AUSTRALIAN
INDUSTRY
STANDARDS

SKILLS FORECAST 2018

WATER

INDUSTRY REFERENCE
COMMITTEE

CONTENTS

EXECUTIVE SUMMARY

The Water industry provides vital services that supply water throughout Australia, ensuring access to drinkable water, reclaimed or treated water for irrigation in agriculture, and sewerage treatment services. Water and sewerage services provided an estimated annual revenue of $22.71 billion, adding over $13.06 billion to the national economy in 2015-2016. The industry employs over 31,000 people across its sub-sectors in water catchment supply, sewerage, drainage services and water pipeline transport.

The industry will continue to be met with changing technological innovation. These include the use of automated systems to detect faults in pipelines remotely. These new systems will enable water companies to identify points for preventative maintenance, greatly reducing the cost and pressures associated with reactive maintenance.

In line with these developments, the industry anticipates large volumes of data will continue to be handled. Big Data will be a strong focus into the future and will require a workforce with digital literacy, analytical and problem-solving skills to ensure this new technology can be maximised across all jurisdictions.

Ensuring the industry can operate sustainably into the future, the management of infrastructure will continue to remain a strong focus. As regulations change, the governments of Australia have increased reporting requirements for water utilities. Regulatory harmonisation across states/territories will continue to be a priority into the future.

The ageing workforce will remain an issue for the industry, requiring a commitment to recruiting and retaining young professionals. Along with this, the industry will need to develop a workforce that is diverse in culture and gender composition.

In 2018-2019 the Water IRC intends to develop new water treatment technology and networks Skill Sets, to ensure the workforce can achieve certification for different water treatment services, depending on the treatment method, which can vary across the nation. Australia has a variety of sources for drinking water that requires different treatment processes to meet drinking water standards. Driving the review are regulatory requirements (which can vary by state), new technology and the changes in water treatment technology. The IRC also intends to review and develop skills for irrigation operations, which are continually changing with new technologies being utilised. These ongoing changes, and the changes in regulatory requirements, continue to be incorporated into the irrigation sector of the Water industry, driving the need for this project.

John Harris

Water IRC Chair

This IRC Skills Forecast was agreed to by the Water IRC on 24 April 2018.

IRC SKILLS FORECAST

The Industry Reference Committee (IRC) Skills Forecasts focus on the prioritisation of the skill needs of the industry sectors each IRC has responsibility for. They are developed and reviewed annually and submitted on behalf of the IRC to the Australian Industry and Skills Committee (AISC) for approval.

The document is deliberately brief, it does not seek to identify every issue within every sector. It is a snapshot of a continually evolving story that is intended to alert and inform a wide audience and enhance the industry's capacity to act.

IRCs are required to consult broadly with stakeholders to ensure a whole-of-industry view about the opportunities and challenges for the workforce and the Training Package review work necessary to meet industry needs. The information is then used to develop the four-year IRC Proposed Schedule of Work.

WATER IRC SKILLS FORECAST

This annual IRC Skills Forecast will be submitted by the Water IRC to the AISC for approval.

The IRC Skills Forecast identifies the priority skill needs of the Water industry following a research and stakeholder consultation process conducted by Australian Industry Standards (AIS) on behalf of the IRC.

Once approved by the AISC, the IRC Skills Forecast informs the development of a four-year rolling National Schedule for review and development work within the NWP National Water Training Package.

More information on the National Schedule can be found at: www.aisc.net.au/content/national-schedule.

Quick Fact

10,000 GL
GIGALITRES

Amount of water extracted for consumption purposes in the Australia economy 2016-17[*]

WATER INDUSTRY REFERENCE COMMITTEE

The Water IRC has been assigned responsibility for the NWP National Water Training Package. More information about the Water IRC and its work can be found here:

www.australianindustrystandards.org.au/committee/water-industry-reference-committee/.

Water IRC Members

Archie Wright
Industry Skills Advisory Council Northern Territory

Brendan Hill
Sydney Water Corporation

Darren Clarke
South Australia Water

David Cameron
Queensland Water

David Scott
United Services Union/Australian Service Union

George Wall (Deputy Chair)
Water Industry Operators Association of Australia

Jason Ip
NSW Water Directorate

Jeff Rigby
Water Services Association of Australia

John Harris (Chair)
Wannon Water

Jonathan McKeown
Australian Water Association

Kate Blizzard
TasWater

Neil Hooley
Water Corporation

Robert Allen
Icon Water

Tony Wright
VIC Water

For more information, please contact:

Klausch Schmidt
Water Industry Manager
Australian Industry Standards

M 0417 568 967
E klausch.schmidt@australianindustrystandards.org.au

Quick Fact

$13.06 B

BILLION

*Added to the Australian economy by
the Water industry in 2015-16 †*

WATER INDUSTRY OVERVIEW

WATER INDUSTRY OVERVIEW

The Water industry in Australia has an estimated annual revenue of $22.71 billion, adding $13.06 billion to the Australian economy in 2015-16. The industry employs over 31,000 people across its sub-sectors: water supply, sewerage, drainage services and pipeline transport (water).

KEY WATER METRICS

REVENUE
$22.71B
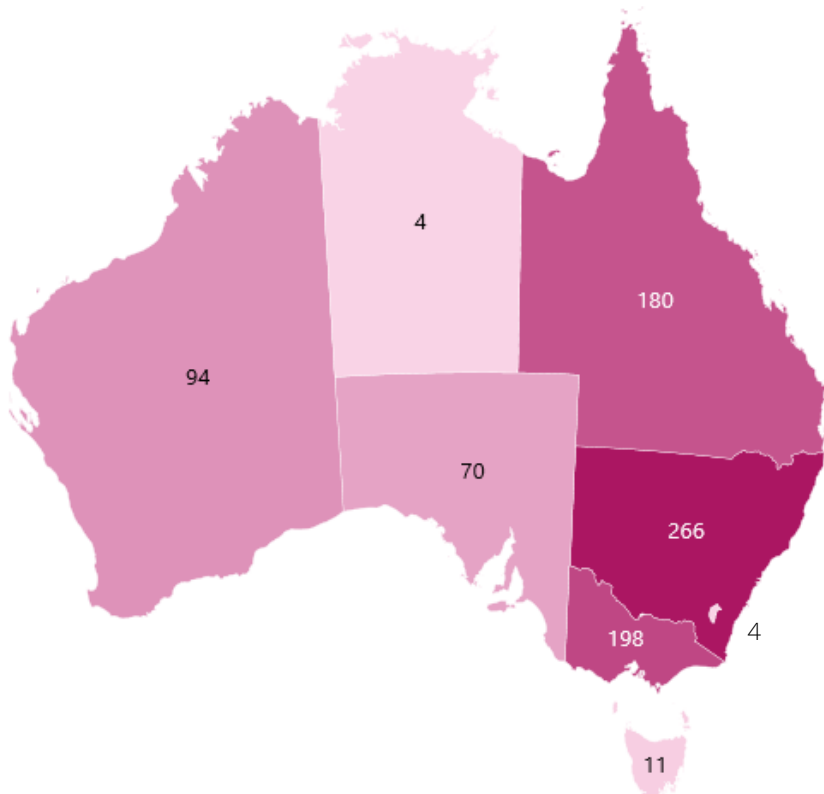
PROFIT
$3.1B*

AVERAGE WAGE PER YEAR
$99,952

EMPLOYMENT GROWTH TO 2023
3.9%
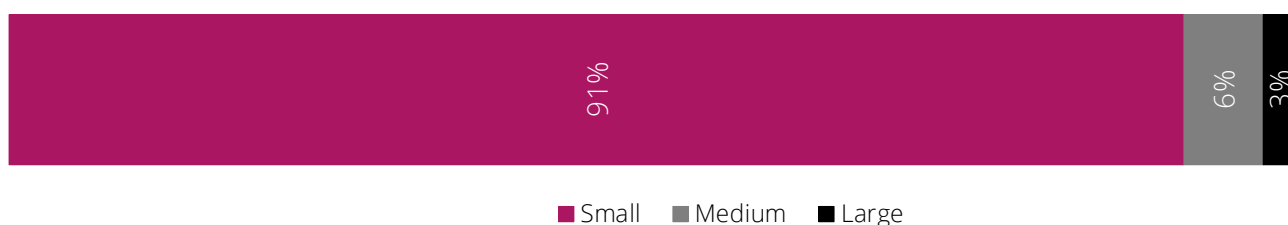
Sources: IBISWorld Reports on Sewerage and Drainage Services, Water Supply.

* Bureau of Meteorology (2017) National performance report 2015–16: urban water utilities, part A. Government of Australia.

ENTERPRISE DENSITY BY STATE/TERRITORY

4
180
94
70
266
198
4
11

WATER BUSINESS COMPOSITION

91% 6% 3%

■ Small ■ Medium ■ Large

Source: Australian Bureau of Statistics (2018) *8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017*. Australian Government.

EXPLANATORY NOTES

Counts of Australian Businesses

Distinct from the Census and Labour Force data, the Counts of Australian Businesses data uses a top down approach where industries are primarily classified by the single predominant industry class associated with a business' ABN. A limitation of this approach is that organisations with a presence in several States/Territories will be counted only once. This can lead to enterprise figures appearing low for a given state/territory, but it's not that there are no enterprises existing in the state/territory, it's that the headquarters are located elsewhere. A further consideration is that organisations in more than one industry will also be only counted in one industry.

Quick Fact

31,000 EMPLOYEES

The number of people employed by the Water industry [†]

KEY WATER STAKEHOLDERS

Employers

Coliban Water
Icon Water
Power and Water Corporation - NT
South Australia Water
Sydney Water Corporation
Tas Water
Unity Water
Wannon Water
Water Corporation
Gold Coast Water
Hunter Water
Seq Water
QLD Urban Utilities
Melbourne Water
City West Water
South East Water
Yarra Valley Water
Barwon Water

Industry Peak Bodies

Australian Water Association
Water Directorate - NSW
Queensland Water Directorate
Water Industry Operators Association
Water Services Association of Australia
Vic Water

Employee Representatives

United Services Union/Australian Service Union
The Australian Workers Union

State Licensing / Regulatory

Environmental Protection Authorities
State Departments of Health

Government

Federal, State/Territory Departments
Department of Agriculture and Water Resources
National Health and Medical Research Council

Industry Advisory

State and Territory Industry Training Advisory
Bodies (ITABs)

Training Organisations

TAFEs, Private RTOs, Enterprise RTOs

NWP NATIONAL WATER TRAINING PACKAGE

The NWP National Water Training Package provides the only nationally recognised Vocational Education and Training (VET) qualifications for occupations involved in water industry operations (generalist, treatment, networks, source, irrigation, hydrography, trade waste), treatment (drinking water, waste water) and irrigation.

The NWP National Water Training Package comprises seven qualifications, 10 Skill Sets, and 148 Units of Competency and associated assessment requirements and covers water supply, sewerage, drainage services and pipeline transport (water).

The NWP National Water Training Package contains the following qualifications:

Certificates

Certificate II in Water Industry Operations
Certificate III in Water Industry Irrigation
Certificate III in Water Industry Treatment
Certificate III in Water Industry Operations
Certificate IV in Water Industry Treatment
Certificate IV in Water Industry Operations

Diploma

Diploma of Water Industry Operations

The NWP National Water Training Package is in the Scope of Registration of 28 Registered Training Organisations.
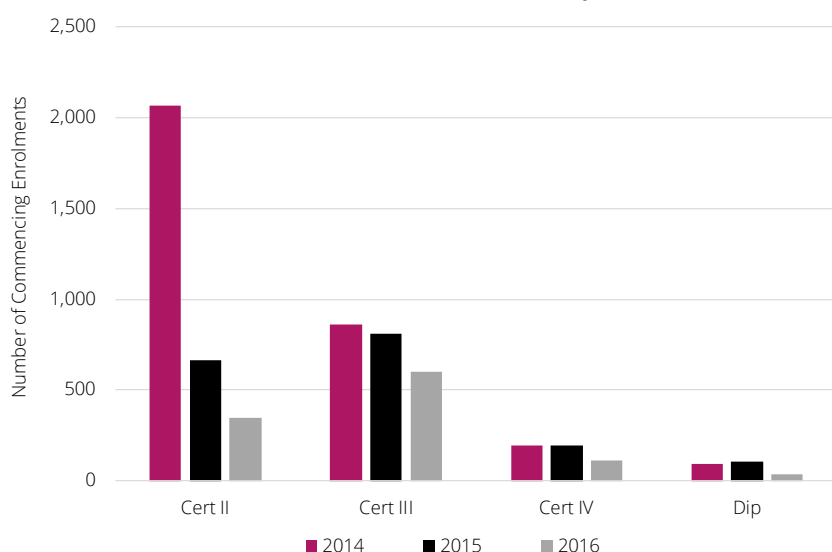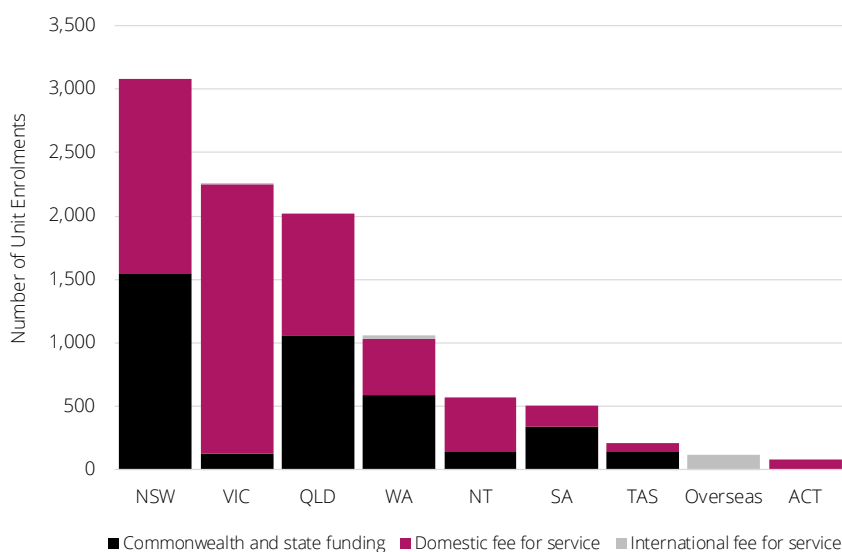
TRAINING DATA

The below charts investigate commencing enrolments by Australian Qualification Framework (AQF) level and funding source by State/Territory, where commencing enrolments of Units are averaged over three years.

COMMENCING ENROLMENTS BY AQF LEVEL

The Certificate II in Water Industry Operations appears to have had a significant reduction in enrolments since it was transitioned to the new Standards for Training Packages in 2015. Enrolments across the remaining levels (Certificate III, IV and Diploma) have also been declining over the last three years.

UNIT ENROLMENT COUNT BY STATE AND FUNDING TYPE 2014, 2015 AND 2016 AVERAGE

Victoria has both the greatest number of fee for service funded Units of Competency and the lowest number of Government funded Units of Competency.

EXPLANATORY NOTES

Training Charts

Total VET Activity (TVA) data is collected from all types of training providers and not only those in receipt of Commonwealth or State funding. TVA data collection commenced in 2014.

Exemptions

Where the submission of training data to TVA conflicts with defence or national security legislation or jeopardise the security or safety of personnel working in defence, border protection, customs or Australian police departments, an exemption from reporting training data is available.

Organisations that deliver training for vital services to the community (such as emergency, fire, first aid and rescue organisations) may have received an exemption to submit data to TVA. From 1 January 2016 however, the exemption from reporting applies only in respect of training activity not delivered on a fee for service / commercial basis.

Quick Fact

820 DAMS

In Australia. This is the highest per-capita surface water storage capacity in the world [‡]

CHALLENGES AND OPPORTUNITIES

TECHNOLOGICAL INNOVATION

Industries world-wide are experiencing rapid change in their daily operations, accelerated by technological innovation. These changes can transform the way industries manage, supply, and regulate their assets. Within the Water industry, technological innovation is enabling innovative approaches to water systems and asset management. These will have far-reaching effects, changing the way water is delivered to highly urbanised regions, commercial zones, and rural locations.

Automation

The use of advanced autonomous systems and modelling, including Geographic-Information Systems (GIS) and machine learning, have had a positive effect on the Water industry. These technologies have enabled water supply, metering, treatment, and infrastructure maintenance companies with methods to improve their operations. These include detecting leaks in network supply pipes, defective sewer systems, sewer choke points, automating waste-water treatment processing, and processing remote water treatment aided by solar power and battery packs. By utilising automated processes, water companies can identify areas of required preventative maintenance. This reduces the cost, demand, and pressures associated with reactive maintenance[1].

The onset of automation in water operations and delivery is anticipated to have a significant impact on the industry and the skill requirements of the workforce. Retraining and up-skilling will be needed to ensure the workforce can keep relevant with new technologies, maintain asset management, and improve water utility efficiency[2].

Inspections and Surveying

Remote monitoring of water assets, condition assessments and efficiency checks are becoming commonplace in the industry. These tools, including drones and remote surveying devices, are changing the way waterways and water assets are monitored and managed. Their use in the industry is highly effective in providing accurate location-based repair sites and areas of interest, substantially reducing occupational health and safety concerns related to the risk posed by manual inspections of elevated and high-risk assets[3].

These new systems and remote operations require highly specialised skills to monitor, diagnose, and interpret large volumes of data to determine faults and identify areas for investigation. The Water IRC notes the current workforce needs further training, comprehension and knowledge of these systems to utilise them to their full capacity. Addressing this in the skills framework is considered a priority.

The Internet of Things

The advent of the Internet of Things, the ever-increasingly miniaturised sensors and internet connected devices, will greatly alter the way water is managed. As this technology becomes embedded in the Water industry, emphasis will be placed on automatic metering, data management, network transmission, and higher-resolution data points. This will enable increased accuracy of water asset management and industry operations.

Catchment management solutions are requiring new approaches to manage water supply effectively and accurately. Increasingly, workers are required to interact with new technological devices and operating systems. Data capture and remote system operations via tablets and smart phones is increasing at water treatment plants and in the field when assessing network issues.

On this basis, digital literacy will be important for the Water industry as they seek appropriately trained staff to work with new technologies. These technological changes will increase the demand for specialist skills; including data analysis and data literacy, network security, and higher-order skills incorporating creative, critical thinking, problem-solving, and inter-personal communication skills, in the workforce. The industry will need to be able to adapt, and provide support to the existing workforce, by upskilling and retraining, to maximise productivity.

Big Data

Big Data, the ever-increasingly large volume of data being captured by sensors and subject to analysis, is further transforming the management of water assets and supply in Australia[4]. Examples include the collection of data from pumping stations (including energy use), water treatment plants, sewage plants, and reservoirs to manage operations remotely. This information is also highly valuable for research and planning. Analysing real-time demand will provide opportunities to increase performance and will aid efficiencies by diagnosing and reducing faults and waste/leakage along the network.

The use of Big Data will enable the advanced systems to assist with real-time operations, decision-making, and provide improved customer service relationships, providing accurate water usage statistics over time to customers. It will also be used to optimise the urban and rural water services, settings, and safety management systems.

INFRASTRUCTURE DEMANDS AND ASSET MANAGEMENT

The Water industry is highly reliant on infrastructure, which requires ongoing maintenance and renewal. Given the dependency on aging infrastructure and increasing urbanisation, new challenges are anticipated to emerge. Water supply management, quality control, and compliance will present complications that must be addressed.

The ongoing development of new water infrastructure, maintenance and upkeep has implications for the workforce. Companies are seeking appropriately skilled labour and management skills for these projects. Water security and the implementation of new approaches such as Integrated Urban Water Management (IUWM) and Water Sensitive Urban Design (WSUD), are also areas of interest to provide reliability to supply and manage water assets in high-density urbanised areas[5,6].

ALTERNATIVE WATER SUPPLY

With increasing demand for water, the industry is investigating new means to supply water from alternative sources. Water supply from alternative sources include: recycled water, seawater desalination, stormwater harvesting, greywater, waste-water systems, and utilising geothermal water for agriculture. Regulatory frameworks have been developed to ensure these treatment methods meet the safety requirements of drinking water quality. However, not every state and territory have a consistent approach to validate the technologies employed[7]. Developing unified approaches to these standards will enable a skilled workforce that is able to deliver services in states and territories, irrespective of the location of training.

CLIMATE CHANGE / SUSTAINABLE MANAGEMENT

Water catchments are under pressure to maintain sustainable water supplies, due to the impacts of climate change. A survey conducted by Deloitte and the Australian Water Association (AWA) in 2014 revealed over 86 per cent of respondents identified climate change as a risk to water management[8].

The impacts of climate change are already being felt within Australia. Rainfall variability is beginning to place increasing pressure on all facets of the Water industry. A Zero Carbon Emissions strategy identifies water supply security as being at risk, due to increasing greenhouse gas emissions[9]. These effects will have long-lasting and negative impacts on the industry, requiring proactive management of water resources.

To ensure the stable and reliable supply of water across all of Australia, the Water industry will have to proactively manage water resources. New systems will need to be utilised to ensure water resources are monitored in real-time, forecasted and consistently available, irrespective of the challenges presented.

The industry acknowledges the critical impact of climate change and drought and is revising water demand models, focussing on assets and solution-based strategies to mitigate these issues[10,11]. An industry-led focus on the planning, development and forecasting of skills will help ensure the skill needs of the workforce are meeting the demands and challenges anticipated in the future.
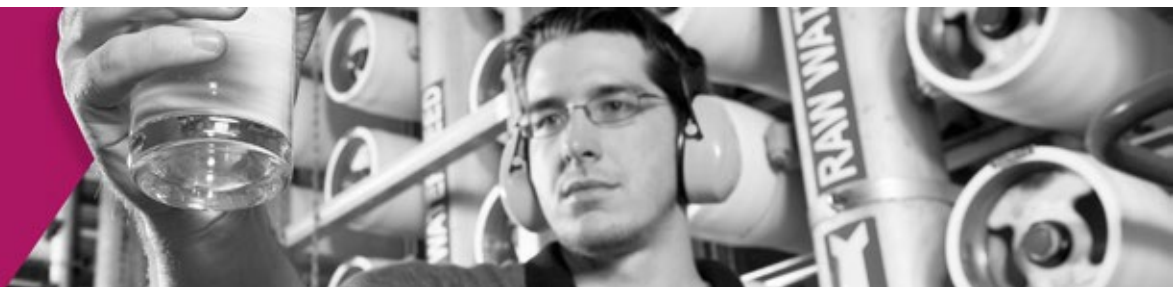
EMPLOYMENT AND SKILLS OUTLOOK

$108 M

MILLION

*Of economic output is produced on average for every GL of water used by Australian industry [§]*

EMPLOYMENT DEMOGRAPHICS

The following charts provide an overview of the Water workforce at a glance. These include age profiles, major occupations, gender-composition by employment type, workers by State/Territory, and the projected employment for the next five years.

WORKFORCE BY STATE/TERRITORY
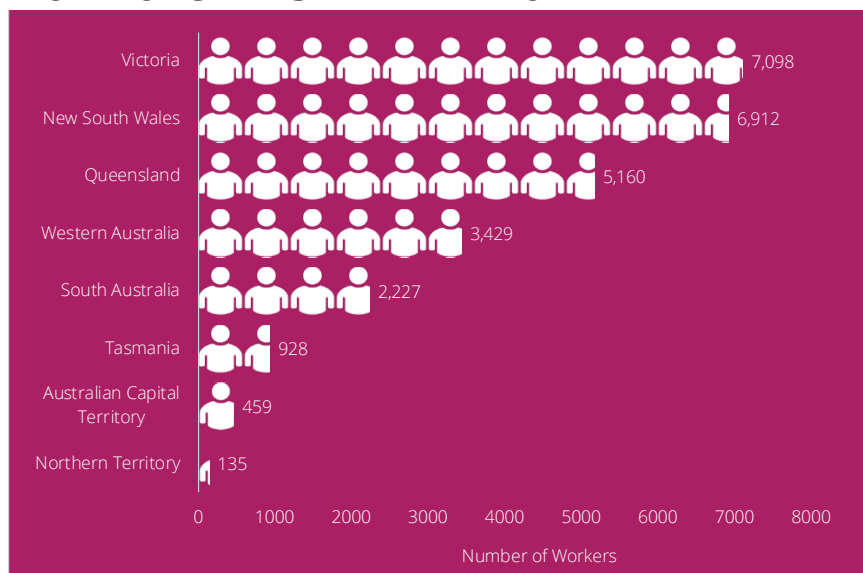
New South Wales and the Northern Territory have significantly fewer Water industry workers than anticipated, based on the population distribution of Australia, albeit for different reasons. New South Wales may be leveraging the benefits of infrastructural density, while the Northern Territory may simply have less infrastructure in place.

Source: Australian Bureau of Statistics (2017) *2016 Census – Employment, Income and Education*. Australian Government.

WATER INDUSTRY AGE PROFILE – 2006 TO 2016
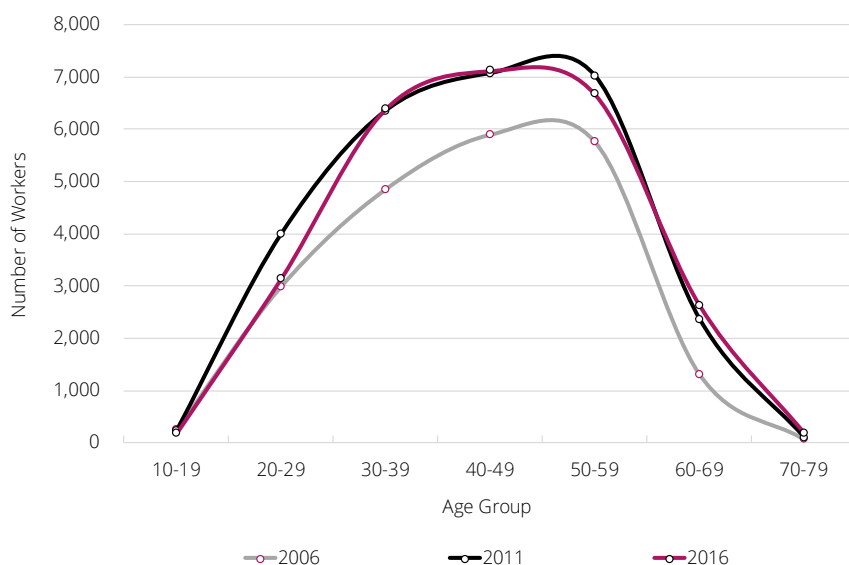
The Water industry workforce grew significantly between 2006 and 2011 but has dropped by around 3 per cent since then. This can be attributed largely to workers under 30, having fallen by one-third since 2011.

Source: Australian Bureau of Statistics. *Census – 2006, 2011, 2016*. Australian Government.
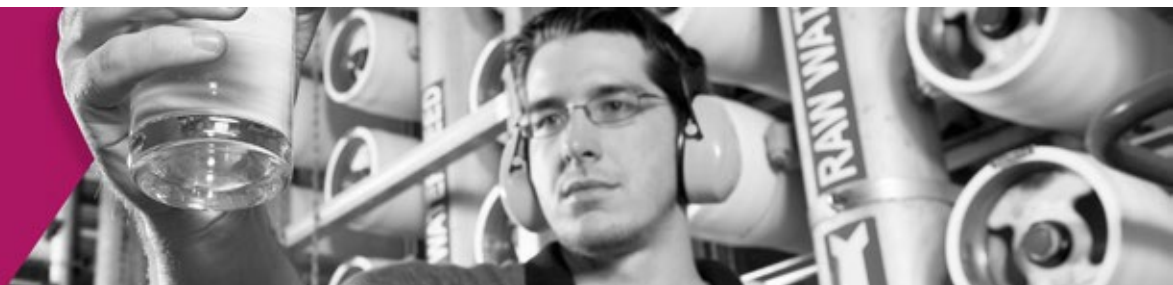
MAJOR OCCUPATIONS WITHIN THE WATER INDUSTRY

Number of Workers (000's)

■ 2006   ■ 2011   ■ 2016

The top five occupations have experienced significant growth between 2006 and 2016, however Plant Operators are the only occupation not to have decreased in size since 2011. The r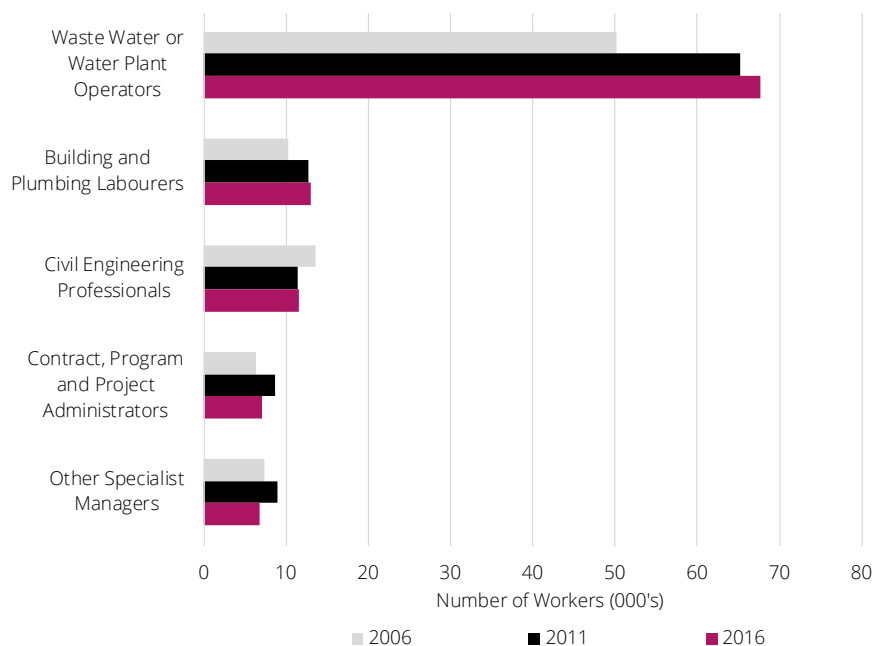eduction in Building and Plumbing Labourers and Civil Engineers is likely to be related to the completion of four desalination plants between 2010 and 2012.

Source: Australian Bureau of Statistics. *Census – 2006, 2011, 2016*. Australian Government.

GENDER BY EMPLOYMENT TYPE

♂ Males full-time   ♂ Males part-time   ♀ Females part-time   ♀ Females full-time
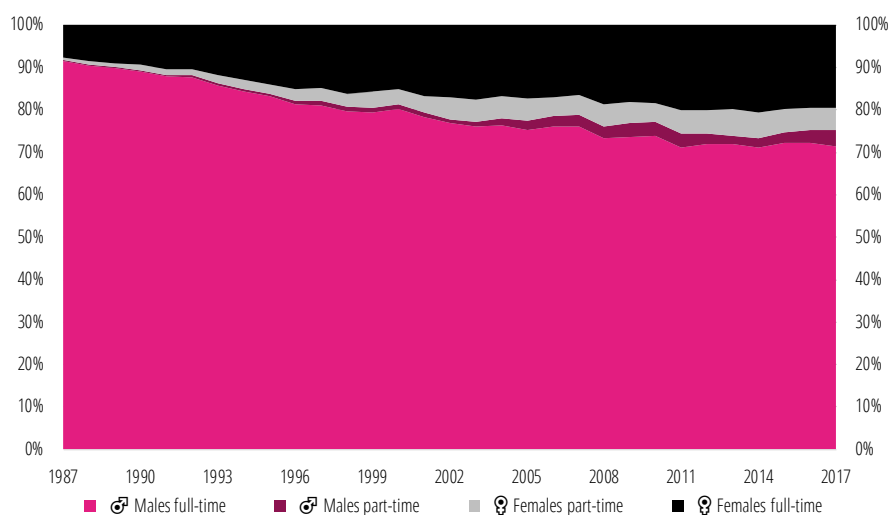
The proportion of females in the workforce has tripled over 30 years. One-fifth of women employees in the Water industry are employed part-time; compared with male employees (3 per cent of 75 per cent total).

Source: Australian Bureau Statistics (2017) *6291.0.55.003 - Labour Force, Australia, Detailed.* Australian Government

PROJECTED AND HISTORICAL WATER WORKFORCE (2005 – 2023)

The Water Supply and Sewerage and Drainage workforces are expected to grow by around 4 per cent each over the next five years.

Source: IBISWorld Reports on Sewerage and Drainage Services, Water Supply.

EXPLANATORY NOTES

Census Data

Each respondent to the Census is asked to provide the industry of their employer *at the location of where the person works*. This question is designed to address the problem of single organisation operating in several industries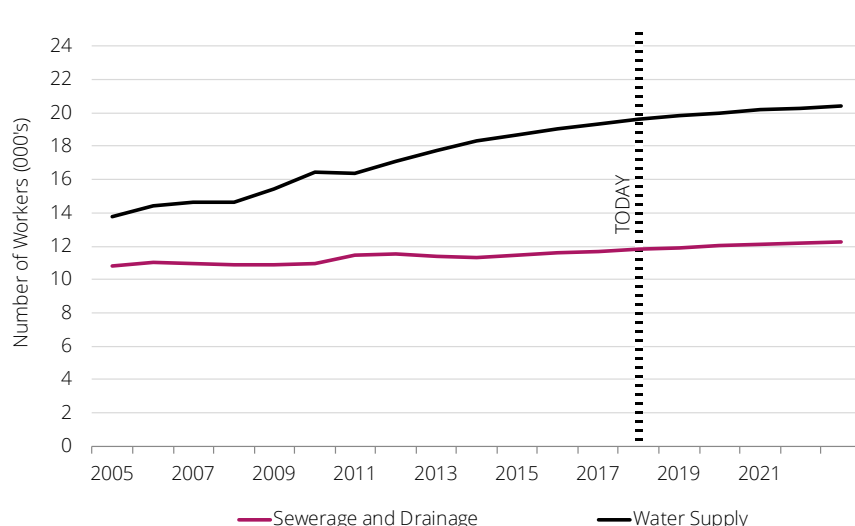, with the assumption being that the individual respondent is typically working in fewer industries than the company they work for. This approach aims to provide better industrial resolution in the data, however it is worth noting that the industry designation is dependent on the individual's interpretation of the question. An example where this could provide misleading data might be a plumber in the Gas Supply industry describing their employer's business (at the location that they are working) as plumbing which would therefore be counted in the Plumbing Services industry.

Labour Force Data

Outside of Census years, the size of an industry's workforce is established by the Australian Bureau of Statistics using the Labour Force survey. This dataset provides a 30-year view of the industry where, like the Census, industry is assigned at the discretion of the individual respondent. Given that the survey is sample-based, it should also be understood that the smaller the industry being measured, the larger the margin of error.

The scope of the Labour Force survey is limited to the civilian population of Australia and therefore members of permanent defence forces are excluded from the survey.

IBISWorld Data

IBISWorld data is comprised from a variety of economic, demographic, government and company data, including the Australian Bureau of Statistics.

WATER INDUSTRY SKILL SHORTAGES

On behalf of the Water IRC, AIS conducted an online survey for stakeholders, between 4 December and 16 January 2018. The IRC sought feedback on the current skill shortages and the reasons for the shortages, as perceived by industry stakeholders.

WATER SKILL SHORTAGES

Over 85 per cent of employers reported experiencing a skills shortage in the last 12 months. The occupations reported as being in shortage were:

1. Water/Wastewater Treatment Operators
2. Educators, Trainers and Assessors
3. Engineers (various)
4. Managers (various)
5. SCADA programmers

REASONS FOR SHORTAGE

Employers identified the following reasons for the shortage with the most frequent response listed first.
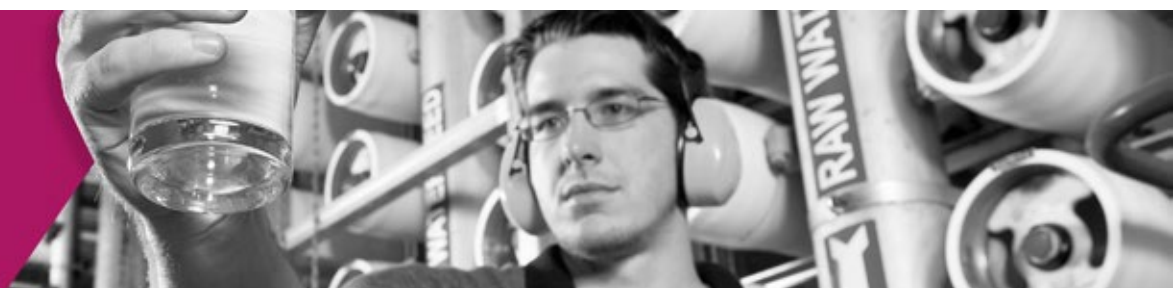
1. Ageing workforce / current staff retiring
2. Wages/salaries considered too low
3. Geographic location of the vacancy
4. Competition from other organisations
5. Cost/time to achieve the required qualification

Quick Fact

827

BUSINESSES
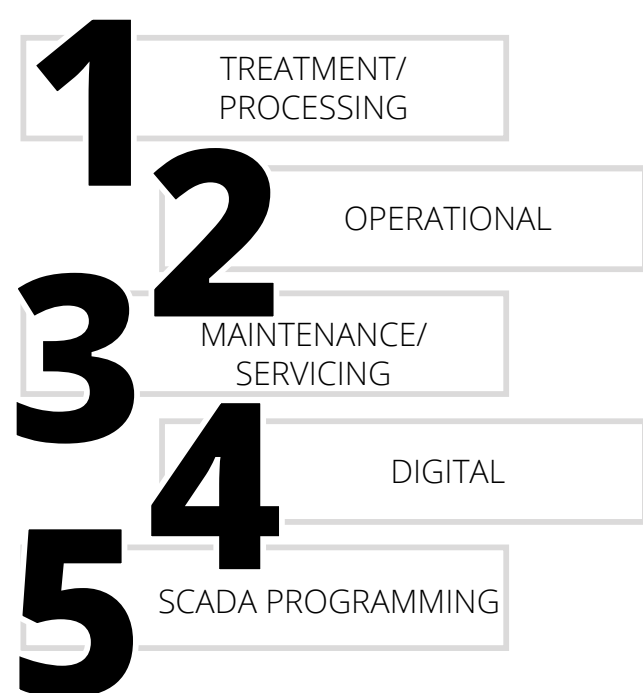
The number of businesses in the Water industry [#]

PRIORITY SKILLS

The priority skills of the Water industry are drawn from stakeholder responses to the Water IRC Skills Forecast survey conducted between 4 December and 16 January 2018.

SKILL CATEGORY

In order of priority to the industry, the following skills were identified from the survey as the most important for the Water workforce within the next three to five years.

1. TREATMENT/PROCESSING
2. OPERATIONAL
3. MAINTENANCE/SERVICING
4. DIGITAL
5. SCADA PROGRAMMING

GENERIC SKILLS

The Generic Skills listed are provided to AIS by the Department of Education and Training. Within the survey, the IRC asks stakeholders to rank these skills in order of importance to the industry. Ranking of the 12 generic workforce skills in order of importance to the Water industry are as follows:

1. Technology
2. Science, Technology, Engineering, Mathematics (STEM)
3. Design mindset / Thinking critically / System thinking / Solving problems
4. Managerial/Leadership
5. Data analysis
6. Customer service / Marketing
7. Learning agility / Information literacy / Intellectual autonomy and self-management
8. Language, Literacy and Numeracy (LLN)
9. Environmental and Sustainability
10. Communication / Virtual collaboration / Social intelligence
11. Financial
12. Entrepreneurial
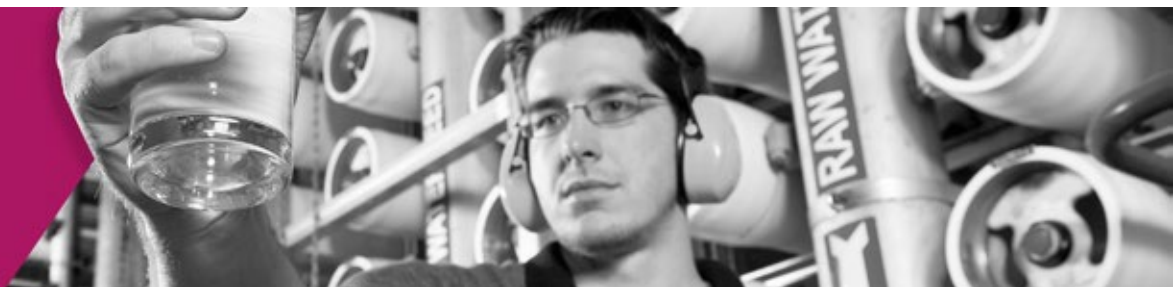
WORKFORCE SUPPLY SIDE CHALLENGES AND OPPORTUNITIES

REGULATORY CHANGES

Federal and state governments have increased the regulation and reporting requirements for water utilities. These changes ensure the delivery of reliable water to the public while minimising the effects on the surrounding environment. Amalgamations of councils and standardisation of workforce training has a flow on effect to operational staff that are required to attain certification to operate, document and make decisions in an increasingly regulated environment. Regulatory harmonisation across states/territories should be worked towards, ensuring the safe handling of water resources in a consistent approach nation-wide.
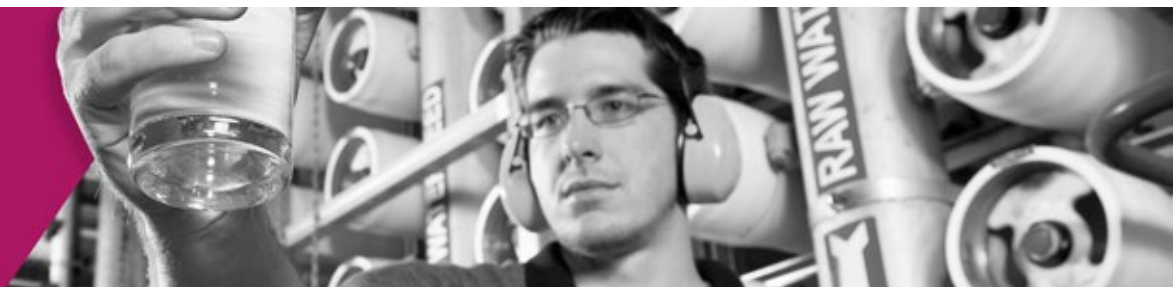
AGEING WORKFORCE

The Water industry of Australia has a large proportion (36 per cent) of its workforce aged over 50 and subsequently due to retire in the next 10-15 years[12]. Attraction and recruitment of new employees, who can be mentored by experienced staff, will help companies to retain industry knowledge as people leave the industry.

The pace of technological change, and the capacity for the existing older workforce to adopt the new technologies, are a challenge for the industry. Workforce planning requires the need to balance employing the younger generation with technological skills, while ensuring accumulated corporate knowledge of the more experienced Water industry workforce is maintained.

Water companies may need to look at how they promote careers in the industry, particularly in entry level roles, where there is a high turnover. Making the industry an attractive and rewarding place to work is needed, to further secure the viability of the industry.

WORKPLACE AND GENDER DIVERSITY

The current workforce gender composition is approximately 25 per cent female, decreasing from 30 per cent in 2011[13]. Workplace cultural changes can also encourage the workforce to enhance the learning and work experience, thereby providing wide-ranging skills and outlooks[14]. Overall, increased performance can be achieved with gender and cultural diversity across all entry points, including management positions. Furthermore, enhancing gender equality may assist with future shortages in the workforce that will arise from generational shifts[15].

INTERNATIONAL / NATIONAL WORKPLACE TRENDS

New technology in the Water industry is the major trend affecting the workforce. The digitalisation of operations to improve services delivered corresponds with a need to increase the digital skills available in the workplace. The incorporation of drone technology, system operations, smart meters, and other digital innovations has altered the methods used to oversee water assets; thereby having an impact on risk management policies. As these technologies continue to thrive in the industry, it will be necessary to prepare the workforce accordingly.

DIGITAL LITERACY AND HIGHER ORDER SKILLS

Advances in technology are changing how the Water industry conducts daily operations for the treatment and delivery of water to customers, including the way assets are monitored. As these technologies become more readily used in the industry, the changes to operations will require the workforce to be equipped with digital literacy skills (i.e. information technology, using new systems including smart meters and system interfaces, data interpretation and analytics).

A report and survey conducted by the Water Services Association of Australia (WSAA) and KPMG in 2017 ('Workforce Skills of the Future') identified digital literacy as a major skill need for the industry, with demand for data specialists and cyber security specialists expected to continue to increase[16]. The Workforce Skills of the Future survey revealed digital skills to be the second most important current or potential gap in skills and capabilities.

Higher order skills are those associated (but not exclusive) to critical thinking, creative thinking, decision-making, and analysis. These skills are improved by teaching and learning strategies, persistence by the individual, and open-mindedness and self-monitoring[17]. Skills in critical thinking were also identified in the Workforce Skills of the Future survey as a current or potential gap, being the third most identified gap in skills and capabilities identified.

Considering the changes identified to the future workforce environment, these skills will become essential. Developing new strategies to retrain existing staff in these skills and adding these skills requirements to the NWP National Water Training Package qualifications will ensure the industry is prepared for the technological change.
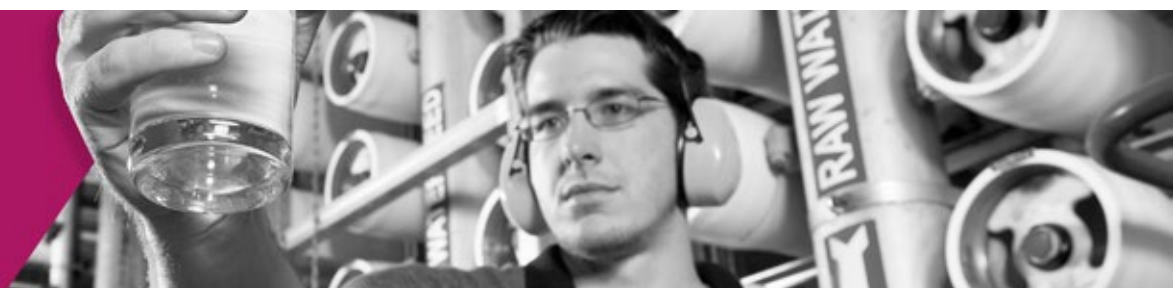
REFERENCES

1   Australian Water Association (2017) *Predicting sewer chokes through machine learning*. AWA Water e-Journal.

2   Deloitte and Australian Water Association (2015) *State of the Water Sector Report*.

3   Goldsmith, M. (2015) *Aerial drones: the future of asset inspection*. Utility Magazine.

4   Dudley, L. (2016) *The utility of the future*. Utility Magazine. Available at: http://www.utilitymagazine.com.au/the-utility-of-the-future/.

5   Furlong, C., De Silva, S. and Guthrie, L. (2016) *Understanding Integrated urban water management as an ideology, method, and objective.* AWA Water e-Journal.

6   Radcliffe, J. (2017) *The Evolution of Low Impact Development*. AWA Water e-Journal.

7   Australian Water Association (2015) *Water Recycling Fact Sheet*.

8   Deloitte and Australian Water Association (2015) *State of the Water Sector Report*.

9   The University of Melbourne Energy Institute (2011) *Australian Sustainable Energy, Zero Carbon Australia Stationary Energy Plan*. Beyond Zero Emissions.

10   Sarker, R. and Gato-Trinidad, S. (2016) *Current Issues in Water Demand Models Being Used in Australia: A Survey*. AWA e-Journal.

11   Australian Water Association (2016) *Australian Water Outlook Report 2016*.

12   Australian Bureau of Statistics (2017) *2016 Census – Employment, Income and Education*. Australian Government.

13   Australian Bureau of Statistics (2017) *6291.0.55.003 - Labour Force, Australia, Detailed*. Australian Government.

14   Australian Water Association (2016) *Cultural diversity key to strengthening water businesses*.

15   de Vette, K (2016) *Unlocking the Untapped Resource, the Business Case for Workforce Diversity*. International Water Association.

16   Water Services of Australia and KPMG (2017) *Workforce Skills of the Future*.

17   King, F., Goodson, L., and Rohani, F. (1998). *Higher order thinking skills: Definition, teaching, strategies, assessment*. Available at: http://www.cala.fsu.edu/files/higher_order_thinking_skills.

*   Australian Bureau of Statistics (2017) *4610.0 Water Account, Australia, 2015-16*. Australian Government.

†   IbisWorld Reports on Sewerage and Drainage Services, Water Supply.

‡   Australian Water Association (no date) *Large dam fact sheet*.

§   Australian Bureau of Statistics (2017) *Household water increases 3% (media release)*. Australian Government.

Australian Bureau of Statistics (2018) *8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017*. Australian Government.

PROPOSED SCHEDULE OF WORK

KEY DRIVERS

WATER IRRIGATION

Industry has requested the review of the Irrigation qualification to ensure that the qualification meets industry requirements regarding regulatory compliance, water type being used, and the current technology and method being used to irrigate. Effective irrigation will influence the entire growth process from seedbed preparation, germination, root growth, nutrient utilisation, plant growth and regrowth. Higher yield and quality will therefore provide significant financial benefits to various farming types. The significance of effective irrigation is that each dollar of on-farm irrigated production, is estimated to generate about $3.50 in regional economic activity (Source: Charles Darwin University).

WATER TREATMENT TECHNOLOGY

Regulatory requirements, technology developments and methodology changes in water treatment are driving this development. The creation of a range of Skills Sets, is an ideal way to complement the existing qualification and assist industry in achieving regulatory compliance. They will allow the flexibility for operators at both large and small plants to undertake the correct mix of training they require to appropriately operate their plants and manage the risk to both public health and the environment.

The typical water or wastewater treatment plant does not meet a one size fits all concept. There are a variety of individual treatment processes that can be chosen and utilised at a plant, depending on factors such as location, flow volume or level of contaminants in the water or wastewater to be treated. There are also differences in the range of technology and complexity of process steps employed at large and small treatment plants. Typically, when seeking to apply for operator certification, additional training is required to address the skill gaps.

PROPOSED RESPONSES

WATER IRRIGATION

The Water IRC has proposed a project to review the NWP30415 Certificate III in Water Industry Irrigation and associated Units of Competency, to ensure that current regulatory and operator requirements reflect industry's needs. Throughout the project, broad consultation with state and territory water utilities and operators will be undertaken, including key regulators, Environment Protection Authority (EPA) and the Department of Agriculture.

WATER TREATMENT TECHNOLOGY

The Water IRC has proposed a project to develop nine Skill Sets addressing the workforce skills and knowledge requirements of water treatment operators to achieve regulatory compliance. There are a variety of individual treatment processes that can be utilised at a plant, depending on factors such as location, flow volume or level of contaminants in the water or wastewater. There are also differences in the range of technology and complexity of process steps employed at large and small treatment plants.

The Skill Sets will have the content available to ensure the operators have the appropriate skills and knowledge to compliantly operate water treatment plants that use a variety of treatment methods. They will allow the flexibility for operators at both large and small plants to undertake the correct mix of Units of Competency they require to appropriately operate their plants and manage the risk to both public health and the environment.

PROPOSED SCHEDULE OF WORK

2018-19

Certificate III in Water Industry Irrigation - Review

The review and development of the irrigation qualification is driven by industry, as the skill requirements of operators is changing. New and evolving technologies and regulatory requirements continue being incorporated into the irrigation sector of the Water industry.

Water Treatment Technology - New Skill Sets

Regulatory requirements, technology developments and methodology changes in water treatment are driving this review. Water treatment processes vary depending on the type of water being treated. Across Australia there are a variety of water that requires different treatment processes to meet the drinking or recycled water guidelines.

2019-20

Water Treatment - Review

Regulatory requirements, technology developments and methodology changes in water treatment are driving this review. The review and development will provide the skills for the implementation of technology-based systems being designed to run water treatment plants.

2020-21

NWP National Water Training Package

The review and development for this year will address scheduled regulatory changes and will cover NWP National Water Training Package Skill Sets and associated Units of Competency. It is imperative that these Skill Sets reflect current regulatory criteria. Water industry enterprises use these to provide the regulatory compliance for the workers in the various sectors using the qualifications or bridging compliance via Skill Sets.

2021-22

NWP National Water Training Package

There are no NWP National Water Training Package products currently identified for review or development during this forecast period.

Where imported Units of Competency are identified as either deleted or superseded, the IRC may elect to revise the affected qualification(s) through the IRC Minor Upgrade process.

2018-19 PROJECT DETAILS

CERTIFICATE III IN WATER INDUSTRY IRRIGATION - REVIEW

Description

Review the qualification and associated Units of Competency to align the evolving skill requirements and technologies used within this sector to be provided for within the qualification. Irrigation is the artificial application of water to land for agricultural production or water disbursement as required.

Rationale

Australia is the driest inhabited continent in the world. As such, there is a need to supplement low rainfall with water from other sources, to assist in growing crops and pasture (page 16). All rights to use and control water are vested in the various states and territories, which issue conditional entitlements for water use (page 24). Compliance with the entitlements is critical to ensuring the industries that rely on irrigation have, a sustainable future. Poor management of irrigation is responsible for environmental problems such as soil salinity and loss of habitat for native flora and fauna.

The key to maximising irrigation efforts is appropriately skilled operators.

Ministers' Priorities Addressed

- The project **will not** propose removal of obsolete and superfluous qualifications from the National Register
- The project **will ensure** that more information is made available about irrigation operations and training delivery to training providers
- The project **will address** the needs of individuals and industry and provide transferable skills from one occupation to another in the Water industry
- The project **will support** creation of Units of Competency that can be owned and used by multiple industry sectors
- The project **does not propose** the development of additional Skill Sets
- The project **does not propose** the incorporation of existing accredited course materials into the NWP National Water Training Package

Consultation Plan

- AIS will undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
- Seek public feedback and input into development of material through the project's duration
- Communicating to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project

- Conducting initial consultation with stakeholders to identify and invite key representatives to establish the Technical Advisory Committee (TAC) and posting information about the project on the AIS website and newsletter
- Conduct face to face consultation sessions as required
- Conducting the first TAC meeting to explain the process and gather comments/feedback
- Communicating the process of drafting, identified Training Package material (Qualifications/ Units of Competency/Skill Sets), then verifying and validating this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
- Continuing communication on the project via the AIS website and newsletter

Scope of Project

To incorporate the new technologies being used by the Water industry and regulatory requirements into the NWP National Water Training Package qualification and associated Units of Competency.

The Training Package is planned to be developed from September 2018, with a Case for Endorsement planned for submission in 31 October 2019.

Training Package

NWP National Water Training Package Release 1.0

Qualifications

One qualification requires review:

- NWP30415 - Certificate III in Water Industry Irrigation

Units of Competency

Units of Competency to be developed or revised:

- Five Units of Competency requiring review (See Appendix A)
- Two Units of Competency to be developed (See Appendix A)

Skill Sets

No Skill Sets to be reviewed.

WATER TREATMENT TECHNOLOGY – NEW SKILL SETS

Description

Develop nine Skill Sets to provide skills gap training to meet the needs of the Water industry operators, to achieve regulatory compliance, in the Water and Wastewater treatment sector.

Rationale

From a regulatory perspective, to enable Water industry operators to appropriately manage the risks to both public health and the environment, it is vital that they undertake training from the NWP National Water Training Package which is matched to the individual treatment plant processes they operate (page 24).

The typical water or wastewater treatment plant does not meet a one size fits all concept. There are a variety of individual treatment processes that can be chosen and utilised at a plant, depending on factors such as location, flow volume or level of contaminants in the water or wastewater to be treated (page 16). There are also differences in the range of technology and complexity of process steps employed at large and small treatment plants (pages 14-16).

Ministers' Priorities Addressed

- The project **will not** propose removal of obsolete and superfluous qualifications from the National Register
- The project **will ensure** that more information is made available about Water Treatment operations and training delivery to training providers
- The project **will address** the needs of individuals and industry and provide transferable skills from one occupation to another in the Water industry
- The project **will support** creation of Units of Competency that can be owned and used by multiple industry sectors
- The project **does propose** the development of additional Skill Sets
- The project **does not propose** the incorporation of existing accredited course materials into the NWP National Water Training Package

Consultation Plan

- AIS will undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
- Seek public feedback and input into development of material through the project's duration
- Communicating to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project
- Conducting initial consultation with stakeholders to identify and invite key representatives to establish the Technical Advisory Committee (TAC) and posting information about the project on the AIS website and newsletter

- Conduct face to face consultation sessions as required
- Conducting the first TAC meeting to explain the process and gather comments/feedback
- Communicating the process of drafting, identified Training Package material (Qualifications/ Units of Competency/Skill Sets), then verifying and validating this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
- Continuing communication on the project via the AIS website and newsletter

Scope of Project

Develop nine Skill Sets and associated Units of Competency for Water and Wastewater treatment technology operators to achieve regulatory compliance.

The Training Package is planned to be reviewed from September 2018, with a Case for Endorsement planned for submission in 31 October 2019.

Training Package

NWP – National Water Training Package Release 1.0

Qualifications

No qualifications will be developed or reviewed.

Units of Competency

Up to four new Units of Competency to be developed.

Skill Sets

Nine new Skill Sets to be developed:

- Each Skill Set to incorporate the specific water type being treated and the technology used to do this

APPENDIX A

CERTIFICATE III IN WATER INDUSTRY IRRIGATION

	Qualification Code	Qualification
1	NWP30415	Certificate III in Water Industry Irrigation

	New Unit Code	New Unit title
1	NWPXXXXXX	Irrigation regulatory compliance
2	NWPXXXXXX	Irrigation Water classes

	Unit Code	Unit title
1	NWPIRR031	Monitor and control drainage operations
2	NWPIRR042	Monitor and schedule water deliveries
3	NWPIRR032	Monitor and control rural water distribution operations
4	NWPIRR023	Detect and rectify faults with automated channel regulators
5	NWPIRR024	Monitor and conduct maintenance on flow control and metering devices

AUSTRALIAN INDUSTRY STANDARDS

Australian Industry Standards (AIS) provides high-quality, professional secretariat services to the Water IRC in our role as a Skills Service Organisation. AIS provide services to eleven allocated IRCs which cover Aviation, Corrections, Gas, Electricity Supply (Generation and Transmission, Distribution and Rail), Electrotechnology, Maritime, Public Safety (including Police, Fire and Emergency Services, Defence), Rail, Transport and Logistics, and Water industries. AIS supports these important industry sectors using our world class in-house capability and capacity in technical writing, quality assurance, project management and industry engagement in the production of Training Packages.

AIS was established in early 2016, 20 years after its predecessor the Transport and Logistics Industry Skills Council (TLISC) was established in 1996. More information about AIS can be found at http://www.australianindustrystandards.org.au.

- We support industry growth and productivity through our modern innovative approach to establishing skills standards
- We provide high-quality, professional secretariat services to help our allocated industry reference committees develop the skills that industry needs
- We partner with industry to shape the workforce of the future