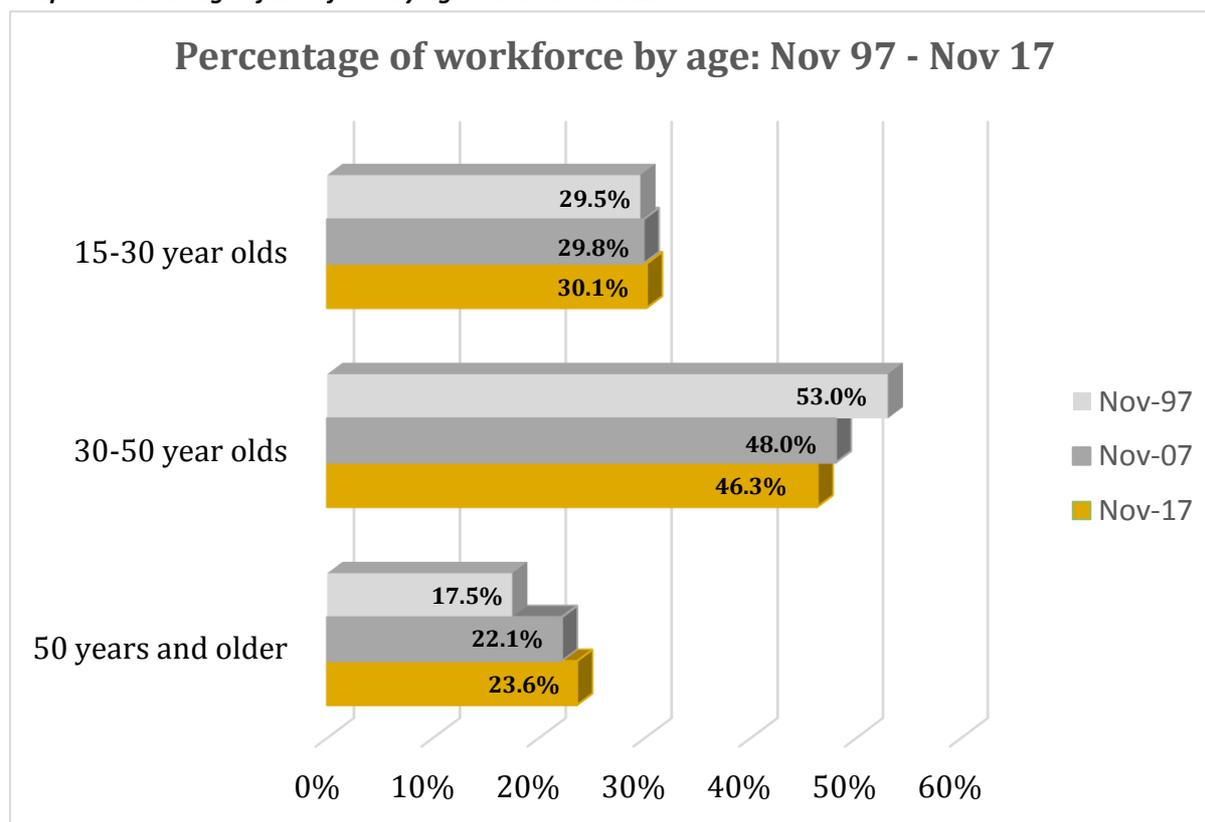
The AISC's *Future Skills and Training Resource* was also used by the IRC to identify the following key drivers for change in the industry and on the CPC Construction, Plumbing and Services Training Package:

- Ageing population, specifically the increase in older workers in the industry
- Digitisation, artificial intelligence and automation
- Empowered customers, specifically demanding smart and green construction
- Skills mismatch

These trends were also identified as having an impact on the industry in the next three to five years by participants in the *Artibus Innovation CPC Skills Forecast Survey 2018*.

### *An Increase in Older Workers*

While the evidence in the employment outlook section shows that the construction industry is typically young, the age profile of the industry has actually become older in the last 20 years.

**Graph 4: Percentage of workforce by age - Nov 97 - Nov 17.<sup>82</sup>**

The graph above shows that, while the percentage of younger workers in the industry has remained relatively constant over the last 20 years – only increasing 0.6%, there has actually been a decrease in the percentage of the workforce aged 30-49 by 6.7% and an increase in the workforce aged 50 and over by 6.1%.

*How will this impact the Construction, Plumbing and Services Industry?*

The skill replacement gap is increasing. Vital skills to the industry are at risk of being lost as increasing amounts of workers retire yet there are proportionally fewer younger workers in the industry to replace their skills.<sup>83</sup> Graph 4 shows that the situation in Australia is strikingly similar.

This potential skill loss is especially relevant to senior level skills such as management and leadership. These skills are projected to be more in demand in the future construction industry, as lower skilled jobs are at risk of being automated, while jobs that require high levels of social intelligence, technical ability and creative intelligence are predicted to increase.<sup>84</sup> Typically, these skills are held by older

<sup>82</sup> Australian Bureau of Statistics: 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, Data Cube EQ12 - *Employed persons by Age and Industry division of main job (ANZSIC), November 1984 onwards*

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003Nov%202017?OpenDocument>

<sup>83</sup> Watson, M. (2012), Concerns for skills shortages in the 21st century: A review into the construction industry, Australia, *The Australian Journal of Construction Economics and Building*, Vol. 7(1), pp. 45–54.

<sup>84</sup> PWC, 2015, *A Smart Move: Future-proofing Australia's workforce by growing skills in science, technology, engineering and maths (STEM)*, accessed online 19/01/2018 at <https://www.pwc.com.au/stem.html>

workers who have worked their way up to these positions, so with a large portion of people with these skills reaching retirement and a fewer portion of people available to take their place, the industry is at risk of critical workforce shortages. This enhances the need for the training package to provide support for higher-level skills and qualifications to upskill workers to replace the skills of retiring workers as well as efforts to attract new talent to construction VET courses and careers.<sup>85</sup>

Furthermore, with an increase in older people in the workforce, their health and safety must be taken into account, as the consequence is likely to be an increase the demand for less physically demanding jobs. Automation and new technology may provide a solution to this problem, however, with this comes the need to upskill and re-skill the older population of construction workers to use new technologies and automated processes.<sup>86</sup>

### *The Introduction of New Technology*

The construction industry is yet to feel the effects of significant digital disruption and is one of the least 'digitally engaged' industry sectors.<sup>87</sup> The major technological advances that will affect the CPC training package are business applications, automation, BIM and pre-fabrication.

#### **Business Applications**

The *Telstra Loop Self Employed Tradies Summary Report* highlights the low uptake of everyday digital technology among the construction workforce and the imperative for tradespeople to rapidly upskill to survive and compete in a service-based economy.<sup>88</sup> The report notes that equipment used for business, including everything from tablets to cranes, has the potential to improve training and workplace performance. For example, the rapid development of handheld devices and computer numerical control (CNC) routers has the potential to greatly improve the safety, precision and operation of many construction tasks, particularly those that are manual or high risk.<sup>89</sup>

#### **Automation**

In the Australian labour market, about 40% of current jobs are deemed to be at high risk of automation over the next 10-15 years, yet we are still training people for these jobs. The Foundation for Young Australian's suggest that this is particularly critical for young people, as more than half of young Australian's are be trained for jobs that will no longer exist in the same capacity in the future.<sup>90</sup> In the construction industry, PwC projections show that lower skilled jobs such as glaziers, plasterers and tilers have an 81.4% probability of being automated, while higher skilled jobs such as construction

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<sup>85</sup> Watson, M. (2012), Concerns for skills shortages in the 21st century: A review into the construction industry, Australia, The Australian Journal of Construction Economics and Building, Vol. 7(1), pp. 45–54.

<sup>86</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036, CSIRO, Australia.

<sup>87</sup> Vision Critical, Telstra Loop; Self Employed Tradies Summary Report, June 2016

<sup>88</sup> Vision Critical, Telstra Loop; Self Employed Tradies Summary Report, June 2016

<sup>89</sup> Vision Critical, Telstra Loop; Self Employed Tradies Summary Report, June 2016

<sup>90</sup> Foundation for Young Australians, 2015, *The New Work Order: Ensuring young Australians have skills and experience for the jobs of the future, not the past*, accessed online 06/02/2018 at: <https://www.fya.org.au/report/new-work-order/>

managers and engineers only have an 8.2% and 4.2% chance of being automated the next 20 years respectively.<sup>91</sup>

### **Building Information Modelling (BIM)**

BIM is the digital version of a building, which includes all information on the building through its whole lifecycle – from design, to build, to operations and even demolition. BIM allows construction professionals, as well as owners and operators to access construction and operation information about the building.<sup>92</sup> The Australian construction industry has had a gradual and varied adoption of BIM, depending on how complex the project is.<sup>93</sup>

BIM has shown to have major benefits for the construction industry, such as reliable cost estimates, 3D walk-through animations for marketing, reliable predictions of the building's sustainability rating, early assessment of potential issues and design errors, tracking of construction activities and site safety planning. It also allows for better communication between project owners, designers, subcontractors and workers on site.<sup>94</sup> In the near future, BIM is projected to completely replace current Computer-Aided Design (CAD) systems in the global industry. This is helped by smartphone and tablet technologies, which allow project workers and stakeholders to quickly access building information from BIM virtually everywhere.<sup>95</sup> Governments' in Australia have been slow to mandate BIM for public works, but Tier One companies are already well advanced in this area and are starting to require sub-contractors to be able to connect with this technology.

### **Pre-fabrication, offsite and modular building**

Pre-fabrication refers to any part of a building that has been created at a different location to the building being constructed.<sup>96</sup> This means that more of the construction process takes place offsite in a manufacturing plant instead of at the building site.<sup>97</sup> The Australian construction industry has been slow to adopt pre-fabrication in comparison to global markets. For example, in Scandinavian countries approximately 50% of residential housing is constructed with pre-fabrication, while in Australia, pre-fabrication only accounts for 3% of residential buildings, though this number is growing.<sup>98</sup> There are major benefits to pre-fabrication such as a significant reduction in construction waste, increase in safe

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<sup>91</sup> PWC, 2015, *A Smart Move: Future-proofing Australia's workforce by growing skills in science, technology, engineering and maths (STEM)*, accessed online 19/01/2018 at <https://www.pwc.com.au/stem.html>

<sup>92</sup> Construction and Property Services Industry Skills Council, 2014, *Environmental Scan 2014-15*

<sup>93</sup> StartupAUS, 2017, *Digital Foundations: How technology is transforming Australia's construction sector*, accessed online 01/02/2018 at <https://startupaus.org/document/constructiontech/>

<sup>94</sup> Azhar, S et al. (2012) 'Building information modeling (BIM): now and beyond', *Australasian Journal of Construction Economics and Building*, **12** (4) 15-28

<sup>95</sup> Azhar, S et al. (2012) 'Building information modeling (BIM): now and beyond', *Australasian Journal of Construction Economics and Building*, **12** (4) 15-28

<sup>96</sup> PrefabAUS, 2018, *What is Prefab*, accessed online 06/02/2018 at: <http://www.prefabaus.org.au/what-is-prefab/>

<sup>97</sup> Alviano, P., 2014, *Job Skills in Prefabricated Construction*, ISS Institute Inc, accessed online 01/02/2018 at: <http://www.issinstitute.org.au/fellowships/fellowship-reports/building-and-construction/>

<sup>98</sup> Alviano, P., 2014, *Job Skills in Prefabricated Construction*, ISS Institute Inc, accessed online 01/02/2018 at: <http://www.issinstitute.org.au/fellowships/fellowship-reports/building-and-construction/>

work practices and injury prevention and time savings due to construction taking place at same time as site preparation.<sup>99</sup>

Prefabrication is not a new construction process, rather it has been used for decades, but developed a reputation as being cheap and of poor quality compared to onsite site construction.<sup>100</sup> However, with the rise of new technologies in the construction industry, particularly BIM it is easier to implement lean design and modularisation into construction, making the fabrication of complex building parts more economical.<sup>101</sup>

#### *How will this impact the Construction, Plumbing and Services Training Package?*

These emerging technologies are likely to have a major impact across the construction industry. For the construction industry to capitalise on these opportunities, the workforce will need to be trained, re-trained and upskilled with the skills and knowledge to not only use these new technologies, but also for the new jobs and tasks that arise.<sup>102</sup>

Automation will not affect all jobs equally, nor has it in the past. For example, lower skilled jobs such as secretary or administrative roles have been partially replaced by computers while higher skilled jobs such as managers have reaped the benefits of this automation as it results in more efficient and cost-effective projects.<sup>103</sup> This trend is set to continue in the construction industry, as automation is predicted to complement and assist jobs of higher skill levels but substitute those of routine and lower skill levels.<sup>104</sup> This means that a significant portion of the industry will need to be up-skilled and new workers trained for higher skilled jobs. However, this does not mean that higher skilled jobs will not be affected by automation. With increased automation comes a need to learn how to use new machines, computers, software and applications and therefore all workers in the construction industry will need to be trained appropriately.<sup>105</sup>

In regard to BIM, construction workers will need to be upskilled and retrained, not only so they have the knowledge and skills to use BIM in their fields<sup>106</sup>, but also because BIM will bring about new and

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<sup>99</sup> McGraw Hill Construction, 2014, Pre-fabrication and Modularization: increasing productivity in the construction industry, accessed online 06/02/2018 at: <https://www.nist.gov/sites/default/files/documents/el/economics/Prefabrication-Modularization-in-the-Construction-Industry-SMR-2011R.pdf>

<sup>100</sup> McGraw Hill Construction, 2014, Pre-fabrication and Modularization: increasing productivity in the construction industry, accessed online 06/02/2018 at: <https://www.nist.gov/sites/default/files/documents/el/economics/Prefabrication-Modularization-in-the-Construction-Industry-SMR-2011R.pdf>

<sup>101</sup> Azhar, S et al. (2012) 'Building information modeling (BIM): now and beyond', *Australasian Journal of Construction Economics and Building*, **12** (4) 15-28

<sup>102</sup> Construction Training Fund, 2014, *Impact of New Technologies on the Construction Industry*, accessed online 18/01/2018 at <https://bcitf.org/whats-new/research>

<sup>103</sup> Foundation for Young Australians, 2015, *The New Work Order: Ensuring young Australians have skills and experience for the jobs of the future, not the past*, accessed online 06/02/2018 at: <https://www.fya.org.au/report/new-work-order/>

<sup>104</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

<sup>105</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

<sup>106</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

more efficient ways of working,<sup>107</sup> which may result in new processes, tasks, policies and regulations for particular jobs. BIM usage will span across many occupations in the construction industry, so it is vital that competencies are incorporated into the training package.<sup>108</sup>

Additionally, an increase in prefabrication in Australia will require construction workers with different skillsets and therefore different training than what is currently available.<sup>109</sup> Prefabrication will require workers to have a mix of skills from both construction and manufacturing. This means that workers entering the industry will need training that comes from both the manufacturing and construction training packages.<sup>110</sup>

### *The Demand for Smart and Green Construction*

With the need for action on climate change and sustainability becoming a focal point globally, so to comes a demand for green and smart buildings. Green buildings significantly reduce the negative impact buildings have on the environment by incorporating sustainable design, construction and operational elements. This also translates to healthier buildings for occupants.<sup>111</sup> Similarly, smart buildings are those that incorporate technology and materials that capture data on how the building is performing. This allows for a greater level of control over energy usage, monitoring tenant usage and maintenance and repair needs while also improving safety features.<sup>112</sup> Often, buildings that incorporate green elements also incorporate smart elements and vice versa.

The green and smart construction industry is growing worldwide, and while adoption has been slow in Australia, it is on the rise. A 2016 study conducted by Dodge Data and Analytics suggests that of the Australian companies surveyed, 48% expect that more than 30% of their projects will be green by 2018. This is an increase of 14 percentage points on green construction projects at the time of the survey.<sup>113</sup> Sectors with highest expected green construction growth rate in Australia are new low-rise residential building construction, retrofits of existing buildings and institutional building construction.<sup>114</sup>

The benefits of smart and green construction are becoming increasingly clearer, which is helping drive market awareness and consumer demand as the world moves towards more sustainable practices and ways of living.<sup>115</sup> These benefits include; lower carbon footprint from building operation, lower

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<sup>107</sup> Bryne, C., 2014, *Building Information Modelling in Australia: Lesson from the UK*, ISS Institute Inc, accessed online 01/02/2018 at: <http://www.issinstitute.org.au/fellowships/fellowship-reports/building-and-construction/>

<sup>108</sup> Bryne, C., 2014, *Building Information Modelling in Australia: Lesson from the UK*, ISS Institute Inc, accessed online 01/02/2018 at: <http://www.issinstitute.org.au/fellowships/fellowship-reports/building-and-construction/>

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<sup>111</sup> Green Building Council of Australia, 2018, *What is Green Building?* <https://www.gbca.org.au/about/what-is-green-building/>

<sup>112</sup> StartupAUS, 2017, *Digital Foundations: How technology is transforming Australia's construction sector*, accessed online 01/02/2018 at <https://startupaus.org/document/constructiontech/>

<sup>113</sup> Dodge Data & Analytics, 2016, *World Green Building Trends 2016: Developing Markets Accelerate Global Green Growth*, accessed online 19/01/2018 at <http://www.worldgbc.org/news-media/world-green-building-trends-2016>

<sup>114</sup> Dodge Data & Analytics, 2016, *World Green Building Trends 2016: Developing Markets Accelerate Global Green Growth*, accessed online 19/01/2018 at <http://www.worldgbc.org/news-media/world-green-building-trends-2016>

<sup>115</sup> Jadhav, NY, 2016, *Green and Smart Buildings*, Springer, Singapore

operating costs, increased value of building, higher rental and occupancy rates and improved health and productivity benefits for occupants.<sup>116</sup>

According to a study conducted by Dodge Data and Analytics in 2016, client demand and environmental regulations are the top two drivers for green building in 2015 globally. This trend can also be seen for Australia, as respondents ranked environmental regulations, the desire for healthier neighbours and client demands as the top three drivers in 2015.<sup>117</sup>

#### *How will this impact the Construction, Plumbing and Services Industry?*

Buildings have a high carbon footprint, as they account for about 40% of global energy consumption.<sup>118</sup> This opens large opportunities for the construction industry to provide innovative solutions to reduce this – one way to achieve this is through green and smart construction.

However, with demand for green and smart construction, comes the need for governments and the industry to prioritise vocational education and training for new and current construction workers in energy-efficiency building and retrofitting, as many construction jobs will see a change in practices and tasks.<sup>119</sup> Construction workers will need to keep their skills and knowledge up to date in advances in water conservation, wastewater recycling and treatment and the renewable energies sector.<sup>120</sup> Some jobs may be more affected than others, as the Construction Skills Queensland (CSQ) and CSIRO *Farsight for Construction* report predicts that those that will see a more significant change in practices and tasks are carpenters, plumbers, heating engineers, painters and plasterers, roofers, and electricians.<sup>121</sup>

#### *Skills Shortages in a Specialised & Growing Industry*

The construction, plumbing and services industry is growing in employment. Typically, businesses in the industry are characterised by sub-contractors with trade specialisations employed in small-scale businesses of less than 20 employees or as sole operators.<sup>122</sup> This means that often a construction worker will specialise in a narrow aspect of their trade. The CSQ and CSIRO *Farsight for Construction* report notes that these specialised contractors can find it difficult to give their apprentices the full

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<sup>116</sup> Jadhav, NY, 2016, *Green and Smart Buildings*, Springer, Singapore

<sup>117</sup> Dodge Data & Analytics, 2016, *World Green Building Trends 2016: Developing Markets Accelerate Global Green Growth*, accessed online 19/01/2018 at <http://www.worldgbc.org/news-media/world-green-building-trends-2016>

<sup>118</sup> World Business Council for Sustainable Development, 2009, *Energy Efficiency in Buildings: Transforming the Market*, accessed online 02/02/2018 at <http://www.wbcsc.org/Projects/Energy-Efficiency-in-Buildings/Resources/Transforming-the-Market-Energy-Efficiency-in-Buildings>

<sup>119</sup> World Business Council for Sustainable Development, 2009, *Energy Efficiency in Buildings: Transforming the Market*, accessed online 02/02/2018 at <http://www.wbcsc.org/Projects/Energy-Efficiency-in-Buildings/Resources/Transforming-the-Market-Energy-Efficiency-in-Buildings>

<sup>120</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

<sup>121</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

<sup>122</sup> IBISWorld, October 2017, *Australia Industry Reports - Construction: Competitive Landscapes*

range of skilling opportunities that are needed to fulfil the requirements of a traditional apprenticeship.<sup>123</sup>

When contrasted with the skill and training needs of the future construction workforce, this is particularly concerning. With an increased reliance on technology, more automated processes and tasks, and construction that is both green and smart, there will likely be a shift in skills, with much of the research indicating the growing need for science, technology, engineering and maths (STEM) skills. A 2015 report on STEM skills in Australia's workforce by PwC reports that 75% of the fastest growing occupations require STEM skills.<sup>124</sup> It is interesting to note that respondents to the Artibus Innovation CPC Skills Forecast Survey 2018 placed STEM skills 10<sup>th</sup> in the ranking of key generic workforce skills. There will need to be a shift in the understanding of the applicability of STEM skills to the construction industry to keep up with the skill needs of the industry into the future.

In addition to STEM skills, critical thinking, problem solving, analytical capabilities, curiosity and imagination have all been identified as skills that help foster STEM skills and are critical to the future workplace.<sup>125</sup> The Foundation for Young Australians (FYA) calls these skills 'enterprise skills,' and in their 2017 report *The New Work Smarts* millions of online job advertisements were analysed and results show that employers are already demanding these enterprise skills and paying higher wages for them. For example, they found that the demand for critical thinking has increased by 158% in the past three years while problem solving skills attract an additional \$7,745 compared with jobs of the same level that don't list problem solving in selection criteria.<sup>126</sup>

For the construction industry, these skills will be particularly relevant as more automated processes are introduced and there is a shift towards higher-skilled jobs. As skill needs change in the industry, employers will need to be able to give employees and apprentices opportunities to upskill and reskill. It is vital that the workforce is updated with relevant skills and knowledge as the industry grows and changes otherwise there is a risk of severe skills shortages and experience, leading to reduced quality and quantity of work and increased project costs, time frames and risks for the industry.<sup>127</sup>

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<sup>123</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

<sup>124</sup> PwC, 2015, *A Smart Move: Future-proofing Australia's workforce by growing skills in science, technology, engineering and maths (STEM)*, accessed online 19/01/2018 at <https://www.pwc.com.au/stem.html>

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<sup>126</sup> Foundation for Young Australians, 2017, *The New Work Smarts: Thriving in the New Work Order*, accessed online 08/02/2018 at: <https://www.fya.org.au/our-research/>

<sup>127</sup> Quezada G, Bratanova A, Boughen N, and Hajkowicz S, 2016, *Farsight for construction: Exploratory scenarios for Queensland's construction industry to 2036*, CSIRO, Australia.

## Proposed Responses and Risks of Not Proceeding

### *Proposed Responses*

#### ***Finalising the transition of the CPC training package to the 2012 standards***

Artibus Innovation's priority is to finalise all current and proposed transitions of the Construction, Plumbing and Services Training Package to the 2012 standards for training packages as set out by the National Skills Standards Council. This will ensure that the CPC training package keeps in line with the standards of other national training packages, allowing for the easy alignment of imported units relevant to specific qualifications, as well as and collaboration on projects across sectors and training packages. It will also ensure that the CPC training package remains of a high quality and meets the workforce development needs of the construction, plumbing and services industry.

#### ***Continuing to update the current training package to respond to skill shortages***

Artibus Innovation will also continue to update the CPC training package to ensure current and emerging skills needs are met. There is a threat of looming skills shortages in the industry with the increase in older workers and lack of younger workers available to replace their skills. In addition, new technologies and the automation of many routine jobs will see a shift towards the need for STEM and enterprise skills. Continually updating the CPC training package to include these higher-level skills are vital to the industry.

#### ***Having an eye on the future***

The future of the construction industry is more streamlined, environmentally friendly and cost effective as a result of the key drivers mentioned above. The workforce will need to be trained, re-trained and upskilled with the skills and knowledge to not only use these new technologies, but for the new jobs and tasks that arise. It is therefore important that the skills and knowledge needed for this future are embedded in the CPC training package. Artibus Innovation aims to continue researching these drivers for change as part of the cross-sector projects on automation, digitisation and environmental sustainability, and developing these into cases for change for the training package.

### ***Risks of not proceeding***

Not updating the CPC training package as proposed risks a loss of currency and erosion of the knowledge and skills in the training package, and therefore in the construction, plumbing and services industry. Emerging technologies and the automation of many routine jobs and processes is likely to have a major impact across the construction industry and in order for these impacts to become opportunities, it is vital that the workforce will need to be trained, re-trained and upskilled with the skills and knowledge to not only use these new technologies, but also for the new jobs and tasks that arise. If this does not occur the CPC training package risks becoming outdated with obsolete skills and knowledge, which could lead to severe skills shortages knowledge and experience among the workforce in the industry.

## Proposed Schedule of Work

<b>Proposed Schedule of Work</b>	
<b>2018 - 19</b>	<p><b>Cases for Endorsement</b></p> <ul style="list-style-type: none"> <li>• CPC30812 Certificate III in Roof Tiling</li> <li>• CPC31211 Certificate III in Wall and Ceiling Lining</li> <li>• CPC31311 Certificate III in Wall and Floor Tiling</li> <li>• CPC31411 Certificate III in Construction Waterproofing</li> <li>• CPC40110 Certificate IV in Building and Construction (Building)</li> <li>• CPC40208 Certificate IV in Building and Construction (Contract Administrator)</li> <li>• CPC40308 Certificate IV in Building and Construction (Estimating)</li> <li>• CPC40408 Certificate IV in Building and Construction (Sales)</li> <li>• CPC40508 Certificate IV in Building and Construction (Site Management)</li> <li>• CPC40611 Certificate IV in Building and Construction (Specialist Trades)</li> <li>• CPC40708 Certificate IV in Building and Construction (Trade Contracting)</li> <li>• CPC50210 Diploma of Building and Construction (Building)</li> <li>• CPC50308 Diploma of Building and Construction (Management)</li> <li>• 1039NAT Certificate III in Remote Area Building Repairs and Maintenance (Certificate III)</li> <li>• CPC41312 Certificate IV in Swimming Pool and Spa Building.</li> </ul> <p><b>Proposed Cases for Change/Cross-SSO Projects</b></p> <ul style="list-style-type: none"> <li>• Building Information Modelling (BIM)</li> <li>• Offsite Construction and Pre-fabrication.</li> </ul>
<b>2019 – 20</b>	<p><b>Cases for Endorsement</b></p> <ul style="list-style-type: none"> <li>• CPC50612 Diploma of Hydraulic Services Design</li> <li>• CPC60115 Advanced Diploma of Building Surveying</li> <li>• CPC60212 Advanced Diploma of Building and Construction (Management)</li> <li>• CPC80215 Graduate Diploma of Building Surveying</li> </ul> <p><b>Proposed Cases for Change/Cross-SSO Projects</b></p> <ul style="list-style-type: none"> <li>• Robotics and Automation</li> </ul>
<b>2020 – 21</b>	<p><b>Cases for Endorsement</b></p> <ul style="list-style-type: none"> <li>• CPC20812 Certificate II in Metal Roofing and Cladding</li> <li>• CPC20908 Certificate II in Urban Irrigation</li> <li>• CPC31511 Certificate III in Formwork/Falsework.</li> </ul>
<b>2021 – 22</b>	A general review, update and maintenance of a suite of qualifications will be undertaken.

## 2018-2019 Project Details

<b>PROJECT 1 - ROOF TILING</b>									
<b>Description</b>	Update the CPC30812 Certificate III in Roof Tiling.								
<b>Rationale</b>	<table border="1"> <thead> <tr> <th><b>Driver</b></th> <th><b>Explanation</b></th> </tr> </thead> <tbody> <tr> <td><b>Policy</b></td> <td>           Transition and update the qualification to align with the:           <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul> </td> </tr> <tr> <td><b>Regulations</b></td> <td>Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.</td> </tr> <tr> <td><b>Industry best-practices</b></td> <td>Update the qualification to align with industry best practices regarding tools, equipment, materials and components.</td> </tr> </tbody> </table>	<b>Driver</b>	<b>Explanation</b>	<b>Policy</b>	Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul>	<b>Regulations</b>	Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.	<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.
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<b>Minister's priorities addressed</b>	<p>In comply with COAGs reforms to training package components, Artibus Innovation proposes to redesign the qualification, which includes:</p> <ul style="list-style-type: none"> <li>• removing obsolete, superfluous and duplicative and units from the system.</li> <li>• including information about industry's expectations of training delivery (i.e. duration of training, mode of delivery and learner characteristics)</li> <li>• improving qualification design to enable individuals to upskill and move easily from one related occupation to another</li> <li>• improving the efficiency of the training system through the creation of units of competence that can be owned and used by multiple industry sectors.</li> <li>• fostering greater recognition of skill sets.</li> </ul>								
<b>Consultation plan</b>	<p>The key engagement methods will be as follows:</p> <ul style="list-style-type: none"> <li>• Technical Advisory Groups (TAGs) will be established in accordance with internal policy and procedures to guide the subject matter expertise components of the work</li> <li>• direct correspondence with regulators</li> <li>• direct correspondence with State Training Authorities</li> <li>• direct correspondence with IRC and key stakeholders</li> <li>• Industry associations and other stakeholders will be invited to capital city forums in all state/territories. A copy of forums</li> </ul>								

## PROJECT 1 - ROOF TILING

	<p>material will be published on the web and an online forum will also be facilitated</p> <ul style="list-style-type: none"> <li>• RTOs will be engaged through online survey and trainer networks</li> <li>• public web project page updated fortnightly</li> <li>• newsletter survey distribution to 4,200 stakeholders, including all RTOs, regulators, industry associations. Minimum of three newsletter profiles</li> <li>• industry survey on early and late draft material</li> <li>• distribution of survey through TAG networks and Artibus digital channels</li> <li>• social media – twitter and linkedin.</li> </ul>																				
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## PROJECT 1 - ROOF TILING

### Units of competency

- 8 CPCRT units of competency to be updated
- 2 new units to considered for development
- Total = **10 units of competency.**

### Skill sets

N/A

DRAFT

<b>PROJECT 2 – WALL AND CEILING LINING</b>											
<b>Description</b>	Update the CPC31211 Certificate III in Wall and Ceiling Lining.										
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<b>Consultation plan</b>	<p>The IRC approved consultation process will be undertaken that will ensure all key stakeholders are consulted in the Wall and Ceiling Lining project.</p> <p><i>Detailed description of the process is outlined in Project 1.</i></p>										
<b>Scope of project</b>	<table border="1"> <thead> <tr> <th colspan="2"><b>Project timeline</b></th> </tr> <tr> <th><b>Details</b></th> <th><b>Date</b></th> </tr> </thead> <tbody> <tr> <td>Proposed work approved by AISC</td> <td>April 2018</td> </tr> <tr> <td>Project kick-off</td> <td>April 2018</td> </tr> <tr> <td>Establish Technical Advisory Group (TAG)</td> <td>May – June 2018</td> </tr> </tbody> </table>	<b>Project timeline</b>		<b>Details</b>	<b>Date</b>	Proposed work approved by AISC	April 2018	Project kick-off	April 2018	Establish Technical Advisory Group (TAG)	May – June 2018
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Proposed work approved by AISC	April 2018										
Project kick-off	April 2018										
Establish Technical Advisory Group (TAG)	May – June 2018										

## PROJECT 2 – WALL AND CEILING LINING

Training package components put forward for consultation	August 2018
Review feedback and update Draft Pack 1	September 2018
Training package components put forward for validation	October 2018
Finalisation and Quality Assurance	November 2018 – January 2019
Training package components sent to STAs for sign-off	February 2019
Submitted for endorsement training package components to Commonwealth Department of Education and Training	March 2019

### Qualification

Code	Title
CPC31211	Certificate III Wall and Ceiling Lining

### Units of competency

- 5 CPCCWC units of competency to be updated
- 2 new units to considered for development
- Total = **7 units of competency.**

### Skill sets

The development of 1 skill set to align with the *Clean Energy Council Accredited Insulation Installers Course*.

<b>PROJECT 3 – WALL AND FLOOR TILING</b>											
<b>Description</b>	Update the CPC31311 Certificate III in Wall and Floor Tiling.										
<b>Rationale</b>	<table border="1"> <thead> <tr> <th><b>Driver</b></th> <th><b>Explanation</b></th> </tr> </thead> <tbody> <tr> <td><b>Policy</b></td> <td>           Transition and update the qualification to align with the:           <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul> </td> </tr> <tr> <td><b>Regulations</b></td> <td>Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.</td> </tr> <tr> <td><b>Industry best-practices</b></td> <td>Update the qualification to align with industry best practices regarding tools, equipment, materials and components.</td> </tr> </tbody> </table>	<b>Driver</b>	<b>Explanation</b>	<b>Policy</b>	Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul>	<b>Regulations</b>	Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.	<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.		
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<b>Minister's priorities addressed</b>	<p>In comply with COAGs reforms to training package components, Artibus Innovation proposes to redesign the qualification, which includes:</p> <ul style="list-style-type: none"> <li>• removing obsolete, superfluous and duplicative and units from the system.</li> <li>• including information about industry's expectations of training delivery (i.e. duration of training, mode of delivery and learner characteristics)</li> <li>• improving qualification design to enable individuals to upskill and move easily from one related occupation to another</li> <li>• improving the efficiency of the training system through the creation of units of competence that can be owned and used by multiple industry sectors.</li> <li>• fostering greater recognition of skill sets.</li> </ul>										
<b>Consultation plan</b>	<p>The IRC approved consultation process will be undertaken that will ensure all key stakeholders are consulted in the Wall and Floor Tiling project.</p> <p><i>Detailed description of the process is outlined in Project 1.</i></p>										
<b>Scope of project</b>	<table border="1"> <thead> <tr> <th colspan="2"><b>Project timeline</b></th> </tr> <tr> <th><b>Details</b></th> <th><b>Date</b></th> </tr> </thead> <tbody> <tr> <td>Proposed work approved by AISC</td> <td>April 2018</td> </tr> <tr> <td>Project kick-off</td> <td>April 2018</td> </tr> <tr> <td>Establish Technical Advisory Group (TAG)</td> <td>May – June 2018</td> </tr> </tbody> </table>	<b>Project timeline</b>		<b>Details</b>	<b>Date</b>	Proposed work approved by AISC	April 2018	Project kick-off	April 2018	Establish Technical Advisory Group (TAG)	May – June 2018
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<b>Details</b>	<b>Date</b>										
Proposed work approved by AISC	April 2018										
Project kick-off	April 2018										
Establish Technical Advisory Group (TAG)	May – June 2018										

**PROJECT 3 – WALL AND FLOOR TILING**

Training package components put forward for consultation	August 2018
Review feedback and update Draft Pack 1	September 2018
Training package components put forward for validation	October 2018
Finalisation and Quality Assurance	November 2018 – January 2019
Training package components sent to STAs for sign-off	February 2019
Submitted for endorsement training package components to Commonwealth Department of Education and Training	March 2019

**Qualification**

Code	Title
CPC31311	Certificate III in Wall and Floor Tiling.

**Units of competency**

- 10 CPCCWF units of competency to be updated
- 2 new units to considered for development
- Total = **12 units of competency.**

**Skill sets**

N/A

<b>PROJECT 4 – CONSTRUCTION WATERPROOFING</b>									
<b>Description</b>	Update CPC31411 Certificate III in Construction Waterproofing.								
<b>Rationale</b>	<table border="1"> <thead> <tr> <th><b>Driver</b></th> <th><b>Explanation</b></th> </tr> </thead> <tbody> <tr> <td><b>Policy</b></td> <td>           Transition and update the qualification to align with the:           <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul> </td> </tr> <tr> <td><b>Regulations</b></td> <td>Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.</td> </tr> <tr> <td><b>Industry best-practices</b></td> <td>Update the qualification to align with industry best practices regarding tools, equipment, materials and components.</td> </tr> </tbody> </table>	<b>Driver</b>	<b>Explanation</b>	<b>Policy</b>	Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul>	<b>Regulations</b>	Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.	<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.
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<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.								
<b>Minister's priorities addressed</b>	<p>In comply with COAGs reforms to training package components, Artibus Innovation proposes to redesign the qualification, which includes:</p> <ul style="list-style-type: none"> <li>• removing obsolete, superfluous and duplicative and units from the system.</li> <li>• including information about industry's expectations of training delivery (i.e. duration of training, mode of delivery and learner characteristics)</li> <li>• improving qualification design to enable individuals to upskill and move easily from one related occupation to another</li> <li>• improving the efficiency of the training system through the creation of units of competence that can be owned and used by multiple industry sectors.</li> <li>• fostering greater recognition of skill sets.</li> </ul>								
<b>Consultation plan</b>	<p>The IRC approved consultation process will be undertaken that will ensure all key stakeholders are consulted in the Construction Waterproofing project.</p> <p><i>Detailed description of the process is outlined in Project 1.</i></p>								
<b>Scope of project</b>	<p><b>Project timeline</b></p> <table border="1"> <thead> <tr> <th><b>Details</b></th> <th><b>Date</b></th> </tr> </thead> <tbody> <tr> <td>Proposed work approved by AISC</td> <td>April 2018</td> </tr> <tr> <td>Project kick-off</td> <td>April 2018</td> </tr> </tbody> </table>	<b>Details</b>	<b>Date</b>	Proposed work approved by AISC	April 2018	Project kick-off	April 2018		
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Proposed work approved by AISC	April 2018								
Project kick-off	April 2018								

**PROJECT 4 – CONSTRUCTION WATERPROOFING**

Establish Technical Advisory Group (TAG)	May – June 2018
Training package components put forward for consultation	August 2018
Review feedback and update Draft Pack 1	September 2018
Training package components put forward for validation	October 2018
Finalisation and Quality Assurance	November 2018 – January 2019
Training package components sent to STAs for sign-off	February 2019
Submitted for endorsement training package components to Commonwealth Department of Education and Training	March 2019

**Qualification**

Code	Title
CPC31411	Certificate III in Construction Waterproofing

**Units of competency**

- 5 CPCCWP units of competency to be updated
- 3 units to be considered for merger
- 3 new units to be considered for development
- Total = **11 units of competency.**

**Skill sets**

N/A

<b>PROJECT 5 – BUILDING AND CONSTRUCTION</b>									
<b>Description</b>	Update a suite of Building and Construction qualifications to align with current vocational outcomes.								
<b>Rationale</b>	<table border="1"> <thead> <tr> <th><b>Driver</b></th> <th><b>Explanation</b></th> </tr> </thead> <tbody> <tr> <td><b>Policy</b></td> <td>Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul> </td> </tr> <tr> <td><b>Regulations</b></td> <td>Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.</td> </tr> <tr> <td><b>Industry best-practices</b></td> <td>Update the qualification to align with industry best practices regarding tools, equipment, materials and components.</td> </tr> </tbody> </table>	<b>Driver</b>	<b>Explanation</b>	<b>Policy</b>	Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul>	<b>Regulations</b>	Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.	<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.
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<b>Minister's priorities addressed</b>	<p>In comply with COAGs reforms to training package components, Artibus Innovation proposes to redesign the qualification, which includes:</p> <ul style="list-style-type: none"> <li>• removing obsolete, superfluous and duplicative and units from the system.</li> <li>• including information about industry's expectations of training delivery (i.e. duration of training, mode of delivery and learner characteristics)</li> <li>• improving qualification design to enable individuals to upskill and move easily from one related occupation to another</li> <li>• improving the efficiency of the training system through the creation of units of competence that can be owned and used by multiple industry sectors.</li> <li>• fostering greater recognition of skill sets.</li> </ul>								
<b>Consultation plan</b>	<p>The IRC approved consultation process will be undertaken that will ensure all key stakeholders are consulted in the Building and Construction project.</p> <p><i>Detailed description of the process is outlined in Project 1.</i></p>								
<b>Scope of project</b>	<p><b>Project timeline</b></p> <table border="1"> <thead> <tr> <th><b>Details</b></th> <th><b>Date</b></th> </tr> </thead> <tbody> <tr> <td>Proposed work approved by AISC</td> <td>April 2018</td> </tr> <tr> <td>Project kick-off</td> <td>April 2018</td> </tr> </tbody> </table>	<b>Details</b>	<b>Date</b>	Proposed work approved by AISC	April 2018	Project kick-off	April 2018		
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Project kick-off	April 2018								

**PROJECT 5 – BUILDING AND CONSTRUCTION**

Establish Technical Advisory Group (TAG)	May – June 2018
Training package components put forward for consultation	August 2018
Review feedback and update Draft Pack 1	September 2018
Training package components put forward for validation	October 2018
Finalisation and Quality Assurance	November 2018 – January 2019
Training package components sent to STAs for sign-off	February 2019
Submitted for endorsement training package components to Commonwealth Department of Education and Training	March 2019

**Qualification**

Code	Title
CPC40110	Certificate IV in Building and Construction (Building)
CPC40208	Certificate IV in Building and Construction (Contract Administrator)
CPC40308	Certificate IV in Building and Construction (Estimating)
CPC40408	Certificate IV in Building and Construction (Sales)
CPC40508	Certificate IV in Building and Construction (Site Management)
CPC40611	Certificate IV in Building and Construction (Specialist Trades)
CPC40708	Certificate IV in Building and Construction (Trade Contracting)

**PROJECT 5 – BUILDING AND CONSTRUCTION**

CPC50210	Diploma of Building and Construction (Building)
CPC50308	Diploma of Building and Construction (Management)

**Units of competency**

- 33 CPCCBC units of competency to be updated
- 10 new units to be considered for development
- Total = **42 units of competency.**

**Skill sets**

N/A

<b>PROJECT 6 – SWIMMING POOL AND SPA BUILDING</b>									
<b>Description</b>	Update CPC40808 Certificate IV in Swimming Pool and Spa Building.								
<b>Rationale</b>	<table border="1"> <thead> <tr> <th><b>Driver</b></th> <th><b>Explanation</b></th> </tr> </thead> <tbody> <tr> <td><b>Policy</b></td> <td>Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul> </td> </tr> <tr> <td><b>Regulations</b></td> <td>Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.</td> </tr> <tr> <td><b>Industry best-practices</b></td> <td>Update the qualification to align with industry best practices regarding tools, equipment, materials and components.</td> </tr> </tbody> </table>	<b>Driver</b>	<b>Explanation</b>	<b>Policy</b>	Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul>	<b>Regulations</b>	Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.	<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.
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<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.								
<b>Minister's priorities addressed</b>	<p>In comply with COAGs reforms to training package components, Artibus Innovation proposes to redesign the qualification, which includes:</p> <ul style="list-style-type: none"> <li>• removing obsolete, superfluous and duplicative and units from the system.</li> <li>• including information about industry's expectations of training delivery (i.e. duration of training, mode of delivery and learner characteristics)</li> <li>• improving qualification design to enable individuals to upskill and move easily from one related occupation to another</li> <li>• improving the efficiency of the training system through the creation of units of competence that can be owned and used by multiple industry sectors.</li> <li>• fostering greater recognition of skill sets.</li> </ul>								
<b>Consultation plan</b>	<p>The IRC approved consultation process will be undertaken that will ensure all key stakeholders are consulted in the Swimming Pool and Spa Building project.</p> <p><i>Detailed description of the process is outlined in Project 1.</i></p>								
<b>Scope of project</b>	<b>Project timeline</b>								
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Proposed work approved by AISC	April 2018								
Project kick-off	April 2018								

**PROJECT 6 – SWIMMING POOL AND SPA BUILDING**

Establish Technical Advisory Group (TAG)	May – June 2018
Training package components put forward for consultation	August 2018
Review feedback and update Draft Pack 1	September 2018
Training package components put forward for validation	October 2018
Finalisation and Quality Assurance	November 2018 – January 2019
Training package components sent to STAs for sign-off	February 2019
Submitted for endorsement training package components to Commonwealth Department of Education and Training	March 2019

**Qualification**

Code	Title
CPC40808	Certificate IV in Swimming Pool and Spa Building

**Units of competency**

- 7 new units to be considered for development
- Total = **7 units of competency.**

**Skill sets**

N/A

<b>PROJECT 7 – REMOTE AREA BUILDING REPAIRS AND MAINTENANCE</b>									
<b>Description</b>	Review 10391NAT Certificate III in Remote Area Building Repairs and Maintenance to evaluate its potential to integrate into the CPC Construction, Plumbing								
<b>Rationale</b>	<table border="1"> <thead> <tr> <th><b>Driver</b></th> <th><b>Explanation</b></th> </tr> </thead> <tbody> <tr> <td><b>Policy</b></td> <td>Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul> </td> </tr> <tr> <td><b>Regulations</b></td> <td>Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.</td> </tr> <tr> <td><b>Industry best-practices</b></td> <td>Update the qualification to align with industry best practices regarding tools, equipment, materials and components.</td> </tr> </tbody> </table>	<b>Driver</b>	<b>Explanation</b>	<b>Policy</b>	Transition and update the qualification to align with the: <ul style="list-style-type: none"> <li>• 2012 <i>Standards for Training Packages</i></li> <li>• COAG Industry and Skill Council directives.</li> </ul>	<b>Regulations</b>	Update qualification to reflect current Workplace Health and Safety (WHS) standards, practice, protocols and procedures.	<b>Industry best-practices</b>	Update the qualification to align with industry best practices regarding tools, equipment, materials and components.
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<b>Consultation plan</b>	<p>The IRC approved consultation process will be undertaken that will ensure all key stakeholders are consulted in the Remote Area Building Repairs and Maintenance project.</p> <p><i>Detailed description of the process is outlined in Project 1.</i></p>								
<b>Scope of project</b>	<table border="1"> <thead> <tr> <th colspan="2"><b>Project timeline</b></th> </tr> <tr> <th><b>Details</b></th> <th><b>Date</b></th> </tr> </thead> <tbody> <tr> <td>Proposed work approved by AISC</td> <td>April 2018</td> </tr> </tbody> </table>	<b>Project timeline</b>		<b>Details</b>	<b>Date</b>	Proposed work approved by AISC	April 2018		
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Proposed work approved by AISC	April 2018								

## PROJECT 7 – REMOTE AREA BUILDING REPAIRS AND MAINTENANCE

Project kick-off	April 2018
Establish Technical Advisory Group (TAG)	May – June 2018
Training package components put forward for consultation	August 2018
Review feedback and update Draft Pack 1	September 2018
Training package components put forward for validation	October 2018
Finalisation and Quality Assurance	November 2018 – January 2019
Training package components sent to STAs for sign-off	February 2019
Submitted for endorsement training package components to Commonwealth Department of Education and Training	March 2019

### Qualification

Code	Title
10391NAT	Certificate III in Remote Area Building Repairs and Maintenance

### Units of competency

- TBD

### Skill sets

N/A

## References

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## Appendix A: Unit Details on Proposed Projects

<b>Project 1 CPC30812 Certificate III in Roof Tiling</b>	
CPCCRT2001A	Handle roof tiling materials
CPCCRT2002A	Use roof tiling tools and equipment
CPCCRT3001A	Tile regular roofs
CPCCRT3002A	Tile irregular roofs
CPCCRT3004B	Repair and renovate tile roofs
CPCCRT3003B	Repair and replace valleys, valley irons and flashings
CPCCRT3005B	Slate a roof
CPCCRT3006B	Fix shingles to roofs and facades
<b>Project 2 Certificate 31211 Certificate III in Wall and Ceiling Lining</b>	
CPCCCWC3001A	Install and finish plasterboard and fibre cement sheeting to curved walls and ceilings
CPCCCWC3003A	Install dry wall passive fire-rated systems
CPCCCWC3004A	Install suspended ceilings
CPCCCWC2001A	Complete penetrations and flashings
CPCCCWC3002A	Install and finish plasterboard and fibre cement sheeting to arches
<b>Project 3 CPC31311 Certificate III in in Wall and Floor Tiling</b>	
CPCCCWF2001A	Handle wall and floor tiling materials
CPCCCWF2002A	Use wall and floor tiling tools and equipment
CPCCCWF3001A	Prepare surfaces for tiling application
CPCCCWF3002A	Fix floor tiles
CPCCCWF3003A	Fix wall tiles

CPCCWF3004A	Repair wall and floor tiles
CPCCWF3006A	Carry out mosaic tiling
CPCCWF3007A	Tile curved surfaces
CPCCWF3005A	Carry out decorative tiling
CPCCWF3008A	Tile domestic pools and spas
<b>Project 4 CPC31411 Construction Waterproofing</b>	
CPCCWP2001A	Handle waterproofing materials
CPCCWP2002A	Use waterproofing tools and equipment
CPCCWP2003A	Prepare for construction waterproofing process
CPCCWP2004A	Prepare surfaces for waterproofing application
CPCCWP3001A	Apply waterproofing process to below ground level wet areas
CPCCWP3002A	Apply waterproofing process to internal wet areas
CPCCWP3003A	Apply waterproofing process to external wet areas
CPCCWP3004A	Apply waterproofing remedial processes
<b>Project 5 Building and Construction</b>	
CPCCBC4002A	Manage occupational health and safety in the building and construction workplace
CPCCBC4003A	Select and prepare a construction contract
CPCCBC4004A	Identify and produce estimated costs for building and construction projects
CPCCBC4005A	Produce labour and material schedules for ordering
CPCCBC4007A	Plan building or construction work
CPCCBC4013A	Prepare and evaluate tender documentation
CPCCBC4014A	Prepare simple building sketches and drawings
CPCCBC4015A	Prepare specifications for all construction works

CPCCBC4016A	Administer a construction contract
CPCCBC4017A	Arrange resources and prepare for the building or construction project
CPCCBC4019A	Apply sustainable building design principles to water management systems
CPCCBC4020A	Build thermally efficient and sustainable structures
CPCCBC4021A	Minimise waste on the building and construction site
CPCCBC4022A	Supervise tilt-up work
CPCCBC4024A	Resolve business disputes
CPCCBC4026A	Arrange building applications and approvals
CPCCBC4028A	Prepare design brief for construction works
CPCCBC4030A	Analyse and communicate industry information
CPCCBC4031A	Process client requirements
CPCCBC4032A	Apply contract law to sales processes
CPCCBC4033A	Maintain the sales environment
CPCCBC4034A	Apply codes and standards to building trade and services contracting
CPCCBC4035A	Initiate the heritage works process
CPCCBC4036A	Prepare to undertake the heritage restoration process
CPCCBC4039A	Undertake the heritage restoration process
CPCCBC4040A	Prepare report for heritage restoration work
CPCCBC4041A	Undertake preparations for refractory work
CPCCBC4042A	Construct a fire brick wall and arch using refractory materials
CPCCBC4051A	Supervise asbestos removal
CPCCBC5005A	Select and manage building and construction contractors
CPCCBC5007B	Administer the legal obligations of a building or construction contract

CPCBC5012A	Manage the application and monitoring of energy conservation and management practices and processes
CPCBC5013A	Develop professional technical and legal reports on building and construction projects
<b>Project 6 Swimming Pool and Spa (Units applicable to this project live in the Building and Construction qualifications/project)</b>	
<b>Project 7 Remote Area Building Repairs and Maintenance (Unit count and suitability to be still determined)</b>	

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