



**Victorian  
Skills Authority**

## **Victorian Skills Plan**

# **Construction Industry Insight**

October 2022



Education  
and Training



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## Introduction

This report on the Construction industry forms part of the 2022 Victorian Skills Plan and outlines demand for occupations, education and training directed to meeting the demand and current workforce issues facing the industry.

This report has been prepared by the Victorian Skills Authority (VSA). The VSA was formed in July 2021 in response to the review *Future Skills for Victoria: Driving collaboration and innovation in post-secondary education and training* (known as the Macklin Review). The VSA is charged with preparing an annual Victorian Skills Plan (the Skills Plan) to guide decision-making on skills and training, by the Government, education and training providers, industry and communities.

### The Victorian Skills Plan

The annual Skills Plan sets out Victoria's skills needs for 2022 to 2025 by drawing on data, evidence and insights from a range of system-wide and local sources.

The Government in conjunction with industry, communities and education and training partners brings collaborative action through the Skills Plan which:

- **defines skill needs** with clear statements of required skills and capabilities (current and emerging)
- **sets priorities** for post-school education and training in Victoria
- **communicates to the community** the opportunities education and training can provide to offer careers for individuals that also meet the workforce needs of industry
- **aligns action** across industry and government to support improved outcomes for all Victorians.

The Skills Plan consists of:

- a summary report – the Victorian Skills Plan
- the industry needs of the Victorian economy segmented into 13 insight reports, each comprising like industries – of which this report is one
- profiles of industry and occupations in the regional areas of Victoria which outline priorities for skills development – either as snapshots or Regional Skills Demand Profiles
- current employment and forecast demand to 2025 across Victoria – a user-driven dashboard.

### About Industry Insight Reports

Each industry insight is based on robust research, qualitative and quantitative data collection and analysis and extensive consultation with the Government's Industry Advisory Groups, partners and stakeholders over a period of six months. Each report sets out to:

- profile the **industry outlook**, taking into account sector trends and key drivers of demand
- detail the **workforce and skilling implications** of the industry based on forecasting
- set **industry priorities** in responding to current and future workforce challenges
- provide initial guidance for an **education and training response** to these challenges.

The industries reflected in each report are defined according to their classification within *1292.0 - Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006*, prepared by the Australian Bureau of Statistics. Occupations within industries have been defined using the *Australian and New Zealand Standard Classification of Occupations (ANZSCO)*.

Each industry insight contributes to the conclusions and recommendations of the Skills Plan, focusing on actions for implementation over a three-year period.

The VSA acknowledges and extends sincere thanks to the individuals and organisations that participated in the consultations and contributed to these materials.

**Using this report**

This is a point-in-time report on the construction industry in Victoria and the associated skills and workforce issues.

This report, along with the Skills Plan, has been prepared for industry and provider partners as a summary of demand for occupations and workforce issues. In addition to being used by the Victorian Government to consider responses, as a public document it is available to industry and education and training partners to form actions and responses.

The report does not represent the full picture of workforce issues in the industry. Opportunities associated with skills and workforce are longstanding. The information in the report, however, provides the basis for ongoing work on skills demand and responses, including by the VSA and through the Industry Advisory Groups.

**Feedback**

Feedback on this report, and others, is welcome and can be provided to [SkillsPlan@education.vic.gov.au](mailto:SkillsPlan@education.vic.gov.au). Feedback will contribute to developing insights and actions.

## Report coverage

This report focuses on the construction industry as defined under ANZSIC and the occupations relevant to the industry, classified according to ANZSCO. It covers building construction, heavy and civil engineering construction and construction services.

Statistics about an industry and its sub-sectors are collated by the Australian Bureau of Statistics (ABS) from the activity of businesses. Each business is classified to an industry based on their primary activities. Where an individual works for multiple businesses, their main job is used.

Industry classifications rarely encompass the full nature of the work (and therefore skills) associated with a given industry. ABS definitions of industries or sectors may not align with the definitions used by an industry association, while the allocation of businesses on primary activity can result in businesses that perform similar services but with a different emphasis being classified across different industries.

Coverage in this report is limited to employment in the industry and sectors as defined by ABS, noting some occupations are almost exclusively associated with an industry, such as plumbers in construction, while others, such as accountants and electricians, are associated with many industries. Note, however, that occupational demand for Victoria as reflected in the dashboard is the total of occupational demand for all industries.

Table 1 sets out activities that may occur within the Construction industry but are reported formally under other industries. The relevant Industry Insight report is listed.

**Table 1 | Scope of related industry activities and insights related industries**

Activities	Industry insight
<ul style="list-style-type: none"> <li>Garden maintenance activities and maintenance of lawns</li> </ul>	Administrative and Support Services
<ul style="list-style-type: none"> <li>Providing management advice and related consulting services on business or personnel management policies or practices</li> <li>Providing engineering consulting services (e.g., feasibility studies, preliminary and final plans and design)</li> <li>Providing architectural services (e.g., planning and designing buildings, structures and development of land)</li> <li>Providing surveying and mapping services (including exploration surveying services on contract)</li> </ul>	Professional, Scientific and Technical Services
<ul style="list-style-type: none"> <li>Installation and monitoring of security systems</li> </ul>	Public Administration and Safety
<ul style="list-style-type: none"> <li>Off-site production of prefabricated buildings or building components</li> <li>Manufacturing bituminous surfacing materials (except hot-mix bituminous paving)</li> <li>Manufacturing air conditioning duct work</li> <li>Fabrication of aluminium and timber framed class products</li> </ul>	Manufacturing
<ul style="list-style-type: none"> <li>Quarrying sand or gravel</li> <li>Quarrying earth soil or filling</li> </ul>	Mining
<ul style="list-style-type: none"> <li>Repairing electrical and gas appliances</li> <li>Installing motor vehicle air conditioning equipment</li> </ul>	Services
<ul style="list-style-type: none"> <li>Pumping or cleaning septic tanks</li> </ul>	Electricity, gas, water and waste
<ul style="list-style-type: none"> <li>Selling sand, gravel or other quarried construction materials</li> </ul>	Wholesale Trade

## Executive summary

### Industry outlook

The construction industry is essential for Victoria's economic prosperity. It provides diverse employment opportunities depending on the type and scale of the work and intersects closely with other industries such as manufacturing and professional services. Over 309,800 workers are employed across the civil, industrial, commercial and residential building sector in Victoria.<sup>1</sup>

The COVID-19 pandemic disrupted many of Victoria's infrastructure projects due to lockdowns at various points in time. Despite this, the industry outlook remains strong. Substantial government investment in recent years through initiatives such as Victoria's Big Build and HomeBuilder will continue to drive demand. Population growth in regional Victoria will also drive growth, however ongoing supply chain disruptions and material shortages are likely to remain a challenge.

### Workforce and skilling implications

On average, across all industries total employment is expected to grow by an additional 211,900 workers to 2025, from 3,538,900 workers in 2022, an annual growth rate of 1.97 per cent<sup>a,2,3</sup> In comparison between 2017 and 2020 employment grew by 2.68 per cent<sup>b</sup> annually.<sup>4</sup>

In the Construction industry, employment is expected to grow by an additional 19,200 workers to 2025, from 309,800 workers in 2022, an annual growth rate of 1.99 per cent<sup>c</sup> which is higher than the overall Victorian average across all industries.<sup>5,6</sup> In comparison between 2017 and 2020 employment across this industry grew by 5.67 per cent<sup>d</sup> annually.<sup>7</sup>

Workforce growth will be required to meet expected demand. By 2025, an estimated 34,100 new workers are needed.<sup>8</sup> This includes employment growth of 19,200 and replacement of 14,900 retirees.<sup>8,9</sup>

Table 2 identifies the top ten occupations in demand across the industry to 2025. Of these, seven occupations (highlighted in table) are expected to experience employment growth at a rate above the overall Victorian average between 2022 and 2025.

**Table 2 | Occupations in demand in the construction industry to 2025<sup>e,f,10,11</sup>**

Occupation	Current employment	Employment growth (2022–25)		Retirements (2022–25)	New workers needed (2022–25)
		Number	Per cent		
Construction Managers	31,100	1,900	2.6%	1,500	3,400
Electricians	22,600	2,250	2.8%	950	3,200
Plumbers	32,350	1,500	2.2%	750	2,250
Carpenters and Joiners	43,200	450	0.5%	1,300	1,750
Architectural, Building and Surveying Technicians	12,000	1,200	3.3%	400	1,600

<sup>a</sup> 3-year compound annual growth rate

<sup>b</sup> Computed for 2017 to 2020 employment growth for pre-COVID comparison

<sup>c</sup> 3-year compound annual growth rate


<sup>d</sup> Computed for 2017 to 2020 employment growth for pre-COVID comparison

<sup>e</sup> Supporting roles such as office managers, accounting clerks and human resource managers have been excluded.

<sup>f</sup> Some roles will also appear in other industries, for example electricians will also appear in the Electricity, gas, water and waste industry insight. Note: Due to rounding, some totals may not correspond with the sum of the separate figures.

Occupation	Current employment	Employment growth (2022–25)		Retirements (2022–25)	New workers needed (2022–25)
		Number	Per cent		
Building and Plumbing Labourers	13,300	900	2.3%	650	1,550
Civil Engineering Professionals	9,050	600	3.9%	300	900
Earthmoving Plant Operators	6,600	200	0.8%	500	750
Painting Trades Workers	11,000	150	0.5%	550	700
Insulation and Home Improvement Installers	4,050	350	2.3%	300	650

## Legend

 Above Victorian employment growth average between 2022 and 2025

The rise in preferences for renewable and recyclable materials is driving demand for new job roles, including energy efficiency engineers, energy auditors, solar installers and wind turbine technicians. Increasing understanding of workplace hazards is also creating roles such as hazardous materials labourers, risk analysts and regulatory affairs specialists.

Industry has also identified changing skill needs. Workers will need to upskill in new areas such as digital twin technology, asset management software, building information modelling (BIM) and Computer Aided Design (CAD) software.

Meeting this demand will be challenging. A large number of occupations were identified as in shortage. These roles will need to be filled for growth to be realised. The construction industry reports that lack of diversity in entrants to the industry such as women, retention challenges, an ageing workforce and sometimes poor workplace conditions as further contributing to this challenge.

### Workforce priorities

Three priorities are identified to address workforce and skilling needs for the construction industry:

1. Build the pipeline of workers in key roles and retain them in industry – focus is required to bring more workers through apprenticeship pathways into the industry without compromising skill development
2. Secure a highly capable workforce that keeps pace with new skills – addressing skills gaps in areas will increase employee confidence and retention
3. Upskill workers where appropriate into supervisory and management roles and/or to become advanced technical practitioners – enhanced professional development and pathway opportunities into senior roles can retain individuals and improve project timelines.

### Education and training pipeline and workforce response

Pathways to employment in the construction industry are split across Higher Education and VET with 10 per cent of workers holding a degree or above as their highest level of education and 58 per cent of workers holding a VET level qualification as their highest level of education.<sup>12</sup>

Key entry points to the industry include the Certificate II in Building and Construction Pre-apprenticeship, Certificate III in Carpentry, Certificate III in Electrotechnology Electrician and Certificate III in Plumbing<sup>13</sup> and there are other entry points to the industry to other trade roles. While

activity is high in some courses, many have low enrolment numbers and opportunities exist to expand take-up.

There is a need to increase interest in and awareness of career pathways in construction, particularly for women. Highlighting the opportunities available in less common trades such as painting, and tiling should also be a focus.

Exploring new partnership models between industry and education providers (e.g. TAFE, Industry Registered Training Organisations (RTOs) and universities) is also key. These partnerships will ensure workers gain the necessary skills and improve completions. In parallel, the response should include increased use of post-trade and post-graduate short courses and micro-credentials so workers can deepen their technical expertise in the industry.

Protection to consumers and employers required through regulation is supported through high quality skilling programs. The supply of adequately informed, skilled and (sometimes) qualified and/or licensed workers alleviates monitoring and enforcement costs and ultimately encourages clients of the industry to avoid the risks associated with using unskilled workers.

Joint effort is required to lift the value proposition of working in construction, to address workforce challenges linked to mental health and high rates of insolvencies.

Table 3 highlights actions that can be adopted by education, industry, and government to meet workforce demand.

### **Table 3 | Actions for consideration for education, industry, and government**

- Industry, government and education providers to work together to expand interest and awareness in construction related career pathways to build the pipeline of workers, particularly with women and other underrepresented groups in the industry.
- Promote and provide clear pathways into the full range of roles within construction.
- Strengthen partnerships between industry and education providers to ensure workers gain the necessary practical skills throughout their training.
- Explore opportunities to expand the availability of skill sets micro-credentials so workers in the industry can upgrade for new licensing and new technologies.
- Industry to lead discussions focused on strengthening the value proposition for working in construction industry, including job design, rostering and working conditions to attract new cohorts.



## Industry outlook

### The construction workforce is the fourth largest in Victoria

Construction is a large and growing industry in Victoria, contributing \$21.6 billion to the Victorian economy.<sup>14</sup> The industry is responsible for the construction of buildings and other structures, as well as the additions, alterations, reconstruction, installation, maintenance and repair of those structures.<sup>15</sup> Construction also involves demolition and clearing of building sites.<sup>16</sup> Other primary activities include blasting, test drilling, landfill, levelling, earthmoving, excavating, land drainage and other land preparation.<sup>17</sup> Large-scale construction activity can be performed across multiple project sites, but is most frequently managed from one single site where all the back-office support staff will be located.<sup>18</sup>

The construction workforce is the fourth largest in Victoria, employing 9 per cent of the total workforce (309,800 workers).<sup>19</sup> Across the industry, 11.6 per cent of workers are female, significantly lower than the Victorian average of 47.2 per cent, and 24.6 per cent of the workforce is aged over 50, lower than the Victorian average of 29 per cent.<sup>20,21</sup> Workers' average annual earnings are \$85,311 compared to the Australian average of \$69,103.<sup>22</sup>

The construction workforce is the fourth largest in Victoria, employing 9 per cent of the total workforce, with over 300,000 people.

In general, the industry comprises three sectors – residential buildings, industrial and commercial buildings and civil infrastructure.<sup>23</sup>

#### Residential buildings

The residential building sector includes businesses engaged in building activities for high-rise apartments, detached houses and medium-density dwellings which include townhouses, terrace houses, semi-detached houses and duplexes.<sup>24</sup> There are three main types of businesses in the residential building space, volume builders; custom or bespoke builders and renovators.<sup>25</sup> The sector directly employs 42,500 people in Victoria.

As of June 2019, there were approximately 23,000 businesses in the Victorian residential building construction industry.<sup>26</sup> Most businesses (55 per cent) have an annual turnover of less than \$200k, while 89 per cent have an annual turnover of less than \$2m. This is likely due to the extensive use of sub-contracting across the industry.<sup>27</sup>

#### Industrial and commercial buildings

The industrial and commercial sector includes the construction of non-residential buildings, such as offices, retail and wholesale trades facilities, and non-passenger transport facilities, such as freight and port loading terminals.<sup>28</sup> It also includes buildings used for public purpose such as schools, universities, hospitals and libraries.<sup>29</sup> The sector directly employs approximately 15,300 workers in Victoria, it also includes a large proportion of businesses (approximately 4,000) with fewer than 20 employees.<sup>30</sup>

#### Civil infrastructure

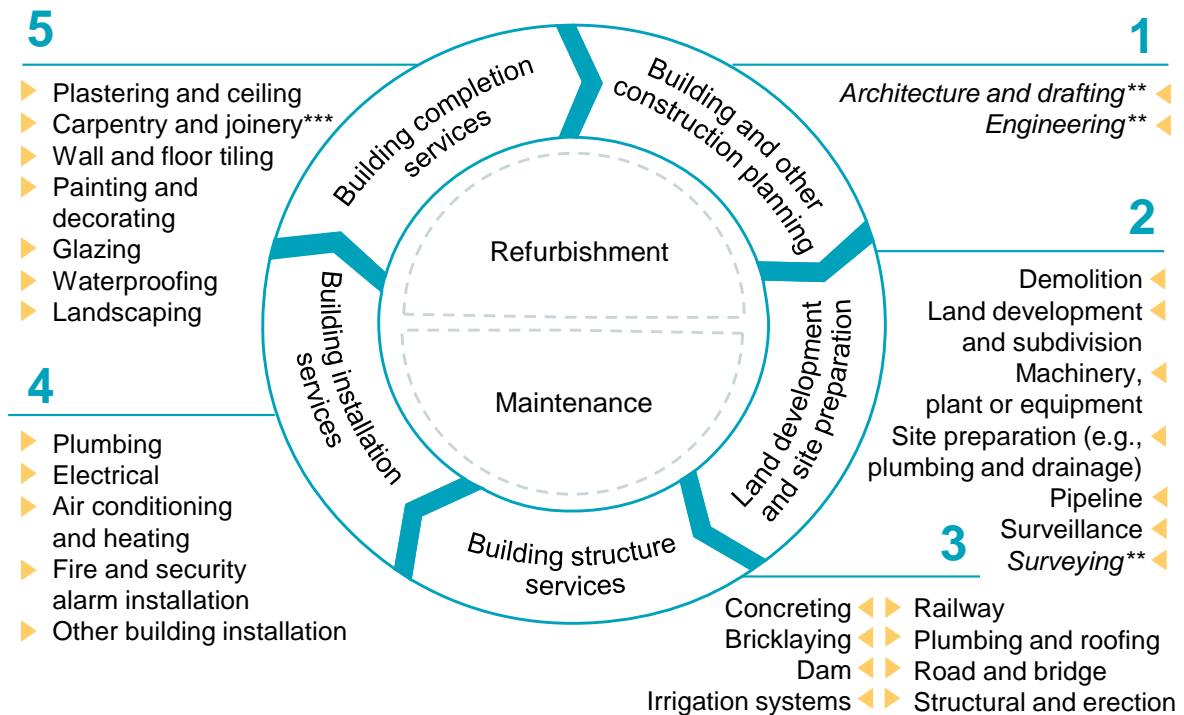
The civil construction sector includes businesses engaged in construction and maintenance of horizontal infrastructure, with around 2,500 civil construction businesses operating in Victoria.<sup>31</sup> Civil work is referred to this way as it is often associated with structures that are longer than they are tall, and includes land development, site preparation activities and construction and maintenance of roads, bridges, airports and train stations.<sup>32</sup> There are around 24,900 workers employed in the civil sector in Victoria.<sup>33</sup> Most work is in major projects with authorities such as VicRoads, water authorities, airports and councils.<sup>34</sup>

### Workers operate across the three sub-sectors

The remaining workers employed by the construction industry are not primarily employed by only one sub-sector, but provide services to a range of sub-sectors. This includes the services identified in Figure 1 such as land development and site preparation services, building structure services, building installation services and building completion services.

Each sector relates to the type and scale of work undertaken. Professional, scientific and technical services such as architecture, drafting and engineering are critical support services (see Figure 1).

**Figure 1 | Sectors and services from a construction project lifestyle perspective**



\*\* Sub-industry within ANZSIC Professional, Scientific and Technical Services and not included in employment data for Construction.

\*\*\* Carpentry and joinery also support building structure services.

Most businesses in the industry are either sole traders or very small, employing fewer than 20 people, although prime companies are engaged for major commercial and civil projects.<sup>35</sup> The majority of the smaller businesses tend to be Australian owned, with sales occurring in the domestic market.<sup>36</sup> Construction materials are, however, increasingly imported from overseas.<sup>37</sup> The Commission for Better Regulation completed a review of the supply chain issues facing Victoria’s building and construction industries in 2021, making ten recommendations for consideration by the Victorian Government under three key themes: alleviating supply issues in the short term; assisting industry and consumers to manage market conditions in the short term; and protecting against future shocks over the medium to long-term.<sup>38</sup> The Victorian Government supported recommendations that reduce current supply pressures and increase opportunities into future development of alternative building materials, while protecting the rights of affected consumers.<sup>39</sup>

The industry operates under significant regulation with most employees requiring a trade or a professional qualification to work. Most workers on sites need to comply with occupational health and safety requirements such as the Construction White Card and many who perform specialist work, especially that impacts public safety, need to obtain additional licences. In total, these conditions give rise to a high rate of formal education and training in the industry, especially through VET.<sup>40</sup>
















The COVID-19 pandemic has had a significant impact on the construction industry and related timelines for key infrastructure projects. The industry was required to shut down at various points over 2020 and 2021 to limit infection rates, however, was later deemed an essential service and activity continued.<sup>41</sup> Some sectors still operated under restricted conditions. Sites had visit limits of tradespeople and workers for alterations and extensions in homes which were occupied needed to observe distancing and hygiene requirements.<sup>42</sup>













Around three-quarters of workers in the industry provide services to a range of sub-sectors across the construction industry.

## Investment is driving demand across all construction sectors in Victoria

The Victorian Government has signaled that it will continue to invest in the industry to ensure it remains a driving force for Victoria’s economy through the pandemic recovery and beyond, demonstrated by initiatives such as the Big Build. The demand for construction workers in Victoria is expected to grow by 34,000 new workers (replacing workers expected to retire plus employment growth) between 2022 and 2025.<sup>43</sup> The industry outlook is driven by a range of factors, set out in Table 4.<sup>44</sup>

**Table 4 | Drivers of demand in the construction industry**

Driver		Civil	Industrial and commercial	Residential Building
Policy	Government investment in public infrastructure, residential construction and the transition to renewable energy (e.g., Renewable Energy Zones and Victoria’s renewable energy targets), creating significant demand for construction services.	 High	 High	 High
	Regulatory changes to ensure workplace safety and energy efficiency will increase skill and compliance requirements.	 High	 High	 High
Economic	Supply chain disruptions have caused shortages (and therefore higher prices) in materials, resulting in project delays, budget overruns, and cascading impacts across the industry.	 High	 High	 High
	The disclosure of climate risk in response to the requirements of investors, insurers and financiers, and the cost of energy will drive updates to building design, construction practices, materials and technology.	 High	 High	 High
Social	An increased awareness of mental health challenges in the industry have prompted the release of new regulations to address psychological health in the workplace and improved guidance for employers.	 High	 High	 High

Driver	Civil	Industrial and commercial	Residential Building	
Victoria's shift towards lower density housing options and reduced people per household are likely to reduce demand for high density housing.	 Low	 Medium	 Medium	
<b>Technological</b> New technologies, such as Building Information Modelling (BIM), GPS, drone technology and autonomous plant management will drive greater efficiencies and productivity.	 High	 High	 Medium	
<b>Environmental</b>	The transition to require more sustainable materials and practices across the construction industry will be significant in terms of regulation. Examples include reduced fugitive emissions, more efficient use of gas, electrification and alternative gasses such as hydrogen and biogas.	 High	 High	 High
	The impact of climate change (bushfires, flood, heating) will increase risk and require a renewed approach to risk management and skills in erosion, waste materials and products, water, and energy, particularly for the design and construction of resilient infrastructure and housing.	 Medium	 Medium	 Medium

Drivers are expected to impact sectors differently across the industry over the next three to five years. Further detail is provided in Appendix A.

### Residential buildings

Government stimulus and initiatives focused on public and affordable housing is driving growth in the short term. Victoria's Big Housing Build includes \$5.3 billion to construct more than 12,000 new dwellings, including 9,300 new social housing dwellings and 2,900 new homes in locations close to jobs and transport.<sup>45</sup> Other initiatives include the HomeBuilder grant, which provides eligible owner-occupiers (including first home buyers) with a grant to build a new home, substantially renovate an existing home or buy an off-the-plan home/new home.<sup>46</sup> Victoria has also seen an increase in the number of people moving to regional Victoria during COVID-19 which has stimulated demand for the construction of homes and rental properties.<sup>47</sup> The rise in household income and employment has driven demand for property purchases such as residential homes or for rental and renovations of existing homes.<sup>48</sup> Industry notes there is an expected decline in residential building activity once government initiatives end and COVID-19 influenced consumer behaviour slows down.<sup>49</sup>

Volatility in international trade is impacting the supply of products for the industry, which relies heavily on imported products,<sup>50</sup> and risks slowing the rate of activity in the sector for the short-term.

Government stimulus and initiatives are driving demand in the residential building sector, such as Victoria's Big Housing Build and HomeBuilder grant.

## Industrial and commercial buildings

Industrial and commercial markets are expected to weaken as private investment declines and uncertainty exists over the domestic economy.<sup>51</sup> An example includes the decline in approvals of medium and high-density apartments since 2018.<sup>52</sup> Despite a decline in private investment, the Victorian Government is planning and delivering several projects to grow the sector. This includes projects to increase the efficient movement of freight across Victoria, such as investing \$28 million in a port rail shuttle to improve the way freight moves around Melbourne and the Port of Melbourne's \$125 million on-dock rail that will get more freight onto rail and take trucks off local roads.<sup>53,54</sup>

## Civil infrastructure

Victoria's Big Build is expected to deliver 165 major road and rail projects worth approximately \$80 billion. Example projects include the Metro Tunnel, removal of 85 level crossings across Melbourne, West Gate Tunnel, major road upgrades, Melbourne Airport Rail, Suburban Rail Loop and upgrades to every regional passenger line in Victoria.<sup>55</sup> The North East Link (NEL) is also part of the Big Build and is the largest investment in a road project in Victoria's history.<sup>56</sup> The \$11.1 billion project will begin construction in 2022 and is expected to be completed in 2027-2028.<sup>57</sup> The NEL will complete the missing link in Melbourne's orbital freeway between an upgraded Eastern Freeway and the M80 Ring Road, and is expected to take 15,000 trucks off local roads a day and reduce travel time by 25 minutes.<sup>58</sup> Victoria's Big Build will stimulate economic growth and drive demand for over 18,000 jobs across both the public and private sector.<sup>59</sup>

Population growth is also driving demand for services in this sector, particularly in regional Victoria. Victoria's population is expected to grow 1 per cent in 2022-23 and increasing to 1.7 per cent in 2023-24.<sup>60</sup> Example projects includes the New Arden Precinct and Fisherman's Bend, which will be home to an estimated 15,000 new residents by 2050, requiring the construction of parks, schools, roads, transport and community facilities and services.<sup>61</sup> The Government has also committed significant investment in school infrastructure to meet the needs of growing communities.<sup>62</sup> This includes delivering 100 new schools between 2019 to 2026, in parallel to a new kindergarten being built at or next to every primary school as part of the roll out of funded three-year-old kindergarten across Victoria.<sup>63</sup> The Victorian Government is also investing \$326 million to upgrade 36 special schools, including 14 in regional Victoria.<sup>64</sup> There is a \$1.5 billion investment to deliver a new Footscray Hospital with capacity of 200 beds opening in 2025 and an additional \$2 billion infrastructure investment in the pipeline to expand broader hospital and healthcare capacity.<sup>65</sup> Other examples of key investments include more than \$500 million to deliver the Barwon Women's and Children's Hospital for Geelong's rapidly growing population and \$196 million to replace and expand the mental health facility at Goulburn Valley Health in Shepparton and to purchase land and undertake further planning to deliver additional acute mental health beds in Ballarat and Wangaratta.<sup>66</sup>

## Workforce and skilling implications

### An estimated 34,100 new workers are required to meet projected demand over the next three years<sup>67</sup>

On average, across all industries total employment is expected to grow by an additional 211,900 workers to 2025, from 3,538,900 workers in 2022, an annual growth rate of 1.97 per cent<sup>g,68,69</sup> In comparison between 2017 and 2020 employment grew by 2.68 per cent<sup>h</sup> annually.<sup>70</sup>

In the Construction industry, employment is expected to grow by an additional 19,200 workers to 2025, from 309,800 workers in 2022, an annual growth rate of 1.99 per cent<sup>i</sup> which is higher than the overall Victorian average across all industries.<sup>71,72</sup> In comparison between 2017 and 2020 employment across this industry grew by 5.67 per cent<sup>j</sup> annually.<sup>73</sup>

The 34,100 new workers needed between 2022 and 2025<sup>74</sup> comprises 19,200 in new employment growth and replacement of 14,900 retirees.<sup>75,76</sup> The number of retirements does not consider people leaving the industry for other reasons. Industry highlighted the potential for workers bringing forward retirements rather than take up new trade registration and licensing which have recently been introduced.

The HomeBuilder initiative will drive demand for various tradespersons including bricklayers, carpenters and joiners, electricians and plumbers. Meanwhile, procurement professionals, engineers and architects will be required to support new precincts and infrastructure growth in regional Victoria. Construction managers and supervisors will also be needed to support Tier 1 and 2 contractors across Victoria in the delivery of major commercial and civil infrastructure projects. Scientists such as geologists, geophysicists and hydrogeologists will be needed to determine materials, energy, weather, and the environmental impact on construction projects. Their focus will be on keeping buildings safe, healthy, comfortable and efficient.

Table 5 identifies the top ten occupations in demand<sup>77</sup> based on employment growth and replacing retirees. Of these, seven occupations (highlighted in table) are expected to experience employment growth at a rate above the overall Victorian average between 2022 and 2025. These figures are estimates but it is important to note that they may be under-estimated as they do not account for existing vacancies nor take account of changes in the rate of workers leaving the industry, which stakeholders indicated appears to be higher than normal.

**Table 5 | Occupations in demand for the construction industry<sup>k,l,78,79</sup>**

Occupation	Current employment	Employment growth (2022–25)		Retirements (2022–25)	New workers needed (2022–25)
		Number	Per cent		
Construction Managers	31,100	1,900	2.6%	1,500	3,400
Electricians	22,600	2,250	2.8%	950	3,200
Plumbers	32,350	1,500	2.2%	750	2,250
Carpenters and Joiners	43,200	450	0.5%	1,300	1,750

<sup>g</sup> 3-year compound annual growth rate

<sup>h</sup> Computed for 2017 to 2020 employment growth for pre-COVID comparison

<sup>i</sup> 3-year compound annual growth rate

<sup>j</sup> Computed for 2017 to 2020 employment growth for pre-COVID comparison


<sup>k</sup> Supporting roles such as office managers, accounting clerks and human resource managers have been excluded.

<sup>l</sup> Some roles will also appear in other industries, for example electricians will also appear in the Electricity, gas, water and waste industry insight. Note: Due to rounding, some totals may not correspond with the sum of the separate figures.



Architectural, Building and Surveying Technicians	12,000	1,200	3.3%	400	1,600
Building and Plumbing Labourers	13,300	900	2.3%	650	1,550
Civil Engineering Professionals	9,050	600	3.9%	300	900
Earthmoving Plant Operators	6,600	200	0.8%	500	750
Painting Trades Workers	11,000	150	0.5%	550	700
Insulation and Home Improvement Installers	4,050	350	2.3%	300	650

Legend

 Above Victorian employment growth average between 2022 and 2025

Emerging occupations in the construction industry are primarily due to the rise in renewable and recyclable materials, in parallel to a preference for sustainable practices. This includes energy efficiency engineers, energy auditors, solar installers and wind turbine technicians. Government investment in the renewable energy sector and related projects, including offshore wind energy and renewable energy zones will drive demand for workers to build related infrastructure.<sup>80,81</sup> Other occupations such as hazardous materials labourers and risk analysts result from industry recognition of workplace hazards, in particular asbestos and silicosis safety awareness. The need for tunnellers is growing in response to Victoria’s Big Build initiatives and two significant rail projects, the Suburban Rail Loop and Melbourne Airport Rail.<sup>82</sup> Other occupations in demand due to the Big Build initiatives include structural design engineers, engineering surveyors, professional truck drivers, geotechnical engineers, traffic engineers, rail signalling engineers and electrical line workers.

Regulatory affairs specialists will be needed to respond to various regulatory changes to ensure workplace safety and energy efficiency in the construction industry. See Appendix A for recent reforms and announcements.

Emerging occupations are defined as new, frequently advertised jobs which are substantially different to occupations already defined in ANZSCO. It also includes roles where the number of positions available will continue to grow in the future. Occupations are listed in Table 6.

**Table 6 | Emerging occupations in the construction industry<sup>83</sup>**

Emerging occupations	
• Energy auditors	• Energy efficiency engineers
• Hazardous materials labourers	• Regulatory affairs specialists
• Risks analysts	• Solar installers
• Tunnelers	• Wind turbine technicians

### Existing occupation shortages span tradespersons to professionals

The construction industry is facing widespread workforce shortages, particularly in regional Victoria. Competition for skilled workers has been compounded by the COVID-19 pandemic which has constrained the availability of international skilled labour.<sup>84</sup> Industry has also identified several additional reasons for these shortages, such as challenges with retention of employees, insecure

employment and a decline in worker engagement accompanied by skills supply due to low completion rates in some construction related courses and difficulties finding educators to teach courses.<sup>85</sup>

A shortage exists when employers are unable to fill or have considerable difficulty filling vacancies for an occupation at current levels of remuneration and conditions of employment, and in reasonably accessible locations. Where an occupation specialisation is in shortage, the occupation will be treated as in shortage. Many occupations listed face more chronic shortages in regional Victoria. A list of current occupation shortages is shown in Table 7.

**Table 7 | Occupation shortages in the construction industry<sup>86,87</sup>**

Occupation shortages	
• Bricklayers	• Carpenters
• Concreters	• Construction managers
• Draftspersons	• Drainer, maintenance plumbers and pipefitters <sup>88</sup>
• Drillers (piling/foundation) <sup>89</sup>	• Earthmoving plant operators <sup>90</sup>
• Electrical line workers <sup>91</sup>	• Electricians
• Engineers (various) <sup>92</sup>	• Estimators
• Finishing trades such as plasterers, painters and tilers <sup>93</sup>	• General managers <sup>94</sup>
• Geologists	• Geophysicists and hydrogeologists
• Glaziers <sup>95</sup>	• Joiners <sup>96</sup>
• Landscapers <sup>97</sup>	• Maintenance planner <sup>98</sup>
• Other miscellaneous labourers <sup>99</sup>	• Plumbers <sup>100</sup>
• Procurement professionals	• Project management professionals
• Rail plant operators <sup>101</sup>	• Rail tracker workers
• Risk management professionals (e.g., quality assurance manager) <sup>102</sup>	• Road and civil based plant operators
• Scientists, including geologists, geophysicists and hydrogeologists <sup>103</sup>	• Signal technicians <sup>104</sup>
• Site supervisors	• Surveyors, including building surveyors, land surveyors and quantity surveyors <sup>105</sup>
• Track examination and certification workers <sup>106</sup>	• Other building and engineering technicians
<b>Additional occupations as part of the National Skills Commission's updated Skills Priority List released on 06 October 2022<sup>107</sup></b>	
• Construction estimators	• Crane, hoist or lift operators
• Steel fixers	• Construction riggers
• Structural steel erectors	• Scaffolders
• Crane Chasers	



Given the industry is key to economic activity these factors are expected to impact economic growth in Victoria. The shortage of workers is also likely to lead to extended project timelines and a barrier for businesses seeking to expand their operations.

## Both technical and general skills are in immediate shortage among workers

Highly technical accompanied by general skills are required for most roles in the construction industry. Industry has identified skills shortages due to insufficient breadth of experience in apprenticeships, especially in specialised or small businesses; an ageing workforce that is creating skills gaps as existing workers retire, particularly management and leadership skills; and the rapid uptake in renewable materials and sustainable practices with lags in deploying the new skills to existing workers. Key generic skills include literacy, numeracy, communication and critical thinking.<sup>108</sup> Industry noted that basic literacy and numeracy gaps continue to be an issue when employing workers. Table 8 identifies the range of skills in shortage across the construction industry.

**Table 8 | Skill shortages facing the construction industry**<sup>109,110</sup>

Skill shortages	
<ul style="list-style-type: none"> <li>Customer service</li> </ul>	<ul style="list-style-type: none"> <li>Business management and/or financial management skills<sup>111</sup></li> </ul>
<ul style="list-style-type: none"> <li>Commercial management<sup>112</sup></li> </ul>	<ul style="list-style-type: none"> <li>Design and estimation<sup>113</sup></li> </ul>
<ul style="list-style-type: none"> <li>Digital skills (e.g., working with digital devices, communication applications and networks)</li> </ul>	<ul style="list-style-type: none"> <li>Emerging renewable construction (hydro, digital, electricians)</li> </ul>
<ul style="list-style-type: none"> <li>Fault fixing capability</li> </ul>	<ul style="list-style-type: none"> <li>Foundation skills (e.g., language, literacy and numeracy skills)</li> </ul>
<ul style="list-style-type: none"> <li>Initiative</li> </ul>	<ul style="list-style-type: none"> <li>Innovation</li> </ul>
<ul style="list-style-type: none"> <li>Management and supervision skills</li> </ul>	<ul style="list-style-type: none"> <li>Problem-solving</li> </ul>
<ul style="list-style-type: none"> <li>Procurement management<sup>114</sup></li> </ul>	<ul style="list-style-type: none"> <li>Teamwork</li> </ul>

While some of these skills are required immediately, others will have increasing need in the future. The pace of change in the construction industry will have implications for existing workers who will be required to upskill in areas such as digital twin technology, asset management software, building information modelling (BIM) and Computer Aided Design (CAD) software. Some skills are related to specific sectors only, such as remaining up to date with changing regulation and requirements, specifically changes to the National Construction Code (NCC).

Other skills respond to societal shifts such as increasing industry recognition of workplace hazards, in particular asbestos and silicosis safety awareness and mental health is also requiring a skills response. Trends concern the increasing preference for sustainable practices and recyclable and renewable materials demanding a new skill set.

Emerging skills also often relate to those in shortage due to the lag between demand and workers developing these new skills (see Table 8). This lag comes firstly from the delay in demand becoming widespread enough that the workforce has time to respond, and then in the time taken to train and develop the relevant skills. Some workers may already have these skills while others may be in shortage, detailed in Table 9.

**Table 9 | Emerging skills in the construction industry<sup>115</sup>**

Emerging skills	
<ul style="list-style-type: none"> <li>Artificial intelligence and how it can optimise process-driven operations across the construction project lifecycle.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness of quality assurance and control associated with new insurance requirements and regulation.</li> </ul>
<ul style="list-style-type: none"> <li>Working with steel frames due to recent shortages in timber.<sup>116</sup></li> </ul>	<ul style="list-style-type: none"> <li>Skills to meet the shift to hydrogen or hydrogen blends.<sup>117, 118</sup></li> </ul>
<ul style="list-style-type: none"> <li>Design, engineering and building using sustainable practices and recyclable and renewable materials (e.g., recycled plastic railway sleepers, recycled plastic noise walls).<sup>119</sup></li> </ul>	<ul style="list-style-type: none"> <li>Emerging technologies in the solar and/or heat pump for sustainability purposes.<sup>120, 121</sup></li> </ul>
<ul style="list-style-type: none"> <li>Experience with asset management software (e.g., Maximo).<sup>122</sup></li> </ul>	<ul style="list-style-type: none"> <li>Experience in green building design and construction requirements, embedded energy and building for energy efficiency.<sup>123</sup></li> </ul>
<ul style="list-style-type: none"> <li>Familiarity with 3D CAD design software, and digital tools such as estimating programs for landscape designers.<sup>124</sup></li> </ul>	<ul style="list-style-type: none"> <li>Greater awareness of construction workplace hazards, in particular asbestos safety awareness, silicosis safety awareness and mental health safety awareness.</li> </ul>
<ul style="list-style-type: none"> <li>Greater focus on experience with brownfield and greenfield sites.<sup>125</sup></li> </ul>	<ul style="list-style-type: none"> <li>Greater priority on effective planning, logistics and procedure developments.<sup>126</sup></li> </ul>
<ul style="list-style-type: none"> <li>Operation of new technologies, such as GPS technology, robotics, drone technology and autonomous plant in civil construction.<sup>127</sup></li> </ul>	<ul style="list-style-type: none"> <li>Prefabricated construction installation skills due to new modern methods of construction.</li> </ul>
<ul style="list-style-type: none"> <li>Skills in heritage-listed buildings and retrofit of existing buildings.<sup>128</sup></li> </ul>	<ul style="list-style-type: none"> <li>Skills in ground preparation and tunnel construction.</li> </ul>
<ul style="list-style-type: none"> <li>Skills to better prevent workplace psychological harm and safeguard workers from mental injury, particularly for leaders.<sup>129</sup></li> </ul>	<ul style="list-style-type: none"> <li>Technical skills such as scheduling, budgeting, planning and logistics.<sup>130</sup></li> </ul>
<ul style="list-style-type: none"> <li>Training in new technologies, such as BIM for tradespeople as they are developed.<sup>131</sup></li> </ul>	<ul style="list-style-type: none"> <li>Understanding of digital twin technology.</li> </ul>
<ul style="list-style-type: none"> <li>Understanding of new building requirements, including changes to airtightness standards, condensation management, cavity fixing of cladding and emphasis on accessible housing.<sup>132</sup></li> </ul>	

## Education and training pipeline

There were approximately 83,010 enrolments in construction related VET qualifications in 2020 and nearly 14,980 relevant enrolments in Higher Education in 2019.<sup>133,134</sup> This should translate to close to 36,070<sup>m</sup> graduating students entering the workforce each year with relevant qualifications, presenting a significant opportunity to meet the projected demand, although some will seek employment in other industries. For further detail, see the collaborative response toward the end of this report.

### VET is the primary pathway into and through the construction industry

Employment opportunities in construction are available at all skill and experience levels, but the industry depends heavily on the engagement of skilled tradespeople.<sup>135</sup> Employment is concentrated in four main occupations (carpenters and joiners, plumbers, construction managers and electricians) but also embraces more specialised occupations across sectors (e.g. deep excavators).<sup>136</sup> There are also good entry level opportunities, with 32 per cent of construction workers not holding any post-school qualifications (not accounting for tickets and licences).<sup>137</sup>

A VET level qualification is required for most of the top employing occupations in the industry, including carpenters and joiners, plumbers and electricians. VET will likely continue as the primary channel of training and education supply to the construction workforce, with 58 per cent of workers holding a VET level qualification as their highest level of education.<sup>138</sup>

Apprenticeships and traineeships are highly valued in the industry, and many are government funded. Apprenticeships and traineeships have strong long-term employment prospects and account for a higher share of students who achieve their main reason for training relative to other industries.<sup>139</sup> Enrolment activity is also spread across different qualification levels as the industry provides a range of opportunities for entry or preparation for entry such as for school leavers and mature aged workers.<sup>140</sup>

In 2020, there were around 32,890 enrolments in construction related apprenticeships or traineeships in Victoria.<sup>141</sup>

In 2020, there were close to 2,430 enrolments in construction related skill sets in Victoria.<sup>142</sup> These skill sets are delivered to upskill and for professional development mainly for licensing and ticketing requirements. Examples include high risk work licenses such as crane licenses and forklift licenses, traffic control blue and yellow cards and working at height tickets.

### VET Activity

People enrol in VET courses for one of three main reasons:

- to prepare for employment
- to support current employment
- to progress their careers within the industry.

This equates to training categorised as prior to employment, with employment (as an apprenticeship or traineeship) and upskilling once qualified as shown in Table 10. The table shows the enrolments in 2020 in VET courses on the Victorian Funded Course List (FCL) and the Victorian Funded Skill Set List (FSSL)<sup>143,144</sup> related to this industry and against each category. The enrolment numbers are drawn

<sup>m</sup> This number is determined by taking the total number of VET enrolments in courses undertaken prior to employment, combined with 1/3 of the total number of HE enrolments in AQF 5-8 courses (as these courses are traditionally undertaken prior to employment and the average bachelor degree is three years, so therefore only those in their final year of study will enter the workforce the following year).

from Total VET activity (TVA) which comprises enrolments supported by public funding or by private contribution.

As part of preparing this report, industry representatives have provided their perspectives on the purpose of these qualifications, which is summarised in Figure 2 and helps with reading Table 10.

**Figure 2 | VET pipeline key**

- 'AT' indicates a classroom-based course is also available as an apprenticeship or traineeship option
- 'Q' indicates industry values the course as a qualification
- 'SS' indicates industry values the course as a skill set
- 'EIR' indicates it is an Endorsed Industry Requirement as noted by industry
- 'OL' indicates the course leads to an Occupational License as noted by industry

Note: Industry has not provided feedback on all qualifications and where indicated; each value assignment can be reviewed in the future.

**Table 10 | VET pipeline for construction in Victoria<sup>n</sup>**

Prior to employment	
Qualifications (31,780 TVA enrolments 2020, 771 Skill Set enrolments 2020)	
<b>Advanced Diploma</b>	<b>578</b>
Advanced Diploma of Building Surveying (Q,SS,OL)	578
<b>Certificate II</b>	<b>21,789</b>
Certificate II in Arboriculture (Q)	-
Certificate II in Building and Construction Pre-apprenticeship (Q,SS)	11,705
Certificate II in Civil Construction (Q,SS,EIR)	219
Certificate II in Construction Pathways (AT)	1,461
Certificate II in Drainage	47
Certificate II in Electrotechnology (Career Start) (Q,AT)	2,873
Certificate II in Electrotechnology (Pre-vocational) (SS)	2,432
Certificate II in Glass and Glazing (Q,EIR)	-
Certificate II in Landscaping (Q,AT)	68
Certificate II in Plumbing (Pre-apprenticeship) (Q)	2,984
<b>Certificate III</b>	<b>9,102</b>
Certificate III in Air Conditioning and Refrigeration (Q,SS,AT,EIR)	38
Certificate III in Blinds, Awnings, Security Screens and Grilles (Q,AT,OL)	-
Certificate III in Bricklaying and Blocklaying (Q,AT,EIR)	132
Certificate III in Carpentry (Q,SS,AT,EIR)	1,059
Certificate III in Civil Construction (Q,SS,AT,EIR)	2,810
Certificate III in Civil Construction Plant Operations (Q,SS,AT,EIR)	2,594
Certificate III in Concreting (Q,AT,EIR)	434

<sup>n</sup> VET courses can support a range of occupations across a range of industries, and occupations can also support a range of industries. To present the likely VET trained employment pipeline by industry, enrolments for a course have been assigned to the most common industry in which people seek employment.

Certificate III in Construction Waterproofing (Q,AT,EIR)	591
Certificate III in Demolition (SS,AT,OL)	9
Certificate III in Ecology (Q)	15
Certificate III in Electrical Fitting (Q,SS,AT,OL)	285
Certificate III in Electrotechnology Electrician (Q,SS,AT,OL)	131
Certificate III in Fire Protection (Q,AT,OL)	<5
Certificate III in Flooring Technology (Q,AT,OL)	-
Certificate III in Instrumentation and Control (Q,SS,AT)	13
Certificate III in Joinery (Q,AT,EIR)	11
Certificate III in Landscape Construction (Q,AT,OL)	118
Certificate III in Painting and Decorating (Q,SS,AT,EIR)	39
Certificate III in Plumbing (Q,AT,OL)	62
Certificate III in Renewable Energy - ELV (AT)	-
Certificate III in Rigging (SS)	126
Certificate III in Roof Tiling (Q,AT,EIR)	12
Certificate III in Scaffolding (Q,SS)	208
Certificate III in Shopfitting (Q,AT,OL)	12
Certificate III in Solid Plastering (AT,EIR)	107
Certificate III in Stonemasonry (AT)	7
Certificate III in Wall and Ceiling Lining (AT,EIR)	85
Certificate III in Wall and Floor Tiling (AT,EIR)	202
<b>Certificate IV</b>	<b>310</b>
Certificate IV in Building Project Support (AT)	157
Certificate IV in Home Energy Efficiency and Sustainability (Q,EIR)	80
Certificate IV in Instrumentation and Control (Q,SS,AT,OL)	28
Certificate IV in Landscape Design (Q)	45
Certificate IV in Refrigeration and Air Conditioning Systems (AT,OL)	-
Certificate IV in Renewable Energy (AT)	-
<b>Diploma</b>	<b>&lt;5</b>
Diploma of Air Conditioning and Refrigeration Engineering (Q,AT,OL)	<5
<b>Skill Set</b>	<b>771</b>
Course in Workplace Spotting for Service Assets (Q,EIR)	771
<b>With employment (apprenticeship and traineeship)</b>	
Qualifications (32,892 TVA enrolments 2020)	
<b>Certificate II</b>	<b>158</b>
Certificate II in Automotive Air Conditioning Technology (Q,SS,EIR)	31
Certificate II in Construction Pathways	74
Certificate II in Electrotechnology (Career Start) (Q)	<5
Certificate II in Landscaping (Q)	51
<b>Certificate III</b>	<b>32,497</b>
Certificate III in Air Conditioning and Refrigeration (Q,SS,EIR)	1,720
Certificate III in Blinds, Awnings, Security Screens and Grilles (Q,OL)	68
Certificate III in Bricklaying and Blocklaying (Q,EIR)	751
Certificate III in Carpentry (Q,SS,EIR)	9,339
Certificate III in Civil Construction (Q,SS,EIR)	830
Certificate III in Civil Construction Plant Operations (Q,SS,EIR)	46
Certificate III in Concreting (Q,EIR)	50
Certificate III in Demolition (SS,OL)	<5

Certificate III in Electrical Fitting (Q,SS,OL)	70
Certificate III in Electrotechnology Electrician (Q,SS,OL)	8,571
Certificate III in Fire Protection (Q,OL)	277
Certificate III in Flooring Technology (Q,OL)	344
Certificate III in Instrumentation and Control (Q,SS)	12
Certificate III in Joinery (Q,EIR)	229
Certificate III in Landscape Construction (Q,OL)	1,226
Certificate III in Painting and Decorating (Q,SS,EIR)	587
Certificate III in Plumbing (Q,OL)	7,239
Certificate III in Roof Tiling (Q,EIR)	373
Certificate III in Shopfitting (Q,OL)	79
Certificate III in Solid Plastering (EIR)	25
Certificate III in Stonemasonry	54
Certificate III in Wall and Ceiling Lining (EIR)	419
Certificate III in Wall and Floor Tiling (EIR)	186
<b>Certificate IV</b>	<b>181</b>
Certificate IV in Building Project Support	6
Certificate IV in Civil Construction (Q,SS,EIR)	146
Certificate IV in Electrical - Instrumentation (Q,SS)	6
Certificate IV in Instrumentation and Control (Q,SS,OL)	23
<b>Diploma</b>	<b>56</b>
Diploma of Building and Construction (Management) (Q,EIR)	56
<b>Upskilling once qualified</b>	
Qualifications (15,913 TVA enrolments 2020, 1658 Skill Set enrolments 2020)	
<b>Advanced Diploma</b>	<b>55</b>
Advanced Diploma of Building Information Modelling (BIM) (Q,SS)	31
Advanced Diploma of Interior Design (Q,OL)	24
<b>Certificate II</b>	<b>536</b>
Certificate II in Automotive Air Conditioning Technology (Q,SS,AT,EIR)	536
<b>Certificate IV</b>	<b>7,956</b>
Certificate IV in Building and Construction (Q,SS,AT,OL)	6,349
Certificate IV in Civil Construction (Q,SS,AT,EIR)	50
Certificate IV in Electrical - Instrumentation (Q,SS,AT)	15
Certificate IV in Electrical - Photovoltaic systems (Q,SS,AT)	-
Certificate IV in Electrotechnology - Electrical Contracting (SS,AT)	-
Certificate IV in Electrotechnology - Systems Electrician (SS,AT,OL)	-
Certificate IV in Interior Decoration (Q,EIR)	397
Certificate IV in Kitchen and Bathroom Design (Q,AT,EIR)	47
Certificate IV in Plumbing and Services (Q,SS,OL)	1,098
<b>Diploma</b>	<b>7,366</b>
Diploma of Building and Construction (Building) (Q,SS,AT,OL)	6,197
Diploma of Building and Construction (Management) (Q,AT,EIR)	331
Diploma of Interior Design (Q,EIR)	703
Diploma of Landscape Design (Q)	101
Diploma of Project Management for Prefabricated Building Systems (Timber) (Q,SS)	34
<b>Skill Set</b>	<b>1,658</b>
Course in Building Information Modelling (BIM) (Q,SS)	19
Course in Fusion Welding to ISO 9606 for Experienced Welders	43

Course in Fusion Welding to ISO 9606 for Transition Workers	162
Course in Heating, Ventilation and Air Conditioning Services (Q,SS,EIR)	9
Course in Onsite Installation of Prefabricated Building Systems (Timber) (Q,SS)	16
Course in Working Safely in the Solar Industry (Q,SS)	1,409

Note: Enrolment figures in the table above are as reported by NCVET, Total VET student and courses 2020: program enrolment. There may be instances where program enrolments are not reported by providers to NCVET and therefore not included in the enrolment figures in the total VET training activity data. Total VET activity for 2021 is expected to be released in August 2022.

## Demand for higher education is expected to grow over the next five years

Higher Education also supports pathways into the construction industry, with 10 per cent of workers holding a degree or above as their highest level of education.<sup>145</sup> The number of people working in or for the industry with higher education qualifications is likely to be higher given many other services which support the industry require at least a degree to operate (see figures for professional, scientific and technical services). Management advice and related consulting services, engineering consulting services, architectural services and surveying and mapping services are examples.

A higher education qualification is required for key occupations within the industry, including architects and landscape architects, building surveyors, civil engineering professionals, electrical engineers and engineering managers. Many construction occupations which rely on higher education qualifications are projected to grow over the next five years.<sup>146</sup> Longer periods of study are required to enter the industry through higher education due to the deep knowledge of design and construction methods.

In 2019, there were nearly 14,980 enrolments across construction related HE courses delivered by Victorian universities.<sup>147</sup> There were over 7,000 students studying architecture and urban environment courses, 3,000 studying building and 4,900 studying civil engineering.<sup>148</sup> The construction pipeline in the higher education system is shown in Table 11. Only courses with equivalent full-time study load (EFTSL) of over 100 are included.

**Table 11 | HE pipeline for construction in Victoria, high enrolment courses with EFTSL over 100<sup>149o</sup>**

Architecture and Urban Environment (7,088 EFTSL, Victoria, 2019)	
<b>Australian Qualifications Framework (AQF) 9+ (e.g., Masters and above) (1,909 EFTSL)</b> Examples include: <ul style="list-style-type: none"> <li>• Master of Architecture (692)</li> <li>• Master of Landscape Architecture (420)</li> <li>• Master of Urban Planning (209)</li> <li>• Master of Urban Planning and Environment (114)</li> <li>• Master of Design Innovation and Tech (113)</li> </ul>	<b>AQF 5-8 (e.g., Diploma, Bachelor, Hons) (5,179 EFTSL)</b> Examples include: <ul style="list-style-type: none"> <li>• Bachelor of Architectural Design (844)</li> <li>• Bachelor of Design (Architecture) (374)</li> <li>• Bachelor of Industrial Design (327)</li> <li>• Bachelor of Urban and Regional Planning (Hons) (271)</li> <li>• Bachelor of Landscape Architectural design (235)</li> </ul>

<sup>o</sup> A course may be allocated to different narrow field of educations by different higher education providers based on the primary purpose of the course. Higher education enrolments reported against a course under a specified narrow field of education reflect only the portion of enrolment allocated to the narrow field of education and are not reflective of the total enrolment for the course.

<b>Building (2,989 EFTSL, Victoria, 2019)</b>	
<p><b>AQF 9+ (e.g., Masters and above) (1,245 EFTSL)</b> Examples include:</p> <ul style="list-style-type: none"> <li>• Master of Construction Management (Professional) (652)</li> <li>• Master of Construction Management (399)</li> <li>• Master of Property (160)</li> </ul>	<p><b>AQF 5-8 (e.g., Diploma, Bachelor, Hons) (1,744 EFTSL)</b> Examples include:</p> <ul style="list-style-type: none"> <li>• Bachelor of Applied Science (Construction Management) (924)</li> <li>• Bachelor of Construction Management (Hons) (469)</li> <li>• Bachelor of Building Surveying (150)</li> </ul>
<b>Civil Engineering (4,898 EFTSL, Victoria, 2019)</b>	
<p><b>AQF 9+ (e.g., Masters and above) (1,269 enrolments)</b> Examples include:</p> <ul style="list-style-type: none"> <li>• Doctor of Philosophy (295)</li> <li>• Master of Construction and Infrastructure Management (290)</li> <li>• Doctor of Philosophy – Engineering (126)</li> </ul>	<p><b>AQF 5-8 (e.g., Diploma, Bachelor, Hons) (3,629 enrolments)</b> Examples include:</p> <ul style="list-style-type: none"> <li>• Bachelor of Engineering (Civil and Infrastructure) (Hons) (1,211)</li> <li>• Bachelor of Civil Engineering (Hons) (502)</li> <li>• Bachelor of Engineering (Civil) (Hons) (447)</li> </ul>



## Workforce priorities

### Growing the pipeline and upskilling the existing workforce is a key priority

Key challenges exist in addressing the supply and skill of labour. Some extend beyond the remit of the Skills Plan, such as industry regulations and conditions, and high wage inflation resulting from workforce competition reducing an employer's ability to retain staff. Other challenges relate to the significant growth in demand for workers, the rapid pace of technology adoption in new builds, and the skills and knowledge acquired over multiple years through apprenticeships and work that are not quickly replaced. Collaboration across key stakeholders such as government, industry, TAFEs and dual sector universities will be critical in responding to these challenges.<sup>P</sup>

This Skills Plan identifies three key priorities for the construction industry detailed below.

#### Build the pipeline of workers in key roles and retain them in industry

The construction industry values apprenticeships and traineeship supported by on-the-job learning, but industry stakeholders indicated there is an increased demand for post-qualification professional development which could be in the form of micro-credentials.

More entrants to the industry could be encouraged through apprenticeship pathways. Industry also noted the importance of pre-apprenticeship options in increasing attraction to the industry and could be expanded. For some occupations, supporting more students through school-based apprenticeships and traineeships can keep students engaged in the industry while studying. However, school leavers aren't the only avenue to building the pipeline of workers. Reaching cohorts currently underrepresented in the industry (such as women) could also help fill skills gaps. The industry also needs to address significant challenges with retention across the workforce, including difficulties retaining completing apprenticeships or traineeships, people leaving the industry for other areas and an ageing workforce contributing to a loss of knowledge.

**Table 12 | Issues to address to build the pipeline of workers and retain them in industry**

- There are few training/bridging opportunities for individuals moving from other industries or countries.
- Current pre-apprenticeship pathways do not promote and support the diversity of occupations required.
- There are systemic barriers preventing underrepresented groups from entering and staying in the construction industry.

#### Secure a highly capable workforce that keeps pace with new skills

Many employers believe the quality of apprenticeships and apprentices are in decline, in part due to an increased emphasis on classroom education, while other employers have reported insufficient breadth of experience among apprentices, especially in specialised or small businesses. Stakeholder feedback also indicated a lack of investment from some employers in the apprenticeship model. In parallel to these challenges, technology is demanding workers have new skills. This includes digital drafting, CAD design software and digital tools, GPS technology and drone technology. Changes in regulation are also driving workforce growth and new skills need.

<sup>P</sup> the 2022-2023 State Budget, the Victorian Government allocated \$10 million to establish new Skills Solutions Partnerships, which will help address skills shortages in priority areas through collaboration with government, industry, TAFEs and dual sector universities.

Reform and regulatory changes are also driving skills gaps as workers are increasingly required to upskill to meet these updates. This includes areas such as heating and cooling of homes, airtightness standards, condensation management, cavity fixing of cladding and accessible housing.<sup>150</sup> Improved training and upskilling opportunities can meet these shifting skill requirements, while also ensuring projects meet the latest quality assurance requirements.

**Table 13 | Issues to address to secure a highly capable workforce that keeps pace with new skills**

- Education and training (including apprenticeships) struggles to maintain alignment with contemporary industry needs.
- There is low enrolment in training in occupations with shortages such as building surveying (potentially due to a robust employment market and persisting impacts from COVID-19 disruptions).
- There is a lack of reskilling opportunities that respond to shifting skill demand / new regulatory requirements.

**Upskill workers, where appropriate, into supervisory and management roles and/or to become advanced technical practitioners**

Career advancement in the construction industry focuses on developing leadership skills and/or technical deepening. Finding skilled site supervisors capable of managing people and logistics effectively and efficiently, alongside the necessary on-site experience, is crucial.<sup>151</sup> Site supervisors also require some technical skills such as site estimating and budgeting.<sup>152</sup> Industry notes it is difficult to find supervisors who have general and trades skills. This is in part due to limited upskilling available for workers seeking to progress their career into this role, a lack of mentoring opportunities and limited training for those joining the sector from other industries.<sup>153</sup>

Stakeholders indicated, the challenge filling supervisor roles, means some people are progressing rapidly to these roles, but need upskilling and mentoring.

*“Due to high levels of demand, people are rapidly progressing in their career and really need coaching and mentoring”*

Victorian Skills Plan Consultation, Industry Advisory Group, March 2022

Strengthening articulation pathways from qualified apprentice to supervisor and from supervisor into a management position can be explored. This can include upskilling in specification, estimation, plan reading, project management and business management.<sup>154</sup> Career advancement includes management roles and specialist post-trade skills. Industry noted that equal importance can be attached to deepening the technical expertise of workers once they are formally qualified.

**Table 14 | Issues to address to upskill workers, where appropriate, into supervisory and management roles and/or to become advanced technical practitioners**

- Articulation pathways from qualified apprentice to supervisor and from supervisor into a management position require strengthening.
- Pathways to deepen the technical expertise of workers once formally qualified in areas of high demand are unclear with insufficient activity.
- People are rapidly progressing in their careers without the necessary experience, coaching and mentoring.

## Collaborative response

### There are opportunities to improve how the education and training response attracts new workers and provides upskilling

The education and training response has a key role to play in helping to address the three key workforce issues for the industry:

1. Build the pipeline of workers in key roles and retain them in industry.
2. Secure a highly capable workforce that keeps pace with new skills.
3. Upskill workers, where appropriate, into supervisory and management roles and/or to become advanced technical practitioners.

Prior to employment, there is an opportunity to expand interest and awareness in construction related career pathways to build the pipeline of workers. Example initiatives include a broad-based marketing campaign to attract more people from interstate and overseas to come to Victoria to work.

Opportunities such as ‘Earn and Learn’ through Jobs Victoria support students to receive training while earning on the job with additional support such as mentoring from industry experts.<sup>155</sup>

Attention on reaching currently underrepresented groups in the construction industry can assist. For example, only 11.6 per cent of people working in the industry are female.<sup>156</sup> Industry noted that this figure is even lower for specific occupations such as plumbing and related trades.<sup>157</sup> Significant steps need to be made to increase the number of people from underrepresented groups entering the industry. The implementation of the Victoria Government’s Building Equality Policy (BEP) will support these training and employment opportunities.<sup>158</sup> The BEP seeks to disrupt the existing gender stereotypes, norms and roles in the construction sector.<sup>159</sup> It comprises three actions to address the structural and cultural barriers women face: meeting project-specific gender equality targets; engaging women as apprentices and trainees; and implementing Gender Equality Action Plans (GEAPs).<sup>160</sup>

*“We need to think about how we make the construction industry an inclusive place for workers and offer wellbeing support, with a particular focus on women and people from different cultural backgrounds”*

Victorian Skills Plan Consultation, Industry Advisory Group, March 2022

There is also a need to offer a range of pathways that appeal to the interests of potential entrants. Feedback from winners of the apprentice awards of the Master Builders Association of Victoria highlighted that they enter the field because of the opportunity to construct something unique to the customer’s satisfaction and the sense of fulfilment it brings.

In 2020, 80 per cent of VET-level enrolments were concentrated in seven courses.<sup>161</sup> This presents a challenge in attracting a skilled workforce for a range of other trades such as bricklaying, plasterers, painters and tilers. Attention can focus on educating future workers on the various career pathways available to them. This could include exploring programs that allow students to try different trades through smaller units before committing to an apprenticeship, mentoring and coaching support and encouraging students to complete training for occupations in shortage. Better supporting students to find a trade more suited to their interests and skills up-front will also support workforce retention.

Once a student is employed, the connection between the education provider and employer is critical to ensuring a positive experience. There is an opportunity to strengthen partnerships between industry and education providers (e.g., TAFE, Industry Registered Training Organisations (RTOs) and universities) to ensure workers gain the necessary skills throughout their training and improve completions. Industry suggested expanding the number of Apprenticeship Support Officers (ASOs) located across Victoria who provide free confidential support and advice and can often act as the

bridge between the employer, apprentice and training organisation, each of whom is critical to the successful completion of an apprenticeship.<sup>162,163</sup> The service also helps educate apprentice managers to enhance the experience for apprentices and, over time, could attract them to become educators

The quality and uptake of upskilling opportunities and continued professional development could increase with adjustments to the type and delivery of training. This will be needed to keep up with the rapid adoption of new skills and technologies in the construction industry. It is also important due to high numbers of retirements, risking lost skills and knowledge to the industry and resulting in skill gaps across the workforce. Opportunity can be taken to explore skill sets and micro-credentials to encourage existing workers to remain current and to lift the skills and knowledge of the industry. Advice on where these opportunities exist can be provided via industry partners and the Construction Industry Advisory Group. The industry overall is expected to need new skills, especially in adopting technology and responding to clean economy ambitions so a focus on upskilling will pay dividends.

*“We have a large cohort of workers who will withdraw from the workforce rather than go through the large administrative process to recognize their skills and knowledge”*

Victorian Skills Plan Consultation, Industry Advisory Group, March 2022

There is also an opportunity to review existing licensing and regulatory requirements to ensure workers, once appropriately skilled, can enter the industry as soon as possible. Securing the teaching workforce (HE and VET) to provide education and training to the industry along with updates to qualifications as compliance and regulation changes occur in industry should also remain a focus.

## **Government and industry can focus on improved workforce planning and strengthening the employee value proposition**

An education and training response alone cannot deliver on the workforce priorities. Government and industry working together to identify training and skilling priorities is central to meeting future skills demand. Broader reforms under a banner of workforce planning can help address the required number of workers for the industry.

At this juncture, increasing risk faced by contractors, triggered mainly by material supply constraints, is seeing increased insolvencies in the industry.<sup>164</sup> This is in parallel to low levels of female participation, and reported increases in the rates of mental health issues among workers.<sup>165</sup> There is opportunity to enhance the communication of the value proposition of working in the industry and is a key strategy given the high rates of competition for workers. While job design and working conditions are a matter for the industry, they serve to attract new entrants and strengthens the value proposition of the industry. Demonstrating the place of new skills needed in the industry can also serve to attract more entrants and retain workers.

Government also has a determinative role in supporting and directing the industry. Setting and enforcing regulation and standards to uphold public and worker safety and to meet environmental and social goals for Victoria are key attributes to effective government oversight but need to be designed with industry. From a skilling perspective, monitoring registration and licensing regimes, improving affordability of insurances for professionals and skilled tradespeople are some of the actions available to Government.<sup>166</sup> Government playing its role in consumer education and awareness can promote the use of registered and/or licensed workers only for quality and consumer protection against unlicensed activities.

Victorian Government investment in construction is likely to continue into the immediate future (e.g., Victoria’s Big Build). Recognising that the VSA is charged with planning for future skills, including for this industry, strategies that assist in forecasting of demand will assist. While private investment is

difficult to forecast, especially in the residential sector, there is scope to plan workforces for large scale projects, especially those resulting from public investment. The Office of Projects Victoria (OPV) is providing advice to the Victorian Government on developing and building major infrastructure projects, including advising on the capability and capacity of the workforce to support public infrastructure. The Australian Contractors Association is seeking to bring forward a nationally consistent approach to implementing broad industry reforms through the Future Australian Infrastructure Rating (FAIR).<sup>167</sup> Other initiatives include automatic mutual recognition which enables individuals licensed or registered for an occupation in one Australian state or territory to work in another state or territory using their home state license.<sup>168</sup> This will enable surge workforces to support projects in Victoria.

As the VSA develops its capabilities and capacities it can look at major project activity pipelines as evidence for the preparation of workers in the industry. As an industry with a strong reliance on trade occupations, Apprenticeships Victoria can assist in promoting apprenticeship pathways to support growth projections.

#### **Actions for consideration for education, industry, and government**

- Industry, government and education providers to work together to expand interest and awareness in construction related career pathways to build the pipeline of workers, particularly with women and other underrepresented groups in the industry.
- Promote and provide clear pathways into the full range of roles within construction.
- Strengthen partnerships between industry and education providers to ensure workers gain the necessary practical skills throughout their training.
- Explore opportunities to expand the availability of skill sets micro-credentials so workers in the industry can upgrade for new licensing and new technologies.
- Industry to lead discussions focused on strengthening the value proposition for working in construction industry, including job design, rostering and working conditions to attract new cohorts.

## Appendix A Drivers of demand

Driver	Industry/Sector
Policy	<p>Federal and State Governments have continued to invest significantly in infrastructure and residential construction since 2021, resulting in significant demand for construction services. Major investments and funding commitments include:</p> <ul style="list-style-type: none"> <li>• The 2021 federal HomeBuilder Grant, which received ~39,000 applications in Victoria.<sup>169</sup></li> <li>• \$111 billion invested in 155 major Victorian infrastructure projects between 2021-22 and 2024-25.<sup>170</sup></li> <li>• \$5.3 billion Big Housing Build for over 12,000 new social housing.<sup>171</sup></li> <li>• Major State infrastructure projects underway including the Level Crossing Removal and Metro Tunnel.<sup>172</sup></li> <li>• Additional \$55.2 billion of other major infrastructure projects under consideration by the Government.<sup>173</sup></li> <li>• \$3 billion Golden Plains project to commence construction by June 2022, directly generating 700 jobs.<sup>174</sup></li> <li>• Business case for 'Bypassing Shepparton' projects submitted to Commonwealth Government in December 2020 for review. Shepparton Bypass to cost \$1.3 billion, creating 3,170 construction jobs.<sup>175</sup></li> <li>• \$520 million solar farm at Rushworth/Corop, set to start construction in 2023 creating 700 jobs.<sup>176</sup></li> </ul>
	<p>The Australian and Victorian Governments have recently announced several reforms and regulatory changes focused on workplace safety, energy efficiency, risk management and project delivery in the construction industry. These include:</p> <ul style="list-style-type: none"> <li>• recent amendments by the Victorian Government to the <i>Building Act 1993</i> introducing a new registration and licensing scheme for tradespeople.<sup>177</sup> The scheme aims to reduce non-compliant building work, enhance industry accountability and encourage skills formation.<sup>178</sup> Changes will be implemented for carpentry first, with other trades to follow in subsequent implementation stages.<sup>179</sup> Consulted stakeholders noted that this reform will see workers leave the industry.<sup>180</sup> The future status of the scheme is yet to be determined.</li> <li>• the National Construction Code (NCC) (last updated in 2019) providing the minimum necessary requirements for health and safety, amenity and accessibility, and sustainability in the energy efficiency, design, construction, performance and liveability of new buildings (and new building work in existing buildings) throughout Australia.<sup>181</sup> The code also sets out the minimum energy efficiency standards for new buildings and major renovations in Australia.<sup>182</sup> It is updated every three years, with the next update due to come into effect in September 2022.<sup>183</sup> Proposed areas for upskilling include the heating and cooling of homes, airtightness standards, condensation management, cavity fixing of cladding and accessible housing.<sup>184</sup></li> <li>• the establishment of Cladding Safety Victoria in 2020, with \$600 million of funding to reduce risks associated with the use of combustible cladding.<sup>185</sup></li> </ul> <p>Existing government policies already in place to address skills challenges include:</p> <ul style="list-style-type: none"> <li>• the Major Projects Skill Guarantee requiring all construction projects valued at, or over \$20 million to use Victorian apprentices, trainees or cadets for at least 10 percent of the total estimated labour hours.<sup>186</sup> This seeks to ensure young Victorians benefit directly from the major infrastructure projects being undertaken and that they continue to grow the next generation of skilled workers in Victoria.<sup>187</sup></li> <li>• the Building Equality Policy (BEP) which seeks to create training and employment opportunities for women in the construction industry and came into effect from January 2022.<sup>188</sup> The BEP applies to all entities defined as either a public body or a department under Section 3 of the Financial Management Act 1994 and to all publicly funded construction projects valued at \$20 million or more from 2022.<sup>189</sup> Suppliers are required to meet project-specific gender equality</li> </ul>



Driver	Industry/Sector
	<p>targets, engage women as apprentices and trainees and implement Gender Equality Actions Plans.<sup>190</sup> The BEP aims to create a more gender-inclusive industry.<sup>191</sup></p> <ul style="list-style-type: none"> <li>• Big Build Apprenticeships is a program run by Apprenticeships Victoria that offers apprenticeship and traineeship opportunities on some of Victoria’s biggest projects such as North East Link, the New Footscray Hospital and Warrnambool Learning and Library Hub.<sup>192</sup></li> </ul> <p><b>Civil infrastructure</b></p> <ul style="list-style-type: none"> <li>• Major infrastructure projects and population growth are expected to increase demand for civil construction projects over the next five years. Victoria’s Big Build is expected to deliver 165 major road and rail projects worth approximately \$80 billion. Examples include the Metro Tunnel, removal of 85 level crossings across Melbourne, West Gate Tunnel, major road upgrades, Melbourne Airport Rail, Suburban Rail Loop and upgrades to every regional passenger line in Victoria.<sup>193</sup> The North East Link (NEL) is also part of the Big Build and is the largest investment in a road project in Victoria’s history.<sup>194</sup> The \$11.1 billion project will begin construction in 2022 and expected to be completed in 2027-2028.<sup>195</sup> The NEL will complete the missing link in Melbourne’s orbital freeway between an upgraded Eastern Freeway and the M80 Ring Road, and is expected to take 15,000 trucks off local roads a day and reduce travel time by 25 minutes.<sup>196</sup> Victoria’s Big Build will stimulate economic growth and drive demand for over 18,000 jobs across both the public and private sector.<sup>197</sup></li> <li>• The Victorian Government is investing in the renewable energy sector and related projects. This includes increasing the renewable energy target (VRET) to 50 per cent by 2030.<sup>198</sup> In addition, \$540 million has been invested by government to establish six renewable energy zones (REZs) to support these targets.<sup>199</sup></li> <li>• In March 2022, the Victorian Government announced Victoria’s first offshore windfarm, which is intended to be in operation by 2028.<sup>200</sup> It is estimated that up to 20 per cent of Victoria’s energy capacity in 2050 could come from offshore wind.<sup>201</sup> Three offshore windfarms will deliver up to 6,100 jobs including 3,100 local jobs during development and construction (over 15 years) and up to an additional 3,000 ongoing jobs during operations.<sup>202</sup></li> </ul> <p><b>Industrial and commercial buildings</b></p> <ul style="list-style-type: none"> <li>• The Victorian Government has committed significant investment in school infrastructure to meet the needs of growing communities.<sup>203</sup> This include delivering 100 new schools between 2019 to 2016, in parallel to a new kindergarten being built at or next to every primary school as part of the roll out of funded three-year-old kindergarten across Victoria.<sup>204</sup></li> </ul>
Economic	<ul style="list-style-type: none"> <li>• Supply chain disruptions have caused shortages (and therefore higher prices) in materials. This has resulted in significant delays and cost increases, with cascading impacts across the industry.<sup>205</sup></li> <li>• The low availability and high cost of insurance, particularly for new business entrants, deters construction.</li> <li>• The above challenges are particularly difficult to manage in sectors such as healthcare and defence, which require infrastructure as they expand, and in developing regions (compounded by low interest among private developers).</li> </ul> <p><b>Industrial and commercial buildings</b></p> <ul style="list-style-type: none"> <li>• COVID-19 lockdowns and poor confidence amongst private-sector investors have driven a downturn in commercial construction (approximately 70 per cent of pipeline projects are private sector funded).<sup>206</sup></li> </ul>

Driver	Industry/Sector
Social	<p><b>Residential buildings</b></p> <ul style="list-style-type: none"> <li>Residential construction demand differs depending on the type of housing. Approvals of medium and high-density housing in Victoria has fallen since peaking in 2017-2018.<sup>207</sup> There were 3,500 less medium and high-density apartments approved in March 2021 compared to March 2020.<sup>208</sup> This may also be due to the economic impact of the COVID-19 pandemic. There has also been an increase in the number of detached housing approvals however it is unknown if this trend will continue.<sup>209</sup></li> <li>Growth in the number of people relocating to regional Victoria is driving demand for regional housing. Melbourne experienced a net loss of 17,200 residents in the 12 months to September 2020 (compared to a net loss of 700 in 2019).<sup>210</sup> There was a 34 per cent increase in planning approvals in regional Victoria in 2021 compared to 2020.<sup>211</sup></li> <li>The Victorian Government will introduce new regulations in July 2021 to address psychological health in the workplace through the Occupational Health and Safety Amendment (Psychological Health) Regulations.<sup>212</sup> The regulations will strengthen the occupational health and safety framework and will recognise that hazards that pose a risk to psychological health are no less harmful to workers' safety and wellbeing than physical hazards.<sup>213</sup> They will also provide clearer guidance to employers on their obligations to better protect workers from mental injury.<sup>214</sup></li> </ul>
Technological	<ul style="list-style-type: none"> <li>The adoption of GPS, drone technology and autonomous plant management will enable greater remote working and will require increased digital capability in the construction workforce.<sup>215</sup></li> <li>Advancements in prefabrication, green technology and other emerging technologies will shape the use of processes and materials in the construction industry in favour of sustainability.</li> <li>Building Information Modelling (BIM) is helping to improve the productivity of Victoria's building and construction industry.<sup>216</sup> The tool uses imaging software to present a digital version of a building, including information on the building through its whole lifecycle from design, to build, to operations and demolition.<sup>217</sup> BIM supports early assessment of potential issues and design errors; tracking of construction activities and site safety planning, and better communication between projects, designers, subcontractors and workers on site.<sup>218</sup></li> </ul>
Environmental	<ul style="list-style-type: none"> <li>The construction industry will increasingly need to cater to environmental and societal pressures for more sustainable materials, design and construction methods, including on-site energy generation and storage.<sup>219</sup></li> <li>Construction workers are vulnerable to the cumulative impacts of heat stress which will impact productivity on building sites and require climate related OH&amp;S training.<sup>220</sup></li> <li>Sustainable timber in construction has many benefits, including adding ecological value, carbon capture, insulation and energy benefits. However, investment in softwood processing may be limited by uncertainties surrounding the future supply of forest resources.<sup>221</sup> Reducing log supply as a result of native forests being transitioned to forest reserves increasingly challenges the supply of timber for construction purposes.<sup>222</sup></li> <li>Unpredictable weather and greater instances of natural disasters will increase risk exposure on major projects, requiring a renewed approach to risk management. Contractors that deal specifically with erosion, waste materials and products, lack of water, energy and ecological issues will therefore become more valuable to the industry.</li> </ul>



## Appendix B Data methodology

### VSA Employment Model overview

The VSA Employment Model produces estimates of:

- projected employment growth between 2022 and 2025
- projected retirements between 2022 and 2025
- projected total new workers needed between 2022 and 2025.

Table 15 further defines the model outputs and identifies the primary source for each output.

**Table 15 | Employment model outputs**

	Employment growth 2022-25	Retirements 2022-25	New workers needed 2022-25
<b>Definition</b>	Change in the number of workers employed from 2022 to 2025	Workers expected to permanently leave the workforce from 2022 to 2025	Workers needed from 2022 to 2025 to meet demand from growing employment and to replace retirees
<b>Primary source</b>	Benchmarked to the NSC Employment Projections	Derived from retirement rates from Australian Census Longitudinal Dataset	The sum of employment growth and retirements

All outputs are modelled at the occupation, industry and region level:

- occupations are defined by 4-digit occupation unit groups in the Australian and New Zealand Standard Classification of Occupations (ANZSCO)
- industries are defined by 1-digit industry divisions in the Australian and New Zealand Standard Industrial Classification (ANZSIC)
- regions are defined by the nine Regional Partnerships of Victoria as outlined by the Victorian Department of Jobs, Precincts and Regions.

Benchmark data from the NSC give estimates of projected employment growth. Using an approach called iterative proportional fitting, the detailed occupation, industry and region breakdowns are generated by applying the distribution of employment in ABS Census and other data to the benchmark projections.

The model was developed by the VSA with the support of Nous and Deloitte Access Economics (DAE). The sections further below describe how the key outputs were modelled.

The VSA Employment Model gives a best estimate of employment by industry, occupation and region. It provides an indication but does not, and cannot, tell the full story of the region's economy.

### Employment growth, 2022-25

**Source:** VSA and Nous (2022), *modelling of NSC (2022) Employment Projections*

This modelling takes the NSC Employment Projections as the benchmark data for 2022-25 and breaks it down into occupation by industry by region tables.

The benchmark data sources provide ‘control totals’ for occupation, industry and region breakdowns independently. However, they do not provide the interaction between each of the variables. For example, they do not give the breakdown of occupations within industries.

Iterative proportion fitting uses a detailed ‘seed’ data table with the necessary breakdowns from a representative dataset and scales that distribution to control totals in the new dataset. Over many iterations, the seed data is transformed to sum up to the occupation, industry and region control totals.

The seed data comes from the ABS Census 2016. The control totals for occupation and industry come from the NSC's Employment Projections, and the control totals for region come from the NSC's Small Area Labour Markets data. Table 16 describes the inputs in detail.

The modelling results in:

- industry and occupation projections that align with the NSC Employment Projections
- regional data that matches the distribution across NSC Small Area Labour Markets
- industry by occupation by region data tables that approximate the distribution within the ABS Census 2016.

**Table 16 | Data sources used to model employment growth from 2022 to 2025**

Type	Data	Source
Seed	Employment x 3-digit industry (ANZSIC3) x 4-digit occupation (ANZSCO4) x Statistical Area Level 2 (SA2)	ABS, <i>Census of Population and Housing</i> , place of usual residence data
Control total	Employment x SA2	NSC, <i>Small Area Labour Markets</i> , ‘SALM smoothed SA2 Datafiles (ASGS 2016) - March quarter 2022’.
Control total	Employment x ANZSIC1	NSC, <i>Employment Projections, 2020-25</i>
Control total	Employment x ANZSCO4	NSC, <i>Employment Projections, 2021-26</i>

Notes:

1. Following the modelling, SA2 data is aggregated up to Regional Partnership region. Where an SA2 spans multiple regions, the estimates have been apportioned based on geographic area.
2. The NSC industry projection is often not available until some months after the occupation projections. As at May 2022, there were no 2021 to 2026 ANZSIC1 by state forecasts available. The previous release of 2020 to 2025 ANZSIC1 by state forecasts were used and scaled up to match the Australian total employment numbers in the ANZSCO4 forecasts.

## Retirements, 2022-25

**Source:** VSA, *Deloitte Access Economics (DAE) and Nous (2022), Retirement projections 2022-2025*

Retirements are estimated by applying occupation-specific retirement rates to the employment projections.

Using the Australian Census Longitudinal Dataset, an estimate of the size of the labour force aged 50 and over in 2016 was taken and compared to the size of the labour force aged 45 and over in 2011. After adjusting for migration, the gap is an estimate of retirements between 2011 and 2016. The relative age structures of occupations in the Census 2011 were then used to estimate retirements at the detailed occupation level (ANZSCO4).

The outputs were used to estimate an occupation-specific retirement rate, calculated as:

$$\text{Retirement rate} = \text{retirements between periods } t \text{ and } t+1 / \text{employment at } t$$

The retirement rates were applied to the employment projections to estimate the number of retirements between 2022 and 2025 at the region (Regional Partnerships), industry (ANZSIC1) and occupation (ANZSCO4) level.

## **New workers needed, 2022-25**

New workers needed is the simple sum of employment growth and retirements. It is calculated at the region (Regional Partnerships), industry (ANZSIC1) and occupation (ANZSCO4) level.

**New workers needed is an estimate of demand for workers to join an industry, occupation or region.** In this model, demand comes from growth in employment (as business, government and other employers expand their operations) and the need to replace retirees who leave the workforce.<sup>9</sup>

**New workers needed is not an estimate of skills shortage.** In the VSA Employment Model, demand is always met by supply of new workers who enter the work force from study, unemployment, migration, a change in industry or occupation, or other avenues.

This means that the VSA Employment Model is not suitable for identifying current or future skill shortages. The Victorian Skills Plan draws on the National Skills Commission's Skills Priority List and stakeholder feedback to identify skills shortages within industries and across Victoria.

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<sup>9</sup> This will generally underestimate demand as it does not account for the need to replace workers who leave a job for other reasons, such as switching occupations or migrating out of Victoria.

## Appendix C Victorian VET pipeline methodology

### Enrolment numbers

#### Sources:

NCVER (2021), Total VET students and courses 2020, available [here](#).

Victorian Department of Education and Training (2022), Funded Course List, available [here](#).

Victorian Department of Education and Training (2022), Funded Skill Set List, available [here](#).

The Victorian VET pipeline table estimates the number of enrolments in each qualification and skill set for the 2020 academic year in Victoria. The NCVER total VET students and courses is used as the dataset. Only courses on the Victorian Funded Course List (FCL) and the Victorian Funded Skill Set List (FSSL) are included.

The following steps were taken to develop the table:

1. Each course was reviewed by IAG members and allocated to **only one** of three main reasons for studying: to prepare for employment; to support current employment (apprenticeship or traineeship); and to progress their career. Each course is then listed under their respective allocation.
2. The numbers of students who enrolled in that course in 2020 is then noted in the VET pipeline table.
3. For courses that provide **an apprenticeship and traineeship option and a classroom-based option**, these courses are duplicated twice in the table, with enrolment numbers split across the other two options: the number of apprentice and trainee enrolments are reported under the header 'with employment (apprenticeship and traineeship); the number of classroom-based enrolments is shown under the purpose for completing the classroom-based option (either to prepare for enrolment or to progress their career). An ('<sup>AT</sup>') is noted next to these duplicated classroom-based courses to indicate they are also delivered as an apprenticeship or traineeship.
4. Where industry has provided feedback on the value of qualification or skill set, a ('<sup>Q</sup>') indicates it is valued as a qualification, while a ('<sup>SS</sup>') indicates it is valued as a skill set. A ('<sup>EIR</sup>') indicates it is an Endorsed Industry Requirement and ('<sup>OL</sup>') indicates it is an Occupational Licence. Industry has not provided feedback on all qualifications and where indicated; and each value assignment can be reviewed in the future.
5. Numbers are then totaled in their respective headers above. For the Skills Plan, the number of enrolments 'prior to employment' is a key focus for industry as it indicates how many students are being trained but are not yet employed.

The 2020 enrolment figures are a best estimate of the pipeline of workers for industry to draw on. The 2020 figures were the latest dataset available from the NCVER at the time of developing the Skills Plan and will be updated in future iterations of this document. They intend to provide an indication of the pipeline but do not, and cannot, tell the full story of workforce supply. Factors such as completion rates and the COVID-19 pandemic during 2020 are also likely to impact the availability of the future workforce.

## Appendix D Stakeholder engagement process

Stakeholder engagements allowed VSA to test, update and validate the content of the Construction Industry Insight report. Stakeholders from organisations in government, education and industry were engaged to provide input to the report and the Skills Plan more broadly. Specifically, stakeholders provided insight on economic outlook, workforce and skilling challenges and an education and training response across three rounds of consultations. Engagements guided initial thinking and research, as well as opportunities to test and revise the insights. We would like to thank the following organisations for their participation in the stakeholder engagement process. Table 17 lists the organisations involved.

**Table 17 | Consultation participants**

Organisation
Air Conditioning & Mechanical Contractors' Association
Australian Brick and Bricklaying Training Foundation Ltd
Australian Sign and Graphics Association
Australian Steel Institute
Australian Workers Union
Chisholm Institute
Civil Contractors Federation
Clean Energy Council
Construction, Forestry, Mining and Energy Union
Department of Environment, Land, Water and Planning
Department of Jobs, Precincts and Regions (DJPR)
Department of Premier and Cabinet
Department of Treasury and Finance
Housing Industry Association
Invest Victoria
Master Builders Association of Victoria
Master Painter Association Victoria
Master Plumbers and Mechanical Services Association of Australia
National Electrical Switchboard Manufacturers Association
National Fire Industry Association
Office of Projects Victoria
Plumbing and Pipe Trades Employees Union
Prefab Australia
Victorian Building Authority (VBA)
Victorian School Building Authority

## References

- <sup>1</sup> Victorian Skills Authority and Nous, 2022, modelling based on Australian Bureau of Statistics (ABS), Labour Force Quarterly, February 2022.
- <sup>2</sup> VSA and Nous (2022), modelling of NSC (2022) Employment Projections.
- <sup>3</sup> VSA and Nous (2022), modelling based on Australian Bureau of Statistics, Labour Force, February 2022.
- <sup>4</sup> ABS (February 2022), Labour Force Quarterly, Employment by industry (Victoria), available [here](#).
- <sup>5</sup> VSA and Nous (2022), modelling of NSC (2022) Employment Projections.
- <sup>6</sup> VSA and Nous (2022), modelling based on Australian Bureau of Statistics, Labour Force, February 2022.
- <sup>7</sup> ABS (February 2022), Labour Force Quarterly, Employment by industry (Victoria), available [here](#).
- <sup>8</sup> Victorian Skills Authority (VSA) and Nous (2022), modelling of National Skills Commission (NSC) (2022) Employment Projections.
- <sup>9</sup> VSA, Deloitte Access Economics (DAE) and Nous (2022), Retirement projections 2022-2025.
- <sup>10</sup> VSA, Nous (2022), modelling of NSC (2022) Employment Projections.
- <sup>11</sup> VSA and Nous (2022), modelling based on Australian Bureau of Statistics, Labour Force, February 2022.
- <sup>12</sup> ABS (2016), Census, Education attainment by industry, Victoria.
- <sup>13</sup> NCVET (2021), Total VET students and courses 2020, available [here](#).
- <sup>14</sup> Victorian State Government (2021), Live in Melbourne, Transport, defence and constriction technologies, available [here](#).
- <sup>15</sup> ABS (2008), 1292.0 – Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 1.0), Archived Issue, Division E – Construction, available [here](#).
- <sup>16</sup> ABS (2008), 1292.0 – Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 1.0), Archived Issue, Division E – Construction, available [here](#).
- <sup>17</sup> ABS (2008), 1292.0 – Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 1.0), Archived Issue, Division E – Construction, available [here](#).
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