

Regulatory Impact Statement

Plumbing Regulations 2018



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Table of Contents

Summary	v
Purpose of this Regulatory Impact Statement	1
<u>PART A: OVERALL APPROACH TO REGULATING PLUMBING</u>	
A.1 Why is plumbing work regulated by government?	4
A.2 Objective of regulating plumbing work	18
A.3 Options on overall approach to regulating plumbing work and practitioners	19
A.4 Costs and benefits of the options	37
A.5 Summary of impacts of proposed Regulations	46
<u>PART B: CLASSES OF PLUMBING WORK</u>	
B.1 Drainage	54
B.2 Fire protection	61
B.3 Gasfitting	72
B.4 Irrigation (non-agricultural)	79
B.5 Mechanical services and refrigerated air-conditioning	81
B.6 Roofing (stormwater)	91
B.7 Sanitary	96
B.8 Water supply and backflow prevention	101
<u>PART C: IMPLEMENTATION AND FUTURE WORK</u>	
C.1 Implementation and evaluation	136
C.2 Forward work program	139
<u>APPENDICES</u>	
Appendix A: Current regulatory approach	152
Appendix B: Risks associated with each type of plumbing work	155
Appendix C: Cost assumptions	161
Appendix D: Key assumptions for hot water heater standard cost-benefit analysis	165
Appendix E: Typical plumbing jobs by value of plumbing work	166

Glossary

The Act	<i>Building Act 1993</i>
The current Regulations	Plumbing Regulations 2008
The proposed Regulations	Plumbing Regulations 2018
AMCA	Air Conditioning and Mechanical Contractors' Association
BCR	Benefit-cost ratio
CDP	Continuing professional development
CFA	Country Fire Authority
COAG	Council of Australian Governments
Department	Department of Environment, Land, Water and Planning
ESV	Energy Safe Victoria
FPAA	Fire Protection Association of Australia
GHG	Greenhouse gas
HIA	Housing Industry Association
IDC	Interdepartmental committee
MFB	Metropolitan Fire Brigade
NPV	Net present value
OCBR	Office of the Commissioner for Better Regulation
PAC	Plumbing Advisory Council
PCA	Plumbing Code of Australia, incorporated as Volume 3 of the National Construction Code
PPTEU	Plumbing and Pipe Trades Employees Union
RIS	Regulatory Impact Statement (<i>this document</i>)
SLA	<i>Subordinate Legislation Act 1994</i>
TMV	Thermostatic mixing valve
VBA	Victorian Building Authority
VEU	Victorian Energy Upgrades program
VMIA	Victorian Managed Insurance Authority

Summary

What is the purpose of the proposed Regulations?

The *Building Act 1993* (“the Act”) provides the legislative framework for the regulation of plumbing and building standards in Victoria. The objective of Part 12A of the Act, which specifically relates to the regulation of the plumbing industry in Victoria, is to regulate plumbing work with the aim of ensuring that it is carried out safely and competently.

The Plumbing Regulations 2008 (“the current Regulations”) give effect to the Act by:

- defining the different classes of plumbing work that are regulated in Victoria
- setting competency-based eligibility requirements for becoming a registered or licensed plumber
- formally adopting the Plumbing Code of Australia (PCA) into the Victorian regulations
- setting additional work standards for some types of work not covered or not sufficiently addressed by the PCA
- setting the threshold for the value of plumbing work which requires a Compliance Certificate
- setting fees, including application fees, registration and licensing fees, and the price of Compliance Certificates.

In Victoria, Regulations—statutory rules made under the authority of an Act—automatically expire (“sunset”) after ten years. The current Regulations are due to sunset on 18 November 2018, and new Regulations are needed to replace them.

Why are the proposed Regulations needed?

Without making new Regulations, the framework for regulating plumbing practitioners and plumbing work in Victoria would no longer exist in any meaningful form. There would be no effective regulatory oversight of the quality of plumbing work or competency of plumbers. The department considers this would significantly increase the risk of poor plumbing work leading to property damage, financial loss, or injury to people.

What are the objectives of the proposed Regulations?

The primary objectives of the proposed Regulations are to:

- provide the necessary elements required by the Act to provide an appropriate regulatory framework for plumbing that prevents, to the extent possible, property damage, injury to people, or financial loss
- improve the information available to consumers about the competence of plumbers
- set fees to recover the costs to government of regulating plumbing work.

Secondary objectives to be taken into account are to:

- ensure regulation of plumbing and use of plumbers by consumers is efficient
- give effect to Victoria’s commitments under the mutual recognition agreements.

What is the expected impact of the proposed Regulations?

The proposed Regulations largely continue the existing arrangements, with a number of important changes.

The department has estimated that continuation of the general requirements (i.e., a formal qualification, experience requirements, a Victorian Building Authority (VBA) exam, and setting work standards) was found to have a cost to the plumbing sector of around \$286 million over the next ten years (net present value), or an annualised cost of \$29 million per year. Although there is a lack of evidence about the benefits that result from these requirements, the department believes that this cost will be more than offset by benefits in the form of:

- reduced 'search costs' for consumers, as they will be able to continue to rely on a plumber's registration or licence as evidence of competency. The department has estimated that the Regulations will reduce search costs by \$63 million (net present value) over their 10-year life
- reduced defects or poor quality plumbing work, reducing the incidence of damage to property, financial loss, or harm to people (injury or death). These benefits are difficult to quantify, and informed judgment by the department has been used to conclude that the benefits are likely to outweigh the costs. This conclusion relies on break-even analysis; that is the amount of defective work (work that leads to property damage, financial costs of rectification, and/or injury or death to people) that needs to be prevented by the proposed Regulations in order to justify the costs. The department has relied on advice from VBA to conclude that, in the absence of Regulations, the amount of defective work would be substantially higher than it is now, which it considers is more than enough to break even.

This RIS finds that continuation of the current general arrangements is superior to options that only include part of the current arrangements, as the department believes that all current elements play an important part to reducing the risks associated with plumbing work.

The department considered increasing the threshold of the value of plumbing work for which a Compliance Certificate is required from the current \$750, but decided to maintain it at its current level as the department considers this provides a suitable balance between low risk and higher risk plumbing work. This still represents a cost saving to consumers, as in the absence of the Regulations, Compliance Certificates would be needed for all work over \$500. As the VBA does not collect data on all work less than \$750, the amount of the savings has not been quantified with a reasonable level of confidence. However, the department believes an indicative order of magnitude of the savings to consumers is between \$10 million and \$50 million over the life of the Regulations.

The department also proposes to continue the regulations that allow minor tap repairs to be done without the need for a registered or licensed plumber. The Act already allows an owner-occupier to repair their own taps, however the Regulations extend this to all people for minor tap repairs. The proposed Regulations also continue to allow the change-over of a water efficient shower head to be done without the need for a registered or licensed plumber, from only 3-star shower heads to 3-star or above. As this relates to plumbing work that is already unregulated, the amount of the savings has not been quantified with a reasonable level of confidence. However, the department believes an indicative order of magnitude of the savings to consumers is between \$10 million and \$50 million over the life of the Regulations.

The more significant changes to the existing arrangements proposed in the new Regulations are:

- **Setting a new minimum experience requirement before a plumber may become licensed.** Currently a person need only be eligible for registration to be able to apply to be licensed, with no requirement to gain experience as a registered plumber before seeking a licence. Under the proposed changes, plumbers would need to be registered for at least one year before becoming licensed, except for fire protection, gasfitting, refrigerated air-conditioning and water supply classes which would require two years' experience due to the higher risks in these classes. This change is expected to add to costs to the plumbing sector by less than \$1 million per year, but would be offset, in the department's view, by a significant reduction in plumbing defects and faults that would offset the costs.

- **Changes to the classes of plumbing work to which registration and licences relate.** These changes to work classes are set out in Table 1 below—refer to Part B of this RIS for explanations of why these changes are proposed, and what other options were also considered.

Table 1: Proposed changes to classes of plumbing work

Change to work classes	Impacts
A new specialised class for work on thermostatic mixing valves (TMVs)—see page 110.	This change is aimed primarily at sites that have mandated regular inspections and maintenance of TMVs, such as schools, hospitals and aged care facilities. The additional cost is estimated to be \$1,667 per practitioner entering this new class, but the number of plumbers in this class is unknown. The department considers that the cost per practitioner (which is a once-off cost for each plumber) is justified based on the significant risk to vulnerable people if the TMVs are not properly maintained.
Establishing type B gasfitting as a main class (separate from gasfitting work)—see page 75.	The department estimates that the change will save up to \$300,000 per year in aggregate in avoided training and experience costs for type B gasfitters who no longer need to meet all the requirements of the current gasfitting main class. However, the actual impact will depend on how many plumbers choose to work only in the new class; some may continue to be registered in both classes, meaning there would be no change for those plumbers. It is considered that the quality of work under the new class will not be impacted, as relevant competencies for type B work would still be required to be demonstrated.
Establishing refrigerated air-conditioning work as a main class (separate from mechanical services)—see page 83.	The department estimates that the change will save up to \$100,000 per year in aggregate in avoided training and experience costs for refrigerated air-conditioning practitioners who no longer need to meet all the requirements of the current mechanical services main class. It is considered that the quality of work under the new class will not be impacted, as relevant competencies for refrigerated air-conditioning would still be required to be demonstrated.
Establishing a new ‘basic systems’ class for less complex refrigerated air conditioning systems—see page 88.	This new class of work for the installation of ‘basic’ refrigerated systems (e.g., split systems) seeks to formalise arrangements where historically the VBA provided restricted registration or licensing for this work to meet demand. This approach provides transparency for industry, which may lead to a higher interest in this class of work.

- Changes to work standards in some areas, being:
 - **Requiring a backflow prevention device for taps adjacent to water closet pans.** Currently, when a customer wishes to install a tap adjacent to a toilet, appropriate backflow prevention measures may be required depending on the use of the tap. If a tap is installed near a toilet for the purposes of cleaning the floor of a bathroom, no backflow prevention device is required. Should the use of this tap change in future (e.g., a flexible hose be installed), this scenario poses a significant backflow risk to the household. The new

requirement will require that a plumber install a high hazard protection measure when a tap is installed near a toilet. This aims to reduce the risk of backflow cross connection to fresh water supply, which poses significant risks to the health of consumers. Since the additional cost of a backflow device can be around \$400 per installation, the new requirement may cause the placement of taps to be further away from water closet pans, so as to not require a backflow device. As such, the department expects the level of costs will be moderate to low in practice, with the cost per device being more than offset by the reduced risk of adverse health outcomes (which the department considers to be high).

- **Changing the requirements for sanitary drains under buildings.** Currently, a below-ground sanitary drain cannot service more than one dwelling. This requirement is difficult to meet in some situations (e.g., sub-dividing an existing block to build a second building). In such situations, a plumber may apply to the VBA for a modification, which allows the VBA to approve works that cannot meet the standard, but allows the VBA to set other conditions to mitigate risks. However, the department understands that there are instances of works being undertaken inconsistent with the standard, and without any approved modification overseen by the VBA. The time and cost of applying for modifications is likely to be a factor in this non-compliance. This means risks may not be being adequately mitigated. It is proposed to make a change to the Regulations to allow sanitary drains to service more than one dwelling in certain circumstances and if done according to specific conditions, removing the need for separate applications for modifications, and encouraging greater compliance. This is expected to result in an aggregate cost saving of around \$116,000 per annum, as well as better quality work.
- **New efficiency requirements for replacement hot water heaters.** This new requirement would require any hot water heating appliances being replaced in all Class 1 homes to meet minimum performance standards in relation to carbon emissions. The requirement would essentially prohibit the installation of electric storage water heaters and gas water heaters rated at less than 5 Stars. The proposed change is estimated to cost \$177 million over ten years (NPV) in additional costs of hot water heaters. The department has estimated the benefits of this proposal to be cumulative energy savings of 6,417TJ by 2028, and a cumulative greenhouse gas emissions savings of 1.6Mt CO₂-e by 2028, which it has valued at \$443 million over ten years. This gives an estimated overall net benefit of \$266 million over ten years. A sensitivity analysis conducted by changing a number of assumptions found that the benefit cost ratio remains positive, even with the value of carbon emissions set to zero, withdrawal of the Small-scale Technology Certificates which would increase the cost of heat pump and solar water heaters, and a 25 per cent increase in the cost of heat pump systems. For individual households, the average additional upfront cost is \$304, with expected average energy savings of \$681¹ over the life of the regulation. For households without access to reticulated gas, their most likely response will be to replace an electric storage water heater with a heat pump water heater which has a payback period of less than two years. Under the proposed standard, all households will be better off on average due to reduced energy bills—except those who choose to replace electric storage with an LPG storage heater. Whilst households will be able to install a minimum 5-star-rated LPG storage water heater under the standard, the department is of the view that this is an unlikely outcome (as consumers and plumbing practitioners are generally aware of LPG’s higher running costs, particularly in rural and regional areas). The department recognises that it will be important to ensure the introduction of the hot water standard is supported by good communications to consumers and plumbing practitioners to support informed choices

¹ Domestic hot water research and cost benefit analysis for Plumbing Regulations 2008 Regulatory Impact Statement—work commissioned by the department, available on request.

that maximise the benefits to households, and to understand the benefits in terms of reduced costs over the lifetime of the system.

There is also a range of other minor changes included in the proposed Regulations. The department does not expect these changes to have any material cost impact. These are detailed in relation to individual work classes discussed in Part B of this RIS.

Overall, the aggregate cost impact of the proposed Regulations is as follows:

Table 2: Summary of costs of the proposed Regulations

Element of Regulations	TOTAL COST over 10 years (NPV)
Quantified costs	
Continuation of current arrangements	\$286.2 million
New experience requirements for licensing	+\$11.2 million
Changes to work classes	-\$0.2 million
Changes to below ground sanitary drains	-\$0.8 million
New efficiency requirements for hot water heaters	+\$177 million
Total (of quantified items)	\$473.4 million
Unquantified costs	
Continuation of minor work exemptions (tap repairs and shower heads)	<i>Significant savings to consumers. Possibly within a range between \$10 million and \$50 million, but subject to a number of unknowns that make an estimate highly uncertain.</i>
Continue threshold for Compliance Certificates at \$750	<i>Significant savings to consumers. Possibly within a range between \$10 million and \$50 million, but subject to a number of unknowns that make an estimate highly uncertain.</i>
Backflow prevention for taps adjacent to toilets	<i>Small cost impact</i>

In addition to the above changes, the department considered alternative options that it decided not to adopt because it did not consider the costs of these outweighed the benefits. In addition, further options for change raised by stakeholders have also been considered:

- An option for setting a fixed minimum time (4 years) before an apprentice is eligible for registration was considered. This change would be inconsistent with the agreed national approach to apprentice training and is considered out of scope for these Regulations. In any case, this change would lead to additional costs (the opportunity cost of waiting to become registered) with no clear additional benefit (apprenticeships are competency-based completions, so delaying the time for becoming registered is unlikely to increase the level of competency expected for registration).
- An option to remove the less complex aspects of routine servicing from the scope of work for the fire protection class, or establish a new class specific to routine servicing. While there may have been some cost savings with these changes, the department did not have data on the consequential impact on risks to life and safety from changing training requirements for practitioners undertaking this work, which the department considered fundamental in relation

to this high-risk area. As such, this change has not been adopted. The department has nominated to explicitly amend the scope of work associated with fire protection to include 'routine servicing' to ensure the scope of work is consistent with the relevant Australian Standard, which the department expects will have no or minimal impact in practice. Given inconsistencies across the Plumbing Regulations and Building Regulations and approaches taken in other jurisdictions, the department will monitor and seek to obtain further data and evidence from other jurisdictions, as well as seeking submissions through this RIS to inform a potential forward work program for an appropriate and robust regulatory framework for the treatment of essential safety measures across the building and plumbing systems.

- An option to set a new class, or new competency requirements, for recycled water. The department did not consider there was sufficient evidence to justify further regulatory requirements. This position takes account of prescribed training and standards required for plumbing work undertaken on a recycled water system, opportunities for better sharing of information between the VBA and water authorities, and planned changes to Compliance Certificates to draw attention to the need to complete cross-connection tests.
- Options were considered to remove metal roofing from the scope of roofing (stormwater) plumbing work, or otherwise introduce a new class of work specific to metal roofing work that would allow builders to become authorised to do metal roofing work without the need to meet all requirements of the roofing class of work. Based on information available, the department is not able to determine with sufficient confidence the impacts of this change. The department considers that there is an unquantified risk that any changes to metal roofing may lead to higher rates of non-compliance, noting that causes of current rates of non-compliance are currently inadequately understood. The department invites submissions from stakeholders to provide further data or evidence on the impacts of retaining the status quo arrangements or providing for a separate class of plumbing work for the installation of metal roofs. In particular, views are sought on whether building projects in regional areas experience delays because there is a shortage of licensed and registered plumbers in the class of roofing (stormwater) in regional areas.

What fees are set by the Regulations?

The regulatory framework for plumbing work and plumbers gives rise to a number of costs to government. These include costs of assessing and issuing licences and registrations, audits of plumbing work, investigations and complaints. These costs will amount to around \$19 million in 2017-18.

Government policy is that regulatory fees and user charges should be set on a full cost recovery basis.

The Act allows a number of fees to be set, for the purposes of allowing the VBA to recover costs related to its activities. The fees allowed under the Act are set out in the following table, together with the current fee amount and total revenue estimated for 2017-18.

Table 3: Fees included in the Regulations

<i>Fee</i>	<i>Current fee amount</i>	<i>Value of fee in 2017-18²</i>	<i>Total revenue expected in 2017-18</i>
Application fee for a licence, registration or endorsement	3.84 fee units	\$54.60	\$100,000
Licence fee	21.37 fee units	\$303.88	\$4.4 million
Fee for a temporary licence	5.29 fee units	\$75.22	
Registration fee	24.11 fee units	\$342.84	\$1.5 million
Fee for provisional registration	8.03 fee units	\$114.19	
Fee for a temporary registration	2.13 fee units	\$30.29	
Fee for an endorsement	2.13 fee units	\$30.29	Not used
Fee for a late renewal	5.29 fee units	\$75.22	\$90,000
Fee for duplicate licence or registration document	2.13 fee units	\$30.29	\$900
Fee for an application for a declaration modifying the Plumbing Regulations under section 221ZZO of the Act	8.03 fee units	\$114.19	\$60,000
Fee for a practical examination	11.71 fee units	\$166.52	\$216,000
Fee for a theory examination	4.27 fee units	\$60.72	
Fee for Compliance Certificates ³	2.43 fee units	\$34.55	\$12.4 million
Total			\$18.7 million

The individual fees listed above have not been reviewed for the purposes of remaking the Regulations. A comprehensive review of building fees is planned to be undertaken by 2020, and the department considers it is appropriate to reconsider plumbing fees thoroughly as part of this process, as this will ensure:

- the attribution of costs between building and plumbing activities (which make up the majority of costs) can be properly reviewed at the same time
- the costs of regulatory activities can be benchmarked to demonstrate whether they are efficient
- the overall approach to fees can be reviewed on a consistent basis across building and plumbing sectors. This would include a more detailed cost analysis to determine which fees should recover which costs, and also identify opportunities for fees to be more risk-based (such as different fees for different types of work). This will draw on improvements currently being made by the VBA of its data collection systems.

In this context, ahead of this review it is proposed to continue the current fee amounts (in terms of fee units) for the next two years. All fee amounts will automatically increase by 1.6 per cent from

² Most fees in Victoria are expressed in terms of fee units. This allows fees to automatically increase in line with an annual rate determined by the Treasurer. The annual rate of increase in fees is intended to reflect the increase in underlying costs due to inflation, while taking account of productivity improvements. The value of a fee unit in 2017-18 is \$14.22.

³ Under the Act, the VBA must not sell a Compliance Certificate form at a price greater than \$20, or any other amount specified by the regulations.

1 July 2018 in line with the value of a fee unit determined by the Treasurer,⁴ and increase again from 1 July 2019.

Who was consulted in developing the proposed Regulations?

In early 2017, the department ran a public consultation process seeking feedback from stakeholders and the community on the operation and effectiveness of the current Regulations. As part of this process, stakeholders and interested parties were invited to make submissions to identify what aspects of the regulations worked well and proposals for improvements or change.

Fifty-five submissions were received from practitioners, industry bodies, government agencies, water corporations and registered training organisations on a range of matters, including the scope of regulated plumbing work and registration and licensing requirements. Following this, the department consulted with key stakeholders throughout 2017 regarding feedback received through the early consultation process to better understand the issues raised. The department identified the need for additional targeted industry consultation on key areas of the regulations to properly inform a robust remake process. Targeted consultations occurred on fire protection, refrigerated air-conditioning and mechanical services, type B gasfitting work and recycled water.

Matters that were out-of-scope for the review included proposals that require amendment to the Act or Building Regulations, proposals that are not within the head of power covered by the Act and proposals that would require significant government policy change. Proposals that were assessed as falling out-of-scope for the review will be considered as part of the department's forward policy program, which is detailed in this RIS.

This RIS provides a further opportunity for stakeholders to provide feedback to the department on the proposed Regulations. Stakeholders may wish to comment generally on whether they support the proposed Regulations, or if (and how) they consider other approaches would provide a better outcome. In addition, there are a number of specific questions included throughout the RIS to encourage feedback on certain matters, which are set out below. Wherever possible, please explain the reasons for your view.

⁴ The value of a fee unit from 1 July 2018 is \$14.45.

Questions for stakeholders

Questions on approach to regulation of plumbing work

Is the current broad approach undertaken through the Plumbing Regulations—i.e., largely adopting the PCA and setting additional work standards where appropriate, prescribing qualifications and experience requirements for registration and licensing, including an exam, for new plumbers—an appropriate regulatory framework for addressing risks associated with plumbing work?

Aside from some changes noted above and assessed later in this RIS, is the current approach to setting the different classes of plumbing work appropriate to the effective and efficient administration of plumbing work?

In relation to the proposal to require 1 year of experience as a registered plumber before becoming a licensed plumber, and 2 years of experience for some higher risk classes: could there be any unintended consequences associated with introducing this new requirement? What would they be and why might they arise? Are there any health or safety risks that are not identified in the selection of the 'higher risk' classes of work? Should any additional classes of plumbing work be included as higher risk?

Is the requirement to issue a Compliance Certificate a significant burden for straightforward and low risk plumbing jobs? Are there any particular types of work above \$750 that should be excluded from the Compliance Certificate requirements?

Questions on particular classes and types of plumbing work

Drainage: *Will the proposed requirement provide additional compliance clarity to practitioners when they are required to service more than one building with the same sanitary drain or are there any unintended consequences from the proposal?*

Fire protection/routine servicing: *Are there other ways to ensure routine servicing work is performed to a high standard, with regulatory oversight, while also ensuring there is adequate supply of plumbers for this work? Can stakeholders provide evidence of actual harms that have been caused by unlicensed or unregistered work?*

Gasfitting: *Are the proposed changes for type B and type B advanced classes of work consistent with training pathways and industry best-practice? Are there unintended consequences from the proposed changes?*

Refrigerated air-conditioning: *Are the proposed changes for the refrigerated air conditioning and mechanical services class consistent with training pathways and industry best-practice or are there unintended consequences from the proposed changes? Is it reasonable to transition existing mechanical services practitioners into the new proposed class associated with refrigerated basic systems or are there any unintended consequences with this proposal?*

Roofing (metal roofs): *Is there data or evidence on the impacts of retaining the status quo arrangements or providing for a separate class of plumbing work for the installation of metal roofs? Do building projects in regional areas experience delays because there is a shortage of licensed and registered plumbers in the class of roofing (stormwater) in regional areas?*

Caravans and houseboats: *Is it reasonable to assume that existing requirements on caravan manufacturers placed on plumbing practitioners working on plumbing systems in caravans will provide additional compliance clarity for practitioners at no additional cost? Is it reasonable to assume that existing requirements for some houseboats extended to plumbing practitioners working on all vessels will provide additional compliance clarity at no additional cost?*

Recycled water: Will the proposed non-regulatory approach to addressing concerns about cross connection of recycled water be effective? Are there other steps that could be taken?

TMVs: Is the department's understanding of sufficient capacity in the training sector to service the expected demand for this training accurate? Is it appropriate to provide for 12 months for practitioners to undertake the relevant competency?

Backflow prevention: Does the proposed change to the installation of backflow prevention devices for taps adjacent to toilets provide sufficient clarity to plumbers? Are the changes reasonable, or would they add significantly to costs?

Questions on proposed efficiency standards for water heaters

Do you have any views on the proposed implementation date of 1 May 2019 for the hot water standard? Will this allow manufacturers and plumbing supply stores sufficient time to adjust, particularly around expected changes to demand for low emissions water heaters?

Will there be differences between metropolitan and regional areas in their ability to meet this demand and have stock available?

There are also further questions in relation to the policy areas that the department proposed to explore after the remaking of the Regulations. These are set out from page 139.

Purpose of this Regulatory Impact Statement

The *Building Act 1993* (“the Act”) provides the legislative basis for regulating plumbing work in Victoria. The Act and the Plumbing Regulations 2008 (“the current Regulations”) set out who may do plumbing work and the standards of work required to be met when doing it. While the Act sets out the basic framework for how plumbing work will be regulated, the Regulations set out the detail in relation to the requirements to become a registered or licensed plumber, and the specific standards for plumbing work.

In Victoria, Regulations—statutory rules made under the authority of an Act—automatically expire (“sunset”) after ten years. The current Regulations are due to sunset on 18 November 2018, and new Regulations are needed to replace them.

The sunset/remaking process provides an opportunity to revisit whether regulations are still required, and if so, whether there are ways to improve them. Before new Regulations are made, the *Subordinate Legislation Act 1994* (SLA) requires:



In early 2017, the department ran an early public consultation process where 55 submissions were received from practitioners, industry bodies, water corporations and registered training organisations on a range of matters, including the scope of regulated plumbing work and registration/licensing requirements. The department consulted further with key stakeholders throughout 2017 regarding feedback received through the early consultation process to better understand the operation and effectiveness of the current Regulations. The department has now prepared proposed new Plumbing Regulations 2018 (“the proposed Regulations”) for interested parties to review.

All submissions received in response to the proposed Regulations will be considered, following which a notice of decision and statement of reasons will be published. Once the Regulations are made, copies of all submissions are provided to the Victorian Parliament’s Scrutiny of Acts and Regulations Committee.

To assist parties to comment on proposed Regulations, the SLA requires a Regulatory Impact Statement (RIS) to accompany any proposed Regulations that impose a significant economic or social burden on a sector of the public. A RIS must:

- state the objectives of the proposed Regulations
- explain the effect of the proposed Regulations
- identify other practicable means of achieving those objectives, including other regulatory as well as non-regulatory options
- assess the costs and benefits of the proposed Regulations and of any other practicable means of achieving the same objectives
- state the reasons why the other means are not appropriate.

The Commissioner for Better Regulation undertakes an independent assessment of RISs, in accordance with the *Victorian Guide to Regulation*. The Commissioner has determined that this RIS meets the requirements of the SLA.

Structure of this document

To assist readers navigate this RIS, it has been structured in 3 parts:

PART A deals with the overall regulatory structure for plumbing practitioners and plumbing work, outlining the rationale for continuing with the current broad approach, an assessment of the costs and benefits of different approaches to regulating plumbing practitioners and plumbing work, and summarises elements of the Regulations and changes that will apply to all types of plumbing work.

PART B deals with each class of plumbing work individually, outlining the impacts of continuing the current arrangements and assessing a number of changes specific to each class of work.

PART C outlines matters related to implementation and evaluation of the proposed Regulations, and the forward work program to consider further changes to regulation of plumbing.

PART A:
**OVERALL APPROACH TO
REGULATING PLUMBING WORK**

A.1 Why is plumbing work regulated by government?

1.1. What is plumbing work?

Plumbing work is an important part of the service economy and provides consumers with services with many benefits, including:

- ensuring the integrity of drinking water
- heating a building using gas-powered or wood-fired equipment
- heating or cooling a building using refrigerant-based air-conditioning systems
- ensuring that suitable buildings utilise water reliably to mitigate against a fire event (e.g., sprinklers, etc.)
- facilitating the safe and convenient disposal of human waste.

In addition, effective plumbing work can also have a positive impact on the environment such as reducing energy costs in the home for heating hot water and improving water efficiency so homes use less water, or are able to use alternative water sources safely.

Plumbing work encompasses any work at a premises that deals with the system of pipes, tanks, fittings, and other apparatus required for the supply or removal of water, sanitation in a building. In Victoria, plumbing work has historically been categorised for regulation purposes as falling into any of the following categories:

- backflow prevention work
- drainage work
- fire protection work
- irrigation (non-agricultural) work
- mechanical services work
- refrigerated air-conditioning work
- roofing (stormwater) work (including metal roofs)
- sanitary work
- gasfitting work
- water supply work.

1.2. Why does the government regulate plumbing work?

To be done competently and safely, plumbing work needs a degree of technical skill. If done incorrectly, plumbing work can have serious consequences, such as damage to property, risk to human health, or accidental death.

Risks to human health and life

There are a number of types of plumbing work that have significant risks to public health and safety. If these risks are not mitigated against, in the most catastrophic of cases, it may result in death by:

- risks to human health (illness)—plumbers undertaking work on piping that delivers fresh water, sewage, etc., if undertaken incorrectly, may lead to individuals or communities contracting diseases such as diarrhoea, gastroenteritis, legionella or salmonella

- accidental death—plumbers undertaking work on gasfitting or refrigerated air-conditioning systems are typically handling combustible and toxic substances. If these systems are handled or installed incorrectly, in the worst situations, these can cause death of the practitioner (e.g., explosion) or customers (e.g., explosion or asphyxiation due to a leak of the noxious substance)
- serious injury or death due to defective plumbing work—fire protection plumbing work is critical to ensuring buildings have appropriately installed and operating systems to ensure water can be reliably used in the event of a fire (e.g., sprinklers). If fire protection plumbing work is defective, these systems may fail to deliver water when needed and in the most catastrophic of examples, this may cause to serious injuries and even significant loss of life. In addition, water supply plumbing work involves the installation and maintenance of hot water systems in households, as well as sensitive settings such as hospitals and nursing homes. If this work is defective, the delivery of water temperatures may be inappropriate, which could cause scalding, serious burns or even death.

Damage to private property

There are a number of ways that defective plumbing can contribute to damage to private property, both to consumers and to third parties in more serious cases, including:

- damage to consumers' private property—given the nature of plumbing work, the most serious examples of defective plumbing work causing damage to consumer's private property is likely to be in the context of the home (e.g., residential context). For example, defective roof plumbing work in some of the worst cases could lead to the ingress of water into the building structure, potentially causing costly rectification work to fix the leak itself and any damage that the leak has caused
- damage to third parties—such as significant defective plumbing that results in a leak at one property that impacts neighbouring apartments would lead to third party costs.

Risks to the environment

For particular types of plumbing work, there may be risks to flora and fauna and the environment if installations and connections are defective or the infrastructure itself begins to deteriorate.

The risks to the environment are caused by burst pipes or poor connections to appropriate points of discharge, such as:

- stormwater run-off, if not connected to an appropriate point of discharge, can transport contaminated water, either from roofing materials or other contaminants from the urban environment, such as nitrogen and phosphorus pollutants from fertilizers, pet and yard waste into nearby streams and rivers
- pipes bursting in sewage systems can lead to contamination or sewerage discharge directly into the environment, and could potentially seep into the ground water.

This contamination can have an adverse impact on flora and fauna and kill plants and animals that live in the water.

See Appendix B for further discussion about the specific types of risks associated with each types of plumbing work. These risks of harm associated with the different types of plumbing work are summarised in the following table.

Table 4: Summary of risks from unregulated plumbing work

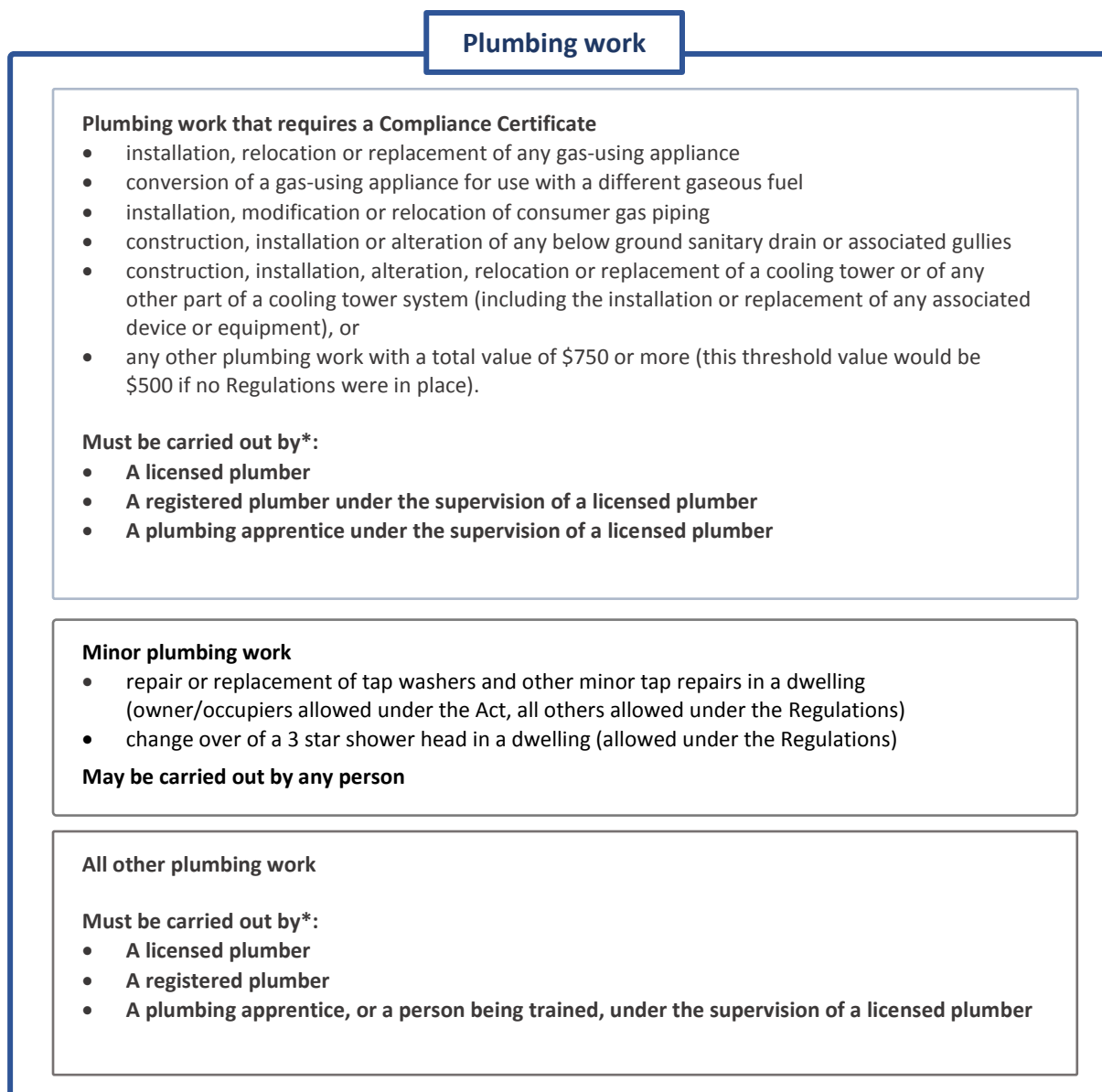
Type of plumbing work	Risks
Irrigation	Irrigation (non-agricultural) work, although generally a low risk activity has the potential for health impacts particularly where properties have both drinking and alternative water supplies. Risk of water leakage that may damage properties, or cause a safety hazard (slips), or financial loss (wasted water, damage to appliances).
Stormwater	Roofing (stormwater) work is also a high failure rate activity with substantial property damage from defective roofing installations a common occurrence. Risk of water leakage that may damage properties, or cause a safety hazard (slips), or financial loss (wasted water, damage to appliances).
Water supply	Water supply plumbing work particularly have water supply contamination risks associated with work which could lead to serious health and safety risks. Water supply has risks of scalding and burns, which represent risks to health and safety. Also risks of leakage, with additional particular consequences on health due to possible exposure to unclean water and risk on contamination. Water supply work is a lower risk activity in residential domestic properties but a leak in a multi-story building has a potential for significant and expensive property damage.
Drainage	Risk of water leakage that may damage properties, or cause a safety hazard (slips), or financial loss (wasted water, damage to appliances). Drainage work can be broken down into separate areas of work being below-ground sanitary drainage, and below-ground stormwater drainage which has less risk but has potential for property damage from flooding.
Sanitary	Risk of water leakage and contamination. Sanitary work is a lower risk activity when carried out in residential domestic properties but large development work or commercial sites have a much higher risk for non-compliance.
Backflow prevention	Backflow prevention work involves the work to ensure that water supply is not contaminated from various contaminants (toilet water, etc.), representing a significant risk to health and safety.
Fire protection	Fire protection work is a high-risk activity with a potential for loss of life if not carried out by appropriately trained practitioners who certify and take responsibility for their work. If not done correctly, properties may not be properly protected from fire; or faulty fire protection systems may unnecessarily cause water damage to properties.
Gasfitting	A high-risk activity that has potential for loss of life through gas leaks or inappropriately maintained gas appliances. Gas leaks may cause harm to people through exposure (inhalation) or may lead to fires (risk to people and property).
Refrigerated air-conditioning	A high-risk activity that has potential for loss of life by bringing together a combination of gas, electricity and water or through gas leaks or inappropriately maintained appliances.
Other mechanical services	Mechanical services work is medium risk and defective installations can result in high cost repairs, where rectification work is necessary and a common high failure rate activity. Bringing together work that involves management of water or gas with electrical appliances causes a risk of fires, electrocution, or explosions.

Because of these risks of harm, the *Building Act 1993* (“the Act”) prohibits any plumbing work be undertaken unless it is authorised under the Act. The Act requires that all plumbing work must be done in accordance with standards of workmanship and performance, by a plumber who is either registered or licensed to conduct that work.

The Act requires that activities defined by the regulations as regulated plumbing work can only be undertaken by a registered or licensed plumber, with the aim of ensuring that it is carried out safely and competently.

Without Regulations, the parts of the Act that regulate plumbing work would not operate at all, as the term ‘plumbing work’ would not be defined. For the purposes of assessing design options in this RIS, it is assumed that defining plumbing work in the regulations is of a machinery nature: this allows the analysis to focus on the impacts of the specific requirements imposed by the regulations. The specific definitions of each type of plumbing work has, however, been reviewed and minor changes are discussed later in this RIS.

Figure 1: How plumbing work is regulated under the Building Act



** work must correspond to the class of work (or specialised class) for which the plumber is licensed or registered.*

The Act provides that a person must not carry out any plumbing work (other than some minor plumbing work) unless he or she is licensed or registered by the Victorian Building Authority (VBA) to carry out that class or type of work.⁵

Licensed plumbers

Plumbers that can do any type of plumbing work (within their licensed class of plumbing work), and the only plumbers who can issue a Compliance Certificate

Registered plumbers

Plumbers that can do plumbing work (within their registered class) where a Compliance Certificate is not required, or work under the supervision of a licensed plumber where a Compliance Certificate is required

Licensed plumbers are expected to have a higher level of knowledge and competency than registered plumbers, and are also required under the Act to hold professional insurance. However, the Act anticipates that the specific requirements to be eligible for registration or licensing will be spelt out in regulations.

In the absence of remaking the Plumbing Regulations, or taking any other new action, the regulation of plumbing would rely only on the provisions and powers in the Building Act. The Act only sets out some of the overall regulatory framework for plumbing. Without regulations made under the Act, there would be regulatory gaps in the intended management of plumbing risks.

Under the base case (the future situation if the current Regulations are allowed to sunset without making any replacement Regulations), there would be no set standards for plumbing work, and no eligibility criteria for who can be registered or licensed to do plumbing work. But it is not the case that plumbing would become totally unregulated—people doing plumbing work would still need to be registered or licensed, and there would be powers under the Act which the VBA could take if plumbing work was found to be done not in a good and workmanlike manner.

Table 5 on the following page sets out the situation if there were no Regulations in place.

As seen from the table, the Act only does part of the job of regulating plumbing work. If there were no regulations, the Act would compel consumers (households and businesses) to use registered or licensed plumbers for most plumbing work, but there would be no eligibility criteria for deciding who may become a plumber, and there would be no specification of standard or quality or work required.

This presents a risk to a consumer forced to engage a third party to do plumbing work at their property.

Without mandating clear standards for plumbing work, such as the Plumbing Code of Australia (PCA), it would be difficult to assess whether plumbing work meets any minimum standards.

⁵ The Act also makes provision for apprentice plumbers and persons being trained to undertake work.

Table 5: The Base Case

What is in the Building Act?	What would happen if there were no Regulations?
<p>To be able to be registered to carry out a particular class of plumbing work, a person must either—</p> <p>(a) have the relevant qualifications and experience required by the regulations; or</p> <p>(b) satisfy the Authority that he or she has knowledge and competence at least equal to that of a person who has the qualifications and experience required by the regulations would have.</p>	<p>There would be no prescribed eligibility requirements for registration. This means the VBA would have to register anyone⁶ who applies using the relevant form and pays the appropriate fee. The VBA would not have the ability to set any minimum eligibility requirements in the absence of regulations.</p>
<p>To be able to be licensed to carry out a particular class of plumbing work, a person must—</p> <p>(a) be eligible to be registered as a plumber with respect to that class of plumbing work; and</p> <p>(b) either—</p> <p>(i) have the relevant qualifications and experience required by the regulations; or</p> <p>(ii) satisfy the Authority that he or she has knowledge and competence at least equal to that of a person who has the qualifications and experience required by the regulations would have; and</p> <p>(c) be covered by the required insurance.</p>	<p>There would be no prescribed eligibility requirements for licensed plumbers, other than insurance requirements. As with registration, this means the VBA would have to register anyone (other than some limited exceptions) who applies using the relevant form and pays the appropriate fee. The VBA would not have the ability to set any minimum eligibility requirements in the absence of regulations.</p>
<p>Plumbing work must comply with the Act and regulations.</p>	<p>There would be no specific work standards or requirements that apply to plumbing work.</p> <p>Insurance requirements may act as discipline for licensed plumbers, and the Act already prohibits a licensed plumber from allowing another person to undertake work on their behalf that is defective in workmanship.</p> <p>The VBA could suspend or cancel a licence if the plumber has carried out plumbing work otherwise than in a good and workmanlike manner, or directed or permitted the carrying out of plumbing work otherwise than in a good and workmanlike manner, or used materials that he or she knew, or reasonably ought to have known, were defective.</p> <p>Consumer law would also apply where work is not carried out in accordance with the contract for services, although it would be difficult to demonstrate what standard of work is implied in a contract.</p>

⁶ The VBA may refuse registration under the Act in limited circumstances, including prior convictions, insolvency, or previous cancellation of registration.

As its essence, the Plumbing Regulations address the following problem:

If consumers must use professional plumbers, how can they have confidence that the plumber is of a satisfactory quality to meet their needs, including safety and protection of their property?

Despite commercial imperatives that would drive incentives for good performance, the department considers that relying on such incentives and industry self-regulation alone does not provide clear and uniform guidance on the specific qualifications, skills, competencies and experience that are appropriate for plumbing practitioners.

In addition, consumers (both residential and commercial) lack a reliable low cost means of ensuring that the practitioners they engage have met minimum requirements for competency and skill without some reliable signal. This reflects a broader information asymmetry between consumers and industry that substantially weakens the consumers ability to avoid unscrupulous practitioners and thus provide an effective commercial incentive to reward competent and honest practitioners.

In this context, the 'consumer' may be the community as a whole, where plumbing work relates to public facilities that may present risks to public health or amenity.

It is rare for consumers to know everything about the quality of a product or service prior to purchase. Consumers may lack the expertise or information to effectively judge the quality or worth of a good or service and if they have imperfect information or if one party to a transaction has more information than the other, then consumers' decisions may be sub-optimal compared to the situation if all information was known.

In economics, this is known as *information asymmetry* and can result in an inefficient allocation of resources, and for individual consumers, the purchase of poor or deficient services.

A helpful way to consider these issues is to categorise services as:

- *search services*—those services for which consumers can assess the quality and service characteristics before purchasing
- *experience services*—those services which must be purchased before quality can be evaluated
- *credence services*—those services for which the consumer is obliged to take the quality of the service on trust since they may not possess the expertise to determine whether the service has been properly supplied.

For most consumers, plumbing services are either an experience service or a credence service. That is, in some circumstances it is necessary for the plumber to complete the work before the quality the service can be assessed—but by then the service must be paid for—and in other circumstances consumers need to take on trust that the work has been completed to appropriate standards. More specifically:

- consumers may find it difficult to assess the attributes of plumbing work due to the technical nature of plumbing services and because plumbing is often hidden underground, under the floor or within wall cavities
- many consumers are not necessarily frequent buyers of plumbing services and so they may lack the experience and knowledge to make an informed decision. While data is not available to identify the number of plumbing jobs that are repeat business versus one-off jobs, it is assumed that few customers have repeat business with plumbers for the same type of job

- it may take a long time for problems to become apparent as the nature of plumbing services means that some problems do not manifest for many years
- some users of plumbing services have a limited capacity to assess the quality of the plumbing services they use.

In light of these risks, without setting any particular eligibility requirements or work standards for plumbers, consumers would need to:

- spend more time (and money) to find out about prospective plumbers, likely with a higher level of residual risk, even after making searches and inquiries, or
- where not satisfied with an outcome (e.g., performance, defects or property damage), pursue lengthy legal proceedings, where it may be difficult to establish what standard of work was expected, rather than allow the VBA to determine if the work complies with a prescribed standard. (To the extent they provide certainty in the quality of work expected, the Regulations/standards reduce the likelihood and/or length of any legal proceedings.)

This approach also relies on waiting for something to go wrong before any action is taken (e.g., complaint made about poor workmanship) rather than seeking to prevent incorrect plumbing work.

1.3. The extent of the problem

The extent of the problem is not known. Plumbing work has been regulated in Victoria for over 100 years, and as such there is no data available that points to the level of risk faced by consumers in the absence of regulations. However, the potential for harms to arise is significant.

Under the current regulatory arrangements, there are over 300,000 separate plumbing jobs done each year. This is based on the number of Compliance Certificates submitted to the VBA, which typically are only required for work over \$750 or other specified types of work (such as most gasfitting work and work on cooling towers); there is likely a large number of plumbing jobs that are undertaken that do not require a Compliance Certificate.

Data is not collected on the value of plumbing work undertaken each year, but based on information provided in Compliance Certificates (which indicate value ranges) and noting that not all plumbing work requires a Compliance Certificate, the value of plumbing work each year is estimated to exceed \$1.5 billion.

Of the plumbing jobs that do require a Compliance Certificate, the types of plumbing work are shown below:

Table 6: Proportion of Compliance Certificates by plumbing class

Work type	Proportion of number of certificates
Gasfitting	20.2%
Cold water plumbing	15.3%
Hot water plumbing	13.6%
Drainage	12.0%
Roof plumbing	11.1%
Sanitary plumbing	8.4%
Mechanical services	6.7%
Refrigerated air-conditioning	4.8%
Solar installation	4.0%
Grey water	1.0%
Fire protection	0.5%
Septic tank installs	0.4%
Backflow prevention	0.1%
Irrigation	0.1%

Note: a Compliance Certificate may cover work in more than one class

Note: while a Compliance Certificate is generally triggered by the value of work exceeding \$750, nearly all gasfitting work (of any value) requires a Compliance Certificate, so the proportion of work attributed to gasfitting is likely overstated compared to other work types.

Compliance Certificates are one of the bases on which plumbing work is audited (along with investigation of complaints and other compliance monitoring). On average since 2010, around 5 per cent of these plumbing jobs have been audited. The following table sets out the outcomes of those audits.

Table 7: Audit compliance by plumbing class

Classes of plumbing work	Audits per class	Cases where non-compliant work was detected	% of work found non-compliant
Backflow prevention work	307	21	7%
Drainage work	42810	3015	7%
Fire protection work	1614	24	1%
Gasfitting work	48578	4973	10%
Irrigation (non-agricultural) work	185	7	4%
Mechanical services work	12845	952	7%
Refrigerated air-conditioning work	10310	1297	13%
Roofing (stormwater) work	33586	2825	8%
Sanitary work	21457	789	4%
Water supply work	93619	5459	6%

It is not clear from these results whether the failure rate reflects areas of poor levels of competency, or inherent risks in the types of plumbing work.

The following table shows the most common reasons for a finding of non-compliance.

Table 8: Most common breach descriptions—all work classes, between 2010 and 2017

No.	Reasons for non-compliance
2399	Incorrect clearances (nearly all in gasfitting)
1885	Inappropriate water delivery temperature (in hot water class)
1196	Work not conducted in good and workmanlike manner (all classes)
1167	Incorrect drain termination (air conditioning)
1087	Inadequate overflow provision (roofing)
1039	Inappropriate heat retention (hot water and solar)
863	Incorrect termination (sanitary, hot water)
689	Undersized drainage systems (roofing)
670	Incorrect minimum industry standards (gasfitting)
642	Unsatisfactory installation (drainage below ground sewer)
638	Incorrect provision for sewerage surcharge (drainage below ground sewer)
635	Unacceptable appliance fluing (gasfitting)
622	Incorrect size (roofing)
599	Defective pressure test (drainage below ground sewer)
584	Unapproved appliance (gasfitting)
546	Defective flashings (roofing)
485	Inadequate support (air conditioning)
478	Cross connection (rainwater tank, cold water plumbing)
476	Incorrect fixings (roofing)

Since 2010, there have also been over 7,500 investigations conducted, mostly arising from complaints. In the majority of these (6,525, or 86 per cent), non-compliance was not proven or no further action was required, but the number of complaints suggests that even under the existing regulatory framework, consumers remain concerned about non-compliance but not in a position to determine non-compliance themselves.⁷

The department considers it to be reasonable to assume that in the absence of the current Regulations, the prevalence of defective plumbing work would be higher overall, although the extent to which this would be the case, particularly in relation to specific categories of plumbing work, is unclear.

Defective plumbing work can lead to various costs. Small defects (e.g., minor non-compliance with standards) can be easily rectified by incurring a small amount of additional work. Other defects not detected at the time of work may lead to significant property damage (e.g., water leakage into a building structure), health impacts (e.g., incorrect separation of potable and non-potable water), or death (e.g., gas explosions or fires).

Data is limited on most of these impacts, particularly smaller defects. The Victorian Managed Insurance Authority (VMIA) has provided indicative data on the cost of repairing defects for which

⁷ Access to information on the internet has improved somewhat the ability for an ordinary consumer to be better informed about plumbing work, however it is unlikely that a consumer would be able to easily identify correct and incorrect information, ascertain (and understand) how standards apply to specific situations, or whether work is performed in accordance with those standards.

an insurance claim was made. These cover some, but not all, different types of work done by plumbers, as shown in the table below.

Table 9: Cost of remedying defects

Defect category	Number of claims 2010-2017	Average amount to repair defect
Plumbing	574	\$5,587
Drainage	180	\$8,474
Air-conditioning and heating system	102	\$4,329
Leaking roof (metal roof)	67	\$6,516

Insurance claims handled by VMIA are only a small subset of actual defective work. The cost of other defects may be smaller (e.g., requirements to re-do work found to be non-compliant by an audit) through to much more significant (e.g., adverse health outcomes due to cross-contamination or incorrect temperature settings, or severe property damage or deaths due to a gas explosion). However, for a generalised cost⁸ of defective work, the weighted average of the defects in the above table (being \$6,080) is a reasonable estimate.

Noting that the areas of work covered by the current Regulations have been in place for some time, it is also important to consider whether the risks of harm posed by each type of plumbing work remains the same. For nearly all work classes this is true: management of water remains a clear risk to property as a source of damage or safety risk. However, in some areas, the risk of harm is likely to have increased since the Regulations were last made; this is due to trends such as:

- increased use of larger air conditioning systems
- innovation in appliances that require greater technical skills to install and repair, such as temperature-controlled water mixing devices (this has only limited use to date, but the department expects use of such devices to increase over the next ten years).

1.4. Mutual recognition

For plumbers, the Regulations also support the ongoing efficacy of the mutual recognition arrangements with other states. The Mutual Recognition Act requires a plumber authorised to undertake plumbing work in another state or territory to also be authorised to undertake the same work in Victoria. Reciprocal arrangements exist in all jurisdictions. This has necessitated all states and territories to work closely in setting the same or similar, although not identical, requirements and standards. Without Regulations that set work standards and eligibility criteria for becoming a plumber, other states may not regard Victorian plumbers as competent to carry out plumbing work in those states, unwinding the intended benefits of the mutual recognition arrangements.

⁸ As most plumbers are able to do work across multiple classes of plumbing work, and data on compliance outcomes is aggregated over all types of work involved in a single plumbing job, the benefits of the high-level approach to regulating plumbing work cannot be attributed to specific work classes. However, some options in the next chapter that deal with specific work types will be assessed using more targeted estimates of benefits.

1.5. Review of the current Regulations

In early 2017, the department ran a public consultation process seeking feedback from stakeholders and the community on the operation and effectiveness of the current Regulations. As part of this process, stakeholders and interested parties were invited to make submissions to identify what aspects of the regulations worked well and to make proposals for improvements or change.

Fifty-five submissions were received from practitioners, industry bodies, government agencies, water corporations and registered training organisations on a range of matters, including the scope of regulated plumbing work and registration and licensing requirements. Following this, the department consulted with key stakeholders throughout 2017 regarding feedback received through the early consultation process to better understand the issues raised. The department identified the need for additional targeted industry consultation on key areas of the regulations to properly inform a robust remake process. Targeted consultations occurred on fire protection, refrigerated air-conditioning and mechanical services, type B gasfitting work and recycled water.

Matters that the department deemed to be out-of-scope for the review included:

- proposals that require amendment to the Act
- proposals that require amendment to the Building Regulations
- proposals that are not within head of power covered by the Act
- proposals that would require significant government policy change.

Proposals that were assessed as falling out-of-scope for the review but that warrant further consideration can inform the department's forward policy program which is detailed later in this RIS.

None of the issues raised by stakeholders were inconsistent with continuing the existing fundamental broad approach to regulation.

The department has also consulted closely with the VBA on identifying areas where the enforcement or application of the Regulations can be improved.

1.6. Cost recovery of regulatory activities

The above discussion in this section outlined possible harms associated with plumbing work that justify some form of government intervention.

The regulatory framework for plumbing work and plumbers gives rise to a number of costs to government. These include costs of assessing and issuing licences and registrations, audits of plumbing work, investigations and complaints.

This subsection outlines the costs to government of the current regulatory framework and the principles for determining who should pay for these costs. The specific details on the amounts recovered (i.e., through setting fees) is discussed in Part A of this RIS—page 49.

Cost recovery is defined as the recuperation of the efficient costs of government provided or funded products, services or activities that, at least in part, provide private benefits to individuals, entities or groups, or reflect the costs their actions impose. Cost recovery is a method of recovering all or some of the cost of particular activities undertaken by government agencies from individuals or businesses, based on the beneficiary pays⁹ or impactor pays¹⁰ principle. The concept 'user pays' is used to capture both situations.

⁹ Those who benefit from the provision of a particular good or service should pay for it. In the context of regulated practitioners, the practitioner is a beneficiary because the licensing activities of the regulatory allow them to carry on a business.

¹⁰ This is where impactors meet the full costs of their actions, based on the view that those who create the need for a service or regulatory activity should incur these costs.

As stated in the *Victorian Guide to Regulation*, general government policy is that regulatory fees and user charges should be set on a full cost recovery basis because it ensures that both efficiency and equity objectives are met. Full cost represents the value of all the resources used or consumed in the provision of an output or activity.

Full cost recovery is consistent with achieving the efficiency and equity objectives because:

- full cost recovery promotes the efficient allocation of resources by sending the appropriate price signals about the value of all the resources being used in the provision of government goods, services and/or regulatory activity
- from a horizontal equity point of view, full cost recovery ensures that those that have benefited from government-provided goods and services, or those that give rise to the need for government regulation, pay the associated cost. Those parties that do not benefit or take part in a regulated activity do not have to bear the costs.

The VBA is a self-funded statutory authority. Government has determined that all of VBA's costs should be met through its own sources of revenue, rather than from the state budget. Fees are the major source of revenue available to the VBA.

1.6.1. Cost of regulating plumbing

Estimating the efficient cost base first requires an identification of all relevant operating costs, capital costs and proportion of overhead costs to be recovered.

There are two general methods for determining which types of costs should be included in the cost base: fully distributed costs and incremental costs. As the majority of VBA expenses relate to performing regulatory activities, a fully distributed costs method is appropriate.

Fully distributed costs

This costing method is the most comprehensive approach and involves allocating all costs (i.e., direct, indirect and capital costs) to the various activities of a government agency.

Direct costs are those that can be directly attributed to an activity e.g., all relevant labour costs, such as wage costs including on-costs and overheads. Indirect costs are not incurred exclusively for the activity being regulated and include corporate services, information technology and shared enforcement and compliance costs. Capital costs include depreciation and the opportunity cost of capital.

The pro-rata method is a top-down approach which allocates indirect costs on a proportionate basis, according to a formula designed to reflect the activities' contribution to these costs.

The most common approach is to allocate indirect costs proportionately across all activities where costs are being recovered.

VBA has estimated the costs associated with regulating plumbing in Victoria. There are two components of costs that are measurable:

- cost of activities that can be directly related specifically to regulating plumbing
- costs of other activities of the VBA for which only a portion should be attributable to regulating plumbing.

The costs that relate specifically to plumbing are shown below.

Table 10: Cost items that are specifically for regulating plumbing

Cost item	Cost in 2017-18
Audits	\$ 2.9 million
Investigations	\$ 2.2 million
Licensing and Registration	\$ 2.8 million
Technical and Regulation ¹¹	\$ 1.0 million
<i>Subtotal specific costs</i>	\$ 8.9 million

These are mostly the costs of staff involved in each of these activities.

The other costs of VBA, which relate to both plumbing and building amount to \$29.6 million in 2017-18. This includes costs such as rent, IT systems, legal services, communications, complaints unit, consumer information, corporate services, and other staff whose activities relate to both building and plumbing sectors. The VBA estimates that around 30 per cent of these costs should be attributed to plumbing activities, based on the number of practitioners and volume of compliance activities. In other words, a further \$10.2 million in VBA costs are attributable to the regulating of plumbing, giving a total cost of around \$19.1 million in 2017-18.

Currently, the revenue collected from plumbing fees is sufficient to meet these costs at the aggregate level.

¹¹ Technical and Regulation expenses relate to staffing the Plumbing Technical Advice phone line; contributing to the development of Codes and Standards; representing the VBA on Codes and Standards committees; providing technical and regulatory advice to external stakeholders and other VBA staff performing functions including audits, investigations and prosecutions; processing application for modifications.

A.2 Objective of regulating plumbing work

2.1. Objectives of the Act

The *Building Act 1993* (“the Act”) provides the legislative framework for the regulation of plumbing and building standards in Victoria. The overall objectives of the Act, some of which relate specifically to plumbing, are:

- a. to protect the safety and health of people who use buildings and places of public entertainment
- b. to enhance the amenity of buildings
- c. to promote plumbing practices which protect the safety and health of people and the integrity of water supply and waste water systems
- d. to facilitate the adoption and efficient application of:
 - i. national building standards
 - ii. national plumbing standards
- e. to facilitate the cost-effective construction and maintenance of buildings and plumbing systems
- f. to facilitate the construction of environmentally and energy efficient buildings
- g. to aid the achievement of an efficient and competitive building and plumbing industry.

The objective of Part 12A of the Act, which specifically relates to the regulation of the plumbing in Victoria, is to regulate plumbing work with the aim of ensuring that it is carried out safely and competently.

2.2. Objectives of the proposed government action

Based on the discussion of the inherent risks of harm associated with plumbing work, the primary objectives of the actions considered in this RIS are to:

- provide the necessary elements required by the Act to provide an appropriate regulatory framework for plumbing that prevents, to the extent possible, property damage, injury to people, or financial loss
- improve the information available to consumers about the competence of plumbers
- set fees to recover the costs to government of regulating plumbing work.

Secondary objectives to be taken into account are to:

- ensure regulation of plumbing and use of plumbers by consumers is efficient
- give effect to Victoria’s commitments under the mutual recognition agreements.

A.3 Options on overall approach to regulating plumbing work and practitioners

3.1. Base case

In the absence of regulations, most people would not seek to become registered or licensed as a plumber to undertake plumbing work at their own property, but would continue to use practitioners that held themselves out to be competent plumbers. In the absence of eligibility criteria, market forces (e.g., reputation), common law (e.g., negligence for defective work resulting in loss), and VBA interventions, would provide a basis for plumbers to undertake some form of training and experience in order to be commercially successful.

In the base case, there would be an effective ‘negative licensing’ system, whereby there would be few eligibility criteria in place for who could be registered or licensed as a plumber, but the VBA would subsequently be able to suspend or cancel a registration or licence if that plumber is found to do poor work.

Plumbers would also seek to perform work at a reasonably high standard in order to continue a viable plumbing business. As plumbers have been undertaking work consistent with (and having been trained according to) the standards set in the Plumbing Code of Australia (PCA) and those additional standards prescribed in the regulations, it is expected that, at least in the short term, this would continue to be a benchmark for most plumbing work undertaken should there be no Regulations from late 2018. There may be some drift away from the PCA standards over time.

3.2. Options for regulating plumbing work and practitioners

Historically, the objectives (see chapter A.2—page 18) have been met in the Regulations by:

- adopting the PCA as the core statement of plumbing work standards
- supplementing the PCA with other standards in particular areas
- requiring that registered/licensed plumbers have completed minimum levels of formal training, experience and an assessment of competency
- specifying the circumstances (i.e., monetary threshold) where plumbing work must be done or overseen by a licensed plumber
- specifying types of plumbing work where a professional plumber is not required.

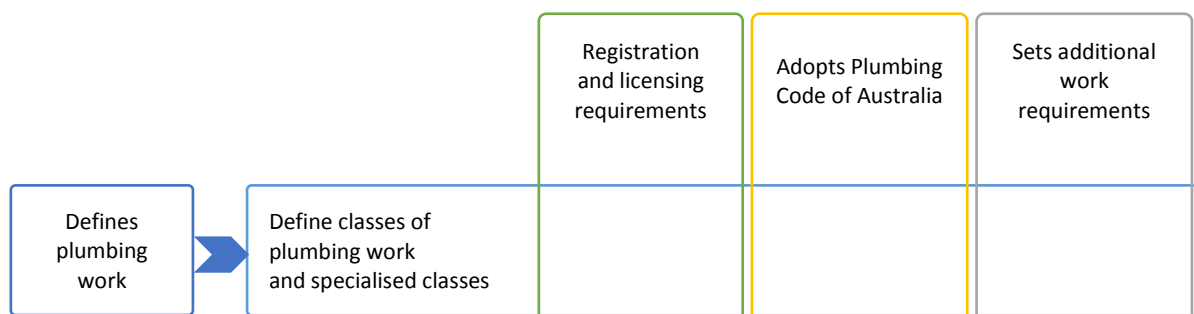
Detail on the current requirements for each of these elements is set out at Appendix A.

Setting standards for plumbing work seeks to ensure that there is a reduced risk to property and people. Clear standards of work also support an efficient and effective compliance system. Setting competency requirements for who may do plumbing work improves the information available to consumers about the competence of plumbers, as holding a registration or licence is a signal to consumers that the VBA has assessed the plumber’s ability to perform adequate quality work.

As noted in chapter A.1, some form of regulations is necessary to give effect to the Act; the Act anticipates that certain requirements will be set in regulations, and there is limited scope to adopt non-regulatory approaches to address potential issues associated with plumbing work. Moreover, the department considers a non-regulatory approach, such as an education campaign, would generally, on its own, have little effect on the problem (beyond what would already be necessary in the base case). Such approaches may, however, be appropriate where risks and potential harms are low, or to complement regulatory measures.

In broad terms, the current approach to addressing the objectives has the following elements:

Figure 2: Elements of current Plumbing Regulations



These elements are used in all other states and territories, as shown below:

Table 11: Regulatory arrangements in Australian states and territories

State	Classes of plumbing work	Registration/licensing requirements	Adoption of PCA	Other work requirements
Victoria	Sets different categories of work	Generally Cert III, and either completion of apprenticeship or 4 years experience + VBA exam	Yes	Yes
NSW	Sets different categories of work	Generally Cert III, and either completion of apprenticeship or 4 years experience	Yes	No
Queensland	Has general licences but some restricted classes	Generally Cert III and apprenticeship + 1 year (or equivalent)	Yes	No
Western Australia	Has different levels of licence and a small number of restricted classes	Cert III + 'fit and proper person' test	Yes	No
South Australia	Sets different categories of work	Generally Cert III + different experience requirements	Yes	No
Tasmania	Sets different categories of work based on risk levels	Generally Cert III + different experience requirements + ongoing CPD requirements	Yes	No
ACT	Sets different categories of work	Cert III or Cert IV for some classes	Yes	No
Northern Territory	General licence categories	Cert III	Yes	No

Some differences between Victoria and other states reflect:

- some types of work regarded as plumbing work in Victoria are treated as other types of building work in other jurisdictions. This explains some of the additional work classes in Victoria that fall within the Plumbing Regulations (e.g., mechanical services), the scope of work covered by the regulations (e.g., metal roofing), and the additional work standards sets out in the current Regulations (as they apply to scopes of work that fall outside the PCA). All these types of work are regulated to similar extents in other states, but not necessarily within the plumbing regulatory framework
- a small number of states have lower qualification requirements. This is despite agreement between states on the content of National Training Packages to align apprenticeship courses. The current Victorian approach is consistent with the National Training Packages
- some types of plumbing work are not common in other states. For example, installation and servicing of solid fuel heaters is more relevant to Victoria (and Tasmania) due to the different climate conditions making such heaters significantly more prevalent and a greater source of risk
- while some states appear to have simpler licensing structures, there is a trade-off between tailoring categories to the specific areas of work and requiring plumbers to be competent across all types of plumbing work. This is explored below.

Overall, it does not appear that other states have more or less onerous regulatory requirements than Victoria, in terms of the basic structure and form.

3.2.1. Options on regulatory approach

The substantive content of the Regulations are the setting of standards of plumbing work and eligibility requirements for becoming a plumber.

Appendix A sets out a description of the current elements. The options assessed in this RIS are the various combinations of each of the core elements, as shown in the table below:

Table 12: Options for regulating plumbing work and practitioners

Option	How to regulate plumbing work		Entry requirements for practitioners		
	PCA	Other work standards	Formal training requirement	Experience requirements	VBA exam
Base case	x	x	x	x	x
1	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	x
3	✓	✓	x	x	✓
4	✓	x	✓	✓	✓

These options recognise that some other jurisdictions do not have separate work standards (outside of the PCA), or do not have all of Victoria's current competency requirements. The inclusion of each of these will be tested by examining the costs and benefits of the above options. The options that include the additional work standards in Victoria (currently listed in Schedule 2 to the Regulations) relate to prescribing standards for types of work that are not within the scope of the PCA. The costs and benefits of continuing these additional standards is specifically considered in chapter A.4 of this RIS, while the rationale for continuing to set these additional standards outside the PCA is discussed in Part B for each work class where these standards apply.

All of the above options include the adoption of the PCA into the formal requirements of plumbing work in Victoria. This is considered a common requirement of any regulatory approach as:

- All states have agreed to adopt the PCA as the core standard for plumbing work in each jurisdiction. A consistent approach to adopting the PCA supports the mutual recognition arrangements. In agreeing to recognise the ability of a plumber licensed in one state to be approved to undertake work in another state critically relies on the expectation that the plumber has a working knowledge of the standards of work expected in that other state. In the absence of a consistent standard, the basis for (and benefits to the economy of) mutual recognition become weakened. At the extreme, there is a risk that if Victoria no longer requires its plumbers to work according to the PCA, other states may no longer recognise their status as licensed plumbers.
- The costs and benefits of the PCA overall are not examined in this RIS. The adoption of the PCA in Victoria is part of national uniform legislation scheme (for which all states have agreed to adopt through legislation). Further, the costs and benefits of the PCA's performance requirements are assessed in accordance with clause 6.5 of the Intergovernmental Agreement, which require a national regulatory impact statement conducted in accordance with the Council of Australian Governments (COAG) Principles of Best Practice Regulation. These periodic reviews of the PCA involve participation by all state and territory governments and are open to public consultation, and consider the impacts on each jurisdiction (including the impacts of state-specific variations included within the PCA). Because these reviews are staged over time, focusing on different parts of the PCA, and as such there is no aggregated quantification of the costs and benefits of the PCA.

Victoria is theoretically free to discontinue adoption of the PCA if such reviews suggest the PCA or any changes made to it no longer offers net benefit to Victoria. The next major review of the PCA is scheduled for 2019,¹² as such it is appropriate to continue the adoption of the PCA in the Plumbing Regulations, and then use the 2019 review process to reconfirm the impacts for Victoria.

3.2.2. Other high level regulatory options not considered feasible

An alternative to adoption of the PCA is for plumbers to follow an industry based-code of practice. A suitable industry body (or bodies) would be responsible for establishing the code, and accrediting plumbers according to that code. Under this option, accreditation or membership of the code-setting body would be the relevant signal to consumers of the plumber's competency.

The department does not consider this a suitable solution, unless the industry code is as good as the PCA (which is developed through a rigorous process involving all stakeholders), and could be used as a basis for disciplinary action against plumbers.

In addition, even with an industry-based code of practice, plumbers would still need to be registered or licensed by the VBA given the framework established in the Act, causing confusion for consumers if industry-based accreditation was also expected.

¹² For further information on the planned review, see: <https://www.abcb.gov.au/Resources/Publications/Education-Training/The-Key-Dates-for-NCC-2019>

3.3. Options to increase minimum experience as a registered plumber before becoming licensed

Plumbing work involves inherent risks to property as well as to health and safety for both plumbers and the broader community. An objective of the regulatory framework is to ensure that the plumbing industry is sufficiently skilled and qualified to undertake the work to the required standard. The department considers there is a need to improve the quality of plumbing work being approved by licensed plumbers.

For relevant classes of plumbing work, the current Regulations require plumbers to complete an apprenticeship and Certificate III qualifications or otherwise have a minimum of 2 or 4 years of experience (depending on the class of plumbing), before they are eligible for registration. This aims to ensure that plumbing practitioners are sufficiently skilled and qualified to carry out plumbing work safely and to a high standard. The department notes that for plumbers already registered or licensed in one class of plumbing work, the regulations provide a pathway where a minimum of one year of experience is required to become registered or licensed in any additional plumbing class.

After becoming a registered plumber, there are currently no experience requirements for a person to be eligible for licensing in any main class of plumbing beyond those included in the eligibility requirements for registration in that class.

Licensed plumbers have a significantly higher level of responsibility than registered plumbers, including responsibility for issuing Compliance Certificates stating that plumbing work meets regulatory standards. Registered plumbers are required to be supervised by a licensed plumber for work requiring a Compliance Certificate while licensed plumbers are responsible for the quality of work once they have issued the Compliance Certificate.

To become licensed, the additional requirements applicants must satisfy are the holding of insurance and the passing of the VBA exam for licensing, which reflects additional competencies required for licensing.

The effect of this is that a person may obtain a licence soon after completing an apprenticeship (factoring in the need to complete additional competencies for licensing), and therefore take on more responsibility and a wider ambit of work, without having to demonstrate a minimum amount of relevant industry experience working first as a registered plumber for an appropriate period of time.

This is addressed in Queensland by the requirement for plumbers to gain an additional year of experience as a provisional plumber after completing their apprenticeship before being eligible to become an occupational plumber (most closely corresponding with a registered plumber in Victoria). This additional year of experience means that plumbers spend time practising and consolidating the skills gained during their apprenticeship prior to taking on the added responsibility of becoming an occupational plumber.

Already, most plumbers work as a registered plumber for a significant period before applying for a licence, with an average of 1.52 years. However, this reflects a wide distribution of some plumbers who have more than ten years' experience before becoming licensed through to a small number (around 5-10 per cent) that become licensed without any experience as a registered plumber.

Data on rectification notices and faults in relation to licensed plumbers recorded by VBA suggests that:

- 3.9 per cent of notices/faults were attributable to plumbers licensed less than 1 year
- 7.6 per cent of notices/faults were attributable to plumbers licensed less than 2 years.

While this appears a small proportion, it overly represents the expected proportion of plumbers within that group (around 2.5-3 per cent per year of experience).

While the requirement to hold insurance can act as a safeguard against non-compliant or defective work, it is nevertheless ex-post in nature. This means that this requirement can help to reduce the negative consequences of non-compliant work when they have already occurred, but does not directly prevent the poor work occurring (although, if insurance either would not be provided or be expensive for a plumber with a poor record to obtain, this might provide an incentive to perform work to an appropriate standard).

A minimum experience requirement for licencing in the main classes of plumbing may improve practitioner skill and knowledge prior to becoming licensed and, as a result, reduce non-compliant rates of plumbing work in the future.

3.3.1. Options for setting an experience requirement for licensed plumbers

The department proposes implementing a mandatory experience requirement before plumbing practitioners are eligible for licensing to improve the skill and knowledge of plumbers prior to becoming licensed. The intent is to provide an interval of supervised industry practice prior to a practitioner being granted authorisation to certify the compliance of work. Other licence requirements would continue, including the applicant holding the prescribed licence competencies and successfully completing the VBA examination of competencies for that class. Applicants from overseas or from jurisdictions where the work is not regulated would need to demonstrate experience equivalent to the minimum registration experience period, in addition to satisfying the license competency requirements.

This proposal ensures that applicants hold, as a minimum, general experience working in the plumbing industry before taking on additional responsibilities, so that applicants are sufficiently skilled and knowledgeable in undertaking responsibilities as a licensed plumber, including the issuing of Compliance Certificates.

This approach recognises that some skills for a trade can only be gained through practical experience over time. The department acknowledges that the cohort of plumbers impacted the most by this approach are practitioners seeking to become licensed to advance their career as soon as possible. However, the department considers that for a trade such as plumbing, additional theoretical knowledge (e.g., competencies for the licensing level) must be complemented with appropriate practical experience for practitioners to be fully effective and ready to take on the higher level of responsibility associated with licensing.

The department acknowledges that this approach differs from the competency-based model which is used for apprenticeships (discussed further below), noting that the nature of an apprenticeship requires a period of practical experience.

There are two questions to consider regarding how this proposal could be implemented:

- How many years of experience should be mandated prior to applying for a licence?
- Should all classes of work be treated equally or should some classes have a higher experience requirement than others?

The following options are considered in this RIS:

Option 1: a minimum experience requirement of 1 year for licensing in all main classes of plumbing.

Option 2: a minimum experience requirement of 2 years for licensing in all main classes of plumbing.

Option 3: a minimum experience requirement of 1 year for licensing in some classes and 2 years in other higher risk classes of plumbing.

The new experience requirement need only be set for the main classes, as plumbers seeking to be licensed in the specialised classes will need to be licensed in the main class first, thereby already satisfying the experience requirement.

Options 1 and 2 use a uniform approach to requiring minimum experience equally on all classes of plumbing work. This is a straightforward approach which assumes that all classes of work have the same risk profile and would benefit equally from standard practical experience requirements.

A 1-year requirement would ‘ease in’ this new requirement without placing a significant burden on any class, as evidence shows that most plumbers already gain this experience prior to applying for a licence. This is because following completion of their apprenticeships, it appears that it usually takes a plumber more than one year to gain the knowledge for, sit and pass the exams required for licensing in that class. This proposal would therefore only affect the small number of plumbers who seek to be licensed with no or little experience as a registered plumber. There are around 5 per cent of applicants not already registered, and around 5 per cent with less than one year’s experience.

A 2-year requirement creates a higher burden than option 1, as it will affect more licensed plumbers.

Option 3 creates an experience requirement of one year for some classes, but an additional year of experience (2 years total) required for classes that the department considers pose a higher risk to the community and/or plumbers who are carrying out the work.

As there is a lack of robust data on the frequency and severity of poor plumbing work broken down by class, the department has taken a qualitative approach to determining which classes of plumbing work should be considered high-risk. This approach considers inherent risks known to be associated with certain classes of plumbing work, the complexity of each scope of work, and anecdotal and quantitative evidence where appropriate.

Classes of plumbing work are deemed to be high risk if the department considered that there is a reasonable chance that poor work could result in significant harm to individuals, the community or property. This is represented in the table below by ‘inherent risk’, with each class rated either low, medium or high. Classes rated as a high inherent risk are automatically considered to be high-risk.

Likewise, classes which are considered to have a low inherent risk are automatically excluded from the high-risk category. For classes which are rated as having a medium inherent risk, the department also considered available evidence on the proportion of rectification notices and faults that are attributable to licensed plumbers with less than 1 or 2 years of experience. This data on experience was also considered against classes considered to be of inherently high or low risk to ensure there were no major discrepancies.

Table 13: Risk matrix for licensing

Classes in Plumbing Regulations	Inherent risk	Evidence of experience link*	Overall risk level (high or not high)
Drainage work	Low	Medium	Not high
Fire protection work	High	NA	High
Gasfitting work	High	Medium	High
Type B gasfitting work**	Medium	Medium	Not high
Irrigation (non-agricultural) work	Low	NA	Not high
Mechanical services work	Medium	Medium	Not high
Refrigerated air-conditioning work**	High	High	High
Roofing (stormwater) work	Low	Low	Not high
Sanitary work	Low	Medium	Not high
Water supply work	High	High	High

* over-representation of plumbers with less than 1 or 2 years of experience in rectification notices.

** classes of plumbing work that are currently specialised classes but will become main classes of plumbing work following proposed changes to the Plumbing Regulations 2018.

Therefore, under Option 3, licensing in the classes of fire protection, gasfitting, refrigerated air-conditioning and water supply would require 2 years prior experience as a registered plumber, whereas other classes would require only 1 year of experience.

Table 14: Classes of plumbing work assessment of high-risk

High risk class	Reason for selection as high risk
Fire protection work	While this class of work is not as complex as some other classes of work, the life safety aspect attached to this scope of work is paramount. Fire protection system reliability provides direct and increased life safety outcomes related to fires within the built environment. Sub-standard workmanship in this class can reduce the reliability of systems contributing to the risk of serious injury or death should a fire occur. The department considers this risk to be severe enough that it is reasonable to require plumbers licensed in this class to have additional experience despite the lack of evidence on the frequency of sub-standard work occurring.
Gasfitting work	Sub-standard gasfitting work may result in serious health and safety impacts including poisoning/asphyxiation, and fires and explosions leading to injury or death to plumbers or residents and damage to property. Gasfitting work therefore requires critical knowledge and skills to ensure the safe installation of gas appliances. Due to the heat, flammability and toxicity associated with gas use or leaks it is a high risk and requires skilled and regulated workforce. Additionally, a high proportion of breaches noted on rectification notices for plumbing work from 2010 to 2017 related to incorrect clearances and unacceptable appliance fluing (8 per cent and 2 per cent of all rectification notices respectively), which contribute to the risk of fire and carbon monoxide poisoning.
Refrigerated air-conditioning work	Incorrect handling of refrigerant gases as part of refrigerated air-conditioning equipment may result in serious health and safety impacts, including explosions leading to injury or death to plumbers or residents and damage to property. Refrigerated air-conditioning work therefore requires critical knowledge and skills to ensure the safe handling and installation of refrigerated air-conditioning equipment.
Water supply work	Sub-standard work in the class of water supply affects the integrity of the supply of water to and from buildings. Plumbers need critical knowledge and skills to protect the integrity of the water supply and the health and safety of the building occupants. Risks to health and safety include contamination with potentially dangerous bacteria or minerals of the water supply or materials are used or if they are connected to water sources that are inappropriate (i.e., recycled water). Incorrectly fitted water supply, which can lead to burns, is a relatively common issue; inappropriate water delivery temperature (over 50°C) was identified as a breach recorded on 4 per cent of all rectification notices issued between 2010 and 2017. The department considers this to be a high-risk class of work, particularly as these risks have the potential to affect the water supply of a large number of people (e.g., in heavily-populated buildings).

Table 15: Class of plumbing work and assessment of medium to low risk

Medium to low risk class	Reasons for selection as medium to low risk
Refrigerated air-conditioning (basic systems) work Drainage work Irrigation (non-agricultural) work	While there are risks associated with sub-standard plumbing work for these classes (as there is for all plumbing work) these classes all have a limited scope of work, and the work itself is less complex in comparison with the other classes of work. This means that it takes less time for practitioners of these classes to gain experience in the full scope of work. This rationale is applied in the regulatory requirements for registration, where these classes have a lower experience requirement for registration (2 years rather than 4 years).
Mechanical services work	In general, the nature of non-compliant mechanical services work does not pose significant health and safety risks for consumers nor the plumbers carrying out the work. Work involving supply of medical gases is particularly high risk but there is only a very small percentage of the mechanical services practitioner population that work in this space. In addition, there are other safeguards outside of the Regulations which address residual risks in this area.
Sanitary work	Sanitary work does not pose a significant risk of contamination to the water supply.
Roofing (stormwater) work	The risks in roofing (stormwater) work generally relate to property damage (as opposed to the health and safety of plumbers and residents).
Type B gasfitting work	There is less increase in responsibilities when moving from registration to licensing in this class.

Questions for stakeholders

Are there any health or safety risks that have not been identified in the selection of the 'higher risk' classes of work? Should any additional classes of plumbing work be included as high-risk? Should some of those included above not be included? Please provide reasons for your answers.

Could there be any unintended consequences associated with introducing this new requirement? What would they be and why might they arise?

3.4. Minimum experience period for apprentices

Feedback from stakeholders during the review of the current Regulations argued for requiring all apprentices to have at least 4 years' experience before becoming registered, even where they complete their apprenticeship before that period.

All apprenticeships in Australia now operate using a competency-based completion model. Competency based completion is a training approach that places emphasis on what a person can do in the workplace as a result of completing a program of training. Progression through a competency-based training program is determined by the student demonstrating that they have met the competency standards through the training program and related work, not by time spent in training.¹³

All states and territories have made a commitment to implement competency-based models for all apprenticeships, as agreed to at the Council of Australian Governments (COAG) in 2006. Competency-based completion has been implemented since 2008, and has applied to all apprentices since 2011. Moving away from this commitment to a 4-year minimum model would be inconsistent with COAG agreements. The department considers a change to a COAG agreement represents a significant government policy change and is therefore out-of-scope for the remake of regulations.

However, given the significant number of submissions from stakeholders on this change, the department considered it appropriate to consider the impact of the proposal further.

Stakeholders argument for the proposed 4-year minimum period for the apprentice is that the current model is not effective at producing apprentices of a high quality, whereas requiring all apprentices to train for at least 4 years would result in improved outcomes.

This change would only affect a proportion of apprentices (around 20 per cent¹⁴), and in general would only delay becoming a registered plumber by up to six months in practice.

This would add to the costs of the Regulations by around \$600,000 per year, or \$5.9 million over ten years.

Moreover, while the cost would be relatively small, the department is not satisfied that it will of itself directly result in corresponding benefits. Apprenticeships are completed when an apprentice has demonstrated the required competencies, which may take some apprentices more or less than 4 years to obtain. While the department acknowledges that there is genuine concern regarding the quality of training outcomes provided to some individuals participating in apprenticeships, the department considers that addressing this issue through improvements in the training system is preferable to creating new barriers to registration that may not directly target the underlying problem.

While consideration of a change to the competency-based model is out of scope for the remake project, the department's position is that retaining the current competency-based completion model for plumbing is appropriate.

¹³ <http://www.education.vic.gov.au/training/providers/rto/Pages/competency.aspx>

¹⁴ Based on VBA data on length of apprenticeships.

3.5. Options for defining the classes of plumbing work

The setting of work classes varies somewhat between the jurisdictions, although all states and territories limit the types of work a plumber may do through the use of classes. In Victoria, the current Regulations specify eight classes of work as set out in the following table. However, within three of these classes, there are sub-classes of specialised plumbing work; the specialised classes prescribe additional competencies required for practitioners to carry out those classes of work.

Table 16: Current classes of plumbing work

Classes of plumbing work	Classes of specialised plumbing work
Drainage	-
Fire protection	-
Gasfitting	Type A appliance conversion Type A appliance servicing Type B gasfitting Type B advanced gasfitting
Irrigation (non-agriculture)	-
Mechanical services	Refrigerated air conditioning
Roofing (stormwater)	-
Sanitary	-
Water supply	Backflow prevention

There are also provisions under the Act that allow the VBA to issue restricted registration or licences, for types of work that fall within a class of plumbing work as defined in the regulations.

The setting of work standards has been done by defining different types of plumbing work classes that attempt to balance the ability to target work requirements and standards to particular types of plumbing work (and make it easy for plumbers who want to specialise in only some types of work), while avoiding the need to obtain a large number of different licences for plumbers doing a wider range of work.

Table 17 on the next page sets out the current (as at 30 April 2018) numbers of plumbers registered or licensed in each class of plumbing work.

Of the total 26,800 total plumbers:

- 14,000 are registered plumbers only, 5,000 are licensed only, and over 7,500 plumbers hold both a licence in at least one class and are registered in other classes
- there are 21,700 plumbers registered, with only around 1,600 registered in only one work class
- there are 12,700 plumbers licensed, with around 1,100 licensed in only one work class
- a registered plumber is registered in around 4 classes (on average); a licensed plumber is licensed in 5 classes (on average). (Note: this includes specialised classes where registration in the main class is a pre-requisite.)

Table 17: Number of registered and licensed plumbers by plumbing class¹⁵

Plumbing class	Registered plumbers	Licensed plumbers
Drainage work	11,904	8,667
Fire protection work	582	118
Gasfitting work	12,273	8,602
Irrigation (non-agricultural) work	11,906	9,479
Mechanical services work	13,376	2,581
Roofing (stormwater) work	12,729	8,147
Sanitary work	12,375	8,633
Water supply work	11,861	9,450
Backflow prevention work	602	1,518
Refrigerated air-conditioning work	824	1150
Type A appliance conversion work	172	588
Type A appliance servicing work	6,804	6,262
Type B gasfitting work	311	325
Type B gasfitting advanced work	40	128

Note: plumbers may be registered/licensed in more than one class.

The department considers that the current specification of work classes is broadly appropriate to balance the administration of registration and licensing, and the need to set different competency requirements for different types of work. As a general principle, the department believes:

- using fewer class categories with broader definitions (at the extreme, no separate classes, just all plumbing work) would have some small savings by having fewer separate VBA exams to be registered or licensed in each category (although a single exam would need to be considerably longer), but higher costs as plumbers would need to demonstrate competency across a larger range of plumbing work. This would not affect many plumbers, but would be a significantly higher burden for those only seeking to perform certain types of work
- conversely, using more classes with narrower definitions would potentially reduce barriers for some plumbers by reducing the scope of competency required to become registered or licensed, but would mean that plumbers who wish to work across multiple work classes (which is most plumbers) would need to undertake more separate exams.

These trade-offs are not that significant, as in practice VBA already has power (under the Act) to use restricted registration/licences, which will continue to be used for plumbers that do not meet the competency requirements to carry out the full range of activities captured under a particular class. In principle, registration and licensing according to a clear and defined set of criteria set out in the Regulations is preferred to reliance on use of restricted licences, which should only be used on an exceptions basis. Hence, the department prefers a relatively comprehensive suite of classes and specialised classes to be included in the Regulations, with restricted licences only used in limited, or exceptional circumstances.

¹⁵ These figures exclude around 30,000 registered and 15,000 licensed in restricted registrations/licences. A large amount of the current restricted licences relate to transitions from previous licence categories, and do not reflect the frequency that new restricted licences are issued.

VBA also considers the current classes broadly suitable for managing the recognition of interstate plumbers who seek to be registered or licensed under Victoria’s mutual recognition arrangements.

The current work classes and specialised classes align with what the department considers the material differences in the competencies required to address the types of risks present in each type of work.

Table 18: Work classes by levels of risk

Work classes	Levels of competency needed to manage risk
Drainage and Irrigation	Generally low risk, competency requirements are lower than other types of plumbing, however sufficiently different types of work to warrant separate classes.
Fire protection Gasfitting Mechanical services Roofing (stormwater) Sanitary Water supply	Similar level of moderate risk, but the sources of risk are considerably different and therefore require different skill sets.
Type A appliance conversion Type A appliance servicing Type B gasfitting Type B advanced gasfitting Refrigerated air conditioning Backflow prevention	Considerably higher source of risk, and each type of work is highly specialised.

Reflecting stakeholder feedback as part of the sunset review, a number of potential changes to the work classes have been considered in this RIS. These are:

- a new main class for routine servicing (fire protection equipment)
- a new main class for work on thermostatic mixing valves
- a new specialised class for recycled water
- establishing type B gasfitting as a main class (separate from gasfitting)
- a new class of plumbing work for metal roofing
- establishing refrigerated air-conditioning work as a main class (separate from mechanical services), and a new ‘basic systems’ class for less complex refrigerated air conditioning systems.

The costs and benefits of these potential changes to the classes of work are discussed in Part B of this RIS.

Question for stakeholders

Aside from some changes noted above and assessed later in this RIS, is the current approach to setting the different classes of plumbing work appropriate to the effective and efficient administration of plumbing work? Please explain the reasons for your view.

3.6. Setting the threshold for Compliance Certificates

The Act requires a Compliance Certificate for all plumbing work over \$500 (and some plumbing work under \$500 in certain categories). The current Regulations raise this threshold to \$750.

Compliance Certificates are a form of self-certification used to ensure a licensed plumber has checked the adequacy of plumbing work in compliance with the standards, and as a source of input to the regulator to inform audit and compliance activities.

The threshold for Compliance Certificates creates an exemption from these requirements for plumbing work below the threshold (although some types of plumbing work continue to require a Compliance Certificate regardless of the value of work). This reflects that some plumbing work is considered to be very low risk, and therefore requires less regulatory oversight, and the desire to minimise compliance burdens on small pieces of work.

3.6.1. Options for the threshold

The department has considered options for setting the threshold:

- not specifying a threshold in the Regulations (i.e., the base case), in which case the threshold would revert to \$500 as stated in the Act
- continue the threshold at \$750 as is currently the case
- increase the threshold to a higher level, such as \$1000 or \$1500.

It is also possible for the threshold to vary over time, such as by automatically linking it changes in the Consumer Price Index, or some other rate of increase. Noting that the cost of plumbing work usually increases over time (both labour and materials costs), an increasing threshold would ensure that work does not over time become subject to the Compliance Certificate requirements where there has been no change in the underlying risks.

However, a threshold that changes over time may add to regulatory burden by plumbers having to regularly determine what the threshold is. This might increase non-compliance. The department considers that plumbers would prefer a single known threshold to provide regularity and certainty, and as such considers the preferred approach is to set a fixed threshold for the life of the Regulations, with the sunset of Regulations every ten years a suitable point to review the threshold. It is also noted that, while the Act requires the setting of a monetary threshold, there is not a precise link between value and risk so, even if the additional cost of a changing threshold over time is relatively low, it seems sufficient to review the threshold every ten years as part of the sunset process (especially in times of low inflation).

The department also gave consideration to having different thresholds for different types of plumbing work, but considered this was not feasible or consistent with the intent of the Act. The Act specifies the particular types of plumbing work for which a certificate is always required, and sets only a single monetary threshold for all other types of plumbing work. Further, plumbing work covered by a single Compliance Certificate may involve multiple types of work for the same job, which would make differential thresholds impractical, or add to the administrative burden by forcing multiple Compliance Certificates for a single job. Therefore, a single threshold amount is preferred.

Threshold of \$500

A threshold of \$500 is in fact the base case, as it is the threshold that would apply if none were set in the Regulations. However, compared to the current arrangements, reverting to this threshold would increase the regulatory burden by requiring many more plumbing jobs to issue a Compliance Certificate. The increases in costs are:

- administrative cost of completing a Compliance Certificate and submitting it to the VBA
- fees associated with the Compliance Certificate
- the requirement for the Compliance Certificate to be issued by a licensed plumber, and therefore plumbers that are only registered would no longer be able to do these minor plumbing works without a licensed plumber.

It is not possible to measure the total impact of this change, as there are no data collected on the number of plumbing jobs between \$500 and \$750. The previous RIS on the 2008 Regulations assumed (based on a small survey) that 35 per cent of plumbing work was between \$500 and \$750, however given increases in costs of labour and material, that proportion is likely to be much lower today.

However, the additional costs per plumbing job are likely to be significant, relative to the value of work being undertaken. Indeed, the requirement for a licensed plumber to oversee and check the work may of itself push the cost of the work above \$750 in some cases.

Threshold of \$750

This is the current situation, although it represents a reduction in the compliance burden compared to the default threshold of \$500 stated in the Act, which would apply if there were no threshold set in the Regulations.

As noted above, it is not possible to estimate the size of this cost saving, as data are no longer collected for all work below \$750. However, as the status quo, options to increase the threshold can be compared to this option.

Increase threshold to \$1000

Increasing the threshold for a Compliance Certificate to \$1000 would remove the administrative burden of completing and lodging certificates for up to 5,000 jobs per year.¹⁶

The savings would be a time saving for the plumber of completing and lodging the certificate (estimated at \$20 per certificate) and not paying the fee (currently \$33.50) to the VBA. The total annual administrative savings would therefore be around \$267,500.

This higher threshold would also remove the need for a licensed plumber to oversee the work in order to issue the certificate, and/or mean that registered plumbers could do the plumbing work at a lower cost rather than where licensed plumbers currently do the work themselves. This could have significant cost savings to consumers, given that licensed plumbers can charge on average 25 to 50 per cent more than a registered plumber. This differential in part reflects the current Compliance Certificate requirements; but increasing the threshold may result in registered plumbers being able to charge more. Therefore, the cost savings to consumers are difficult to determine.

3.6.2. Preferred option

While the costs imposed by the need to have Compliance Certificates is important, the department considers the above analysis suggests the appropriate threshold should not be driven by the

¹⁶ There were 10,000 certificates between \$750 and \$1000 in 2016-17. It is estimated that half of these relate to work for which a certificate would still be required regardless of threshold.

administrative costs of compliance (which are relatively small per job), but by a consideration of the typical value of work for different types of plumbing jobs that have different risk profiles.

The VBA has compiled an analysis of typical plumbing work that falls into value ranges: less than \$500, \$500 to \$750, \$750 to \$1000, \$1000 to \$1500, and above \$1500. This is set out at Appendix E. Below is a summary of some examples of types of work in each value range, and an indication of relative risks.

Table 19: Examples of plumbing work by value range and risk

	\$500	\$750	\$1000	\$1500+
Testing backflow prevention devices	Sewer cut-in for additional fixture	Additional connections for below ground drainage system	Installation & treatment of human waste through primary and secondary wastewater treatment systems such as septic tanks and effluent dispersal fields	Installation of more complex drainage systems
Replacement of fire sprinkler heads	Minor servicing appliances	Installing standard domestic plumbing fixtures for sanitary systems	Installation of fire hydrants and hose reels	Installing fire sprinkler system in buildings over 4 storeys in height
Minor maintenance of irrigation system	Installing rainwater tank onto stable support base	Installation of taps with backflow prevention devices	Install or replace evaporative cooler or refrigerated air-conditioner	Installation of a mechanical heating, cooling or ventilation system in a building
Minor leak repair	Tempering of solar hot water supply	Major servicing and repair of air conditioning systems	Installation of solar hot water collectors, flow and return piping systems and the installation of solar hot water pre-heating storage tanks	More complex water supply involving hot, cold and recycled connections

Key: lower risk ⇒ medium risk ⇒ high risk ⇒ very high risk

Based on this analysis, the department considers that increasing the threshold to \$1000 represents a material increase in risk that is not justified by the relative small administrative cost savings and potential for lower costs to consumers by allowing registered plumbers to do more plumbing work.

The department also notes that there has been no argument made from industry (licensed or registered plumbers) that the current threshold is too low. Based on this information and the types and levels of risks for each type of work, the department considers that \$750 remains the appropriate threshold.

Questions for stakeholders

Is the requirement to issue a Compliance Certificate a significant burden for straightforward and low risk plumbing jobs? Are there any particular types of work above \$750 that should be excluded from the Compliance Certificate requirements?

3.7. Successful completion of approved competency units for licensing

At present, registered plumbers applying for a licence are not required to provide proof of any additional qualifications above those required for registration. Despite this, applicants are required to successfully complete an examination held by the VBA to test applicants' knowledge of relevant competencies. The VBA has indicated that applicants may be attempting this exam without having completed the associated competencies.

To ensure that licensed practitioners are sufficiently qualified, the department proposes that applicants for licensing be required to provide proof of successful completion of the approved competency units specified by the VBA as part of the application process for licensing.

The department considers that this approach provides appropriate assurance that applicants are undertaking required training and should not represent a cost impact given that this training should have occurred prior to application.

3.8. Decision framework for assessing options

The above options related to the overall regulatory approach. Experience requirements for becoming licensed, and changes to work classes are assessed in the remainder of this RIS. In general, options are preferred where the benefits outweigh the costs. This is not always quantifiable, and therefore judgement is required to assess the trade-offs between changes in costs and the changes in the level of potential risk associated with the option.

Even so, lack of data means that some impacts remain relatively uncertain. However, how the lack of data affects the policy decisions made depends on the nature of the uncertainty: for example, the lack of data may relate to the extent of the problem, the magnitude of costs, or consequential risks to consumers. The type of uncertainty may mean that some options for change can be clearly beneficial (e.g., uncertain reduction in costs with no material change in risk) while others are too uncertain to support a change (e.g., known impact on costs but unknown impact on risks).

In considering the importance of risk and uncertainty in making each decision, a number of factors have been considered to inform the department's preferred position:

- qualitative risks associated with particular plumbing work, including those that could impact practitioners, consumers and the broader community
- quantitative evidence and data of the impact of an adverse event occurring (e.g., cost of defective plumbing work, impact on health, life and safety, etc.)
- effectiveness of a regulatory approach mitigating risks associated with particular plumbing work
- costs of implementing regulatory approach to practitioners, industry, government and other sectors.

As part of the department's analysis of options, significant gaps in evidence or data were identified for certain policy areas which did not allow a clear and robust case for regulatory change to be made. In light of this, for relevant options analysis the department has sought to clearly communicate where these gaps in evidence and data exist and any assumptions that were used to assist the analysis.

In addition, some types of regulatory change have been assessed according to some issue-specific principles:

- *Creation of a new class of plumbing work*—the case for a new class of plumbing work could be in response to industry or technological changes occurring in the plumbing industry. Alternatively, this could arise from the fact that should a sub-set of an existing class of plumbing work be created as its own class, this may be an appropriate response to meet the demand of

the market and community expectations of work undertaken. For example, irrigation work was part of the water supply class of plumbing work but analysis as part of the 2008 Plumbing RIS determined that it was appropriate to provision for a separate class of plumbing work associated with Irrigation for introduction as part of the Plumbing Regulations 2008. Consideration would be given to factors including the expected number of practitioners within the new class, overlap with existing classes, and the ability to clearly define the scope of work. New classes may also be considered appropriate to reduce reliance on restricted licences and registrations, which are only intended to be used in exceptional circumstances or on a case-by-case basis; again the justification of the new class would depend on the number of practitioners undertaking work as part of scope of associated with restricted registration or licensing that could practically be defined within the regulations.

- *Creation of a new specialised class*—the case for a new specialised class of plumbing work could reflect the changing profile of risks associated with a type of plumbing work or changes in the complexity of work that could be a result of technological change. This would generally apply to a sub-set of work that is currently being treated as a main class of plumbing work and may require additional training to undertake this work than is provisioned as part of the main class. For example, servicing work on a type A appliance was previously considered as part of the gasfitting class of plumbing work. However, technological advances have considerably added to work complexity and hence it was determined that a new specialised class for this work was appropriate to when the Plumbing Regulations were last remade in 2008.
- *Prescribing additional standards*—while there is an agreement with all states and territories to ensure that there is a nationally consistent approach to plumbing standards work as provisioned through the PCA, additional standards or changes to standards may be appropriate. In Victoria, there are specific types of regulated plumbing work that are not within the scope of the PCA and the department considers that additional specific standards need to be specified to apply to this work. This is the case for mechanical services and refrigerated air-conditioning work. In addition, there may be cases where changes are required to standards reflected in the PCA.
- *Changes to scope of existing classes of plumbing work*—due to changes in technology, the industry or consumer demand, there may be a case to consider changing the scope of existing classes of plumbing work. For example, previously work on medical gas installations was not prescribed plumbing work despite the risks of this work to consumers in hospitals and medical centres. As part of the introduction of the 2008 Plumbing Regulations, it was considered necessary to regulate as part of the mechanical services class of plumbing work to ensure that work carried out met acceptable standards.

A.4 Costs and benefits of the options

4.1. Costs and benefits of the general regulatory approach

This section firstly assesses the costs and benefits of a continuation of the current arrangements (assuming no change in work classes, Compliance Certificate threshold, or experience requirements), and compares this to the alternative general approaches to regulating the sector. Specific options for changes within the current approach are discussed later in this chapter.

The following summarises the costs of each option (all figures are the total for ten years from 2018 to 2027, expressed as net present value (NPV) using a real discount rate of 4 per cent). Costs are incremental to what would continue to be incurred under the base case.

Table 20: Costs of regulatory options

Option	Other work standards	Formal training requirement	Experience requirements	VBA exam	Total cost
1 (status quo)	\$85,694,916	\$89,714,966	\$101,835,464	\$8,922,809	\$286,168,156
2	\$85,694,916	\$89,714,966	\$101,835,464	-	\$277,245,347
3	\$85,694,916	-	-	\$113,620,834*	\$199,315,750
4	-	\$89,714,966	\$101,835,464	\$8,922,809	\$200,473,240

* In the absence of mandatory training or experience requirements, it is assumed that the costs associated with taking the VBA exam involve double the time to prepare and sit the exam, and around one-half of applicants in fact do obtain the current training and experience in order to pass the exam.

See Appendix C for the assumptions and calculations for the above figures. The costs reflect, as relevant to each option:

- additional costs to individual plumbing jobs from having to comply with standards (such as additional work tasks, or working in a way that takes longer, or use different materials)
- the costs of undertaking formal training through a Registered Training Organisation, including course costs, student fees and materials, and time spent attending classes and studying (opportunity cost)
- the delayed opportunity in becoming a plumber by the need to complete an apprenticeship or complete other experience (i.e., reduced earning capacity before being able to become registered)
- the time costs associated with preparing for and sitting the VBA exams.

The potential benefits fall into two categories: reduced search costs to consumers and improved quality of work (less defective work giving rise to costs of rectification, damage to property or harm to people).

Search costs are incurred where consumers spend time investigating the ability of a plumber before engaging them. This may include steps to check the competency, quality and reputation in dealing with customers. Having a registration and licensing system in place provides information to consumers, being that the VBA confirms that the plumber has sufficient knowledge and competency to undertake the relevant type of plumbing work. This information may save consumers some time in checking plumber quality. It would not replace all search efforts, but would have some impact.

Having a robust registration and licensing system still involves search costs for consumers (e.g., seeking quotes, checking registration details). However, compared to the base case, a licensing scheme that incorporates an assessment of competency should reduce the amount of time a

consumer needs to spend. For this RIS, it is estimated that requiring plumbers to hold a registration or licence saves consumers 1 hour of time¹⁷ in *half* of plumbing jobs for which a Compliance Certificate is required.¹⁸ With 371,209 plumbing jobs each year for which a Compliance Certificate is issued, and a value of time to a typical household of \$38.13 per hour¹⁹, the total annual saving in search costs for customers is estimated to be \$7.1 million in 2018-19, and a present value over ten years of \$63 million. This saving would apply to all options.

This average cost of defects discussed in chapter A.1 allows the options to be considered from the point of view of how many defects would need to be prevented directly because of the regulations, in order for the benefits to at least match the costs. The likelihood of each option achieving this outcome can then be compared.

Table 21: Benefits of regulatory options

Option	Cost (from Table 20)	less reduced search costs	Avoided defects for remaining cost to 'break even' (per year)	Break-even point as a percentage of total plumbing jobs each year
1	\$286,168,156	\$63,021,676	3,671	1.0%
2	\$277,245,347	\$63,021,676	3,524	0.9%
3	\$199,315,750	\$63,021,676	2,242	0.6%
4	\$200,473,240	\$63,021,676	2,261	0.6%

The number of defects needed to be avoided to break even is relatively small. Even with the current Regulations in place, there are around 6,600 plumbing jobs detected each year through audit that are found to be non-compliant. Given that around 5 per cent of plumbing jobs are audited, the number of defective jobs is likely to be higher than this; although as audits are conducted on a risk-based approach, the same rate of non-compliance is not expected across all plumbing work.

VBA believes that without a regulatory approach to set work standards and test competency of plumbers, the rate of defective work would be at least double what it is now. This suggests that the break-even point for Option 1 (which continues the current approach) would be easily met, giving confidence that it would result in an overall net benefit.

However, as between the different options, it is necessary to compare the relative likelihoods of achieving the break-even point. Although Option 1 has a higher break-even requirement, the department considers that it also has a higher likelihood of achieving its break-even point, because the department considers that each individual element supports and reinforces the others, thereby enhancing the effect on the competency of plumbers. Relying on only some elements is less effective. For example, around 10 per cent of plumbers that complete an apprenticeship and have the required experience still fail the VBA exam, suggesting the exam provides a benefit in addition to the prescribed qualifications and experience requirements that, in the department's opinion, is likely to exceed the additional cost. Removal of the qualifications and experience requirements would reduce the break-even point by around 40 per cent, however the department believes the likelihood of achieving the intended benefits would fall by more than this, given that formal training and on-the-job experience are the core mechanism to build competence.

Given this trade-off between the intended benefits of an option and the likelihood it will be effective, this suggests that Option 1 is preferred over Options 2 and 3. However, comparison of

¹⁷ Estimate of time to search online reviews of up to three plumbers and/or speak with references.

¹⁸ For jobs under \$750, it is likely that search costs would be small, if any, even in the base case.

¹⁹ Based on the average weekly ordinary time earnings published by the ABS.

options is difficult using break-even analysis, and the conclusion ultimately depends on a subjective judgment.

Options 1 and 4 differ only by the requirement of the additional work standards, set out in Schedule 2 of the current Regulations. The net benefit of continuing those work standards can be considered separately by considering the incremental costs of complying with those standards and the individual break-even points needed to achieve a net benefit. As the various work standards apply to specific kinds of plumbing work, Option 1 should also demonstrate that the expected benefits outweigh the costs for those particular work types.

The costs attributable to the work standards can be broken down as shown in the following table. The table also shows the average cost of a defect within that work class, and the number of defects needed to be avoided in order for those particular work standards to break even on a class-by-class basis.

Table 22: Break-even points for Schedule 2 work standards

Type of plumbing work to which standard relates	Cost over 10 years (PV)	Average cost of defects	Avoided defects for remaining cost to 'break even' (per year)	Break-even point as a percentage of total plumbing jobs each year for this type of work
Fire protection work	\$7,677,161	\$6,078	126	3.24%
Mechanical services work	\$10,885,558	\$6,078	179	1.24%
Roofing (stormwater) work	\$26,598,094	\$6,078	438	0.83%
Refrigerated air-conditioning work	\$22,543,771	\$6,078	371	0.80%
Water supply work—rainwater tanks	\$3,627,391	\$6,078	60	0.36%
Water supply work—solar water heaters	\$12,099,394	\$6,078	199	0.53%
Water supply work—cooling tower	\$13,866	\$6,078	0.2	0.88%
Water supply work—interchange device	\$2,249,680	\$6,078	37	0.45%

These avoided defects are a subset of the avoided defects needed in Table 21 above. They show that only small reductions in defects are needed in order for the individual work standards to achieve a net benefit. For most of these standards, the reduction in defects is in line with the overall reduction needed for the option as a whole to break even, and for which the VBA is confident that the prescribing of work standards would result in sufficient avoided defects to justify the costs. However, the work standards specific to fire protection work and mechanical services require a higher level of defect reduction (albeit still very small compared to the amount of plumbing work in these areas).

For fire protection work, there are less than 20 failed audits per year (on average since 2010). While only 6 per cent of fire protection work was audited over this period, this analysis suggests that in order to break even using this measure of avoided costs, the rate of defective plumbing work in the absence of the specific work standard on fire protection would need to be considerably higher than what it has been under the current Regulations (up to triple) and the work standard would need to be very effective in minimising these defects.

Similarly, for mechanical services work, there were less than 200 failed audits per year (on average since 2010), again suggesting that in order to break even using this measure of avoided costs, the rate of defective plumbing work in the absence of the specific work standard on mechanical services would need to be considerably higher than what it has been under the current Regulations (at least triple) and the work standard would need to be very effective in minimising these defects.

VBA considers that in the absence of prescribing work standards for these types of plumbing work, the incidence of poor quality work that leads to defects and property damage would be significantly higher, at least double the rate under the current arrangements, but it is difficult to put a precise number on this.

This suggests that relying on avoided costs of rectifying defective work does not alone provide enough confidence to justify these additional work standards for fire protection and mechanical services. However, these break-even points are considered very conservative as they only take into account the costs of property damage and costs of repair; another measure of a break-even point would be where the work standards result in prevention of deaths. It is often difficult to link deaths to a particular cause, however it is noted that some work categories (gasfitting, mechanical services and fire protection) have the potential to result in deaths (to the plumber or users of the premises) if not performed properly. The costs associated with the work standards for fire protection and mechanical services work would break even if the standards are directly responsible for preventing:

- for fire protection: 2 deaths over 10 years²⁰
- for mechanical services work: 3 deaths over 10 years.

There is no dataset that attributes deaths directly to non-compliance with work standards, however the VBA is aware of some examples of deaths that are most likely a result of poor workmanship or failure to meet the relevant standard. The department notes that the costs of these standards as estimated in this RIS assumes that over time plumbers will depart from the current requirements. This will necessarily increase the risk of deaths. The department believes these risks are inherently high in these areas, and preventable, and therefore considers retaining these work standards as a sound risk-based position.

Based on the above analysis, the department considers the preferred high-level approach to regulating plumbing work in Victoria is to retain the current elements of:

- the broad approach to defining classes of plumbing work (some changes are discussed below)
- adopting the PCA
- setting competency requirements (qualifications and experience, plus a VBA exam) for becoming a registered or licensed plumber
- setting a small number of additional work standards.

Question for stakeholders

Is the current broad approach undertaken through the Plumbing Regulations—i.e., largely adopting the PCA and setting additional work standards where appropriate, prescribing qualifications and experience requirements for registration and licensing, including an exam, for new plumbers—an appropriate regulatory framework for addressing risks associated with plumbing work? Please explain the reasons for your view.

²⁰ These figures use an estimated value of a statistical life of \$4.3 million, as suggested in guidance published by the Office of the Commissioner for Better Regulations (2016).

4.2. Plumbing work not requiring a registered or licensed plumber

Under section 221D(2) of the Act, a person is not required to be licensed or registered as a plumber when repairing a tap²¹ in a dwelling that the person owns and occupies, or any other plumbing work that the regulations state may be carried out by a person who is not licensed or registered.

Historically, the Regulations have extended the scope of plumbing work that may be carried out by a person who is not registered or licensed to include the repair or replacement of tap washers and other minor tap repairs. This extends the exemption in the Act to include non-owners or non-occupiers of a dwelling. Hence, renters are able to repair their own taps, landlords can repair taps in their properties, and friends or neighbours are able to repair taps.

This exemption included in the Regulations represents a significant cost saving to consumers, as in the absence of the Regulations, people renting, or people who may not be able to repair their own taps in a house they own, would need to engage a registered or licensed plumber to do the minor tap repairs. The department considers this to be unnecessary regulation of work that is very low risk.

The value of the cost saving is unknown, as there are no data on the number of tap repairs that would occur under this scenario as it is already plumbing work that is unregulated. As an indicative estimate—there are 607,354 private dwellings occupied by renters in Victoria.²² Assuming that each of these requires one tap to be repaired at least once every two years, and the cost of a registered plumber to do this work would be \$50, the total cost saving per annum would be around \$15 million.

This probably overstates the actual savings as some people in this situation would still pay a registered plumber to do the work, while in the absence of regulations, it would be expected some people would repair the tap themselves anyway. Therefore, a more conservative estimate of the savings to consumers would be around \$5 million per year, or \$40 million over ten years in net present value terms. However, given the uncertainties in the assumptions used, a more reasonable indicator of the potential magnitude of savings to consumers would be a range of \$10 to \$50 million over the life of the Regulations.

As this likely represents a significant cost saving with very little additional risk of damage or injury, the department proposes to continue this exemption in the proposed Regulations. To improve clarity, it is proposed to provide more specific guidance on what constitutes minor tap repairs, with reference to the removal, reinstallation or like-for-like replacement of tapware handles, bonnets, spindles, tap washers, O-rings or body washers, but does not include the repair or replacement of mixer taps or mixer tap cartridges, breeches, outlets, or ceramic disc spindles due to the higher skill required to undertake this work.

The current Regulations also exempt from requiring a registered or licensed plumber the changeover of a 3-star shower head in a dwelling. This regulatory intervention was intended to encourage homeowners to contribute to Victorian's water efficiency policy aims by removing a potential cost barrier to the replacement of inefficient shower heads with more efficient shower heads, and coincided with other government programs to promote replacement, such as through the Victorian Energy Upgrades (VEU) program.

While the exemption was aimed at promoting the uptake of 3-star shower heads, market developments now provide 3-star shower heads as minimum efficiency, with an expansion of 4- and 5- star shower heads now common on the market. It is proposed to expand the rating of shower head under this exemption to include any shower head of 3-stars or above.

²¹ Other than any thermostatic mixing valve, tempering valve or backflow prevention device.

²² Australian Bureau of Statistics: 2016 Census results.

The value of this cost saving is not known, as no data are collected on the number of shower head replacements. However, under the VEU program (which allows for upgrade to 3-star or higher), there were 382,923 eligible shower head replacements between 1 January 2009 and 31 December 2016. If the cost of a registered plumber to change each shower head was \$50, this would be a saving of around \$19 million since the current Regulations were last made (assuming the exemption in the current Regulations applied to all these replacements). There are also environmental benefits associated with increased upgrading of shower heads (for both water and energy savings), to which the Plumbing Regulations contributes some, but not all, of the incentive.

The rate of shower head replacement to more efficient shower heads has slowed in more recent years (to around 20,000 per year) and is expected to slow further, as there are fewer older (less efficient) shower heads in place, and in recent years all new shower heads sold have been at least 3-star. Therefore, the rationale to continue the exemption is less on promoting improved water efficiency (although that is still important), and more on recognising that replacement of a shower head is very low risk plumbing work that does not require a registered or licensed plumber.

Assuming that over the next ten years there are on average 10,000 shower head replacements, the continuation of this exemption would save consumers around \$500,000 per year. The department considers this cost saving, the very limited additional risk associated with this work, and the ongoing alignment with the promotion of water and energy efficiency justifies continuing this exemption in the proposed Regulations.

4.3. Increasing the minimum experience as a registered plumber before becoming licensed

The requirement for minimum experience has two associated costs:

- an opportunity cost—the reduced earning capacity while a plumber must wait before becoming licensed
- an administrative cost—plumbers can no longer apply for a licence directly, but must first apply for registration and then a licence.

Option 1: a minimum experience requirement of 1 year for licensing in all main classes of plumbing

The opportunity cost is estimated to be \$360,000 per year higher than the current arrangements. The additional administrative burden is estimated at \$16,000 per year. In total, the department estimates that the additional costs to plumbers of this option compared with the current Regulations would be \$376,000 per year, or \$3.4 million over ten years (NPV).

Over ten years, this option would likely affect only 660 plumbers becoming licensed. In order to break even, the change would need to result in avoidance of 60 defective jobs. The estimates imply, on average, that if one in ten of the affected plumbers performs one less job with a defect (within their first year) as a result of this requirement, then it would break even. The department considers this reasonably likely to occur, given current compliance rates and the volume of work done by individual plumbers.

Formalising a period of experience in the regulations would ensure consistency (because all plumbers would be required to gain the experience) and would also allow the VBA to reasonably assess the quality of this experience to ensure it is suitable.

The disadvantage of this option is that it does not take into account the different levels of risk amongst the classes of work. Higher risk classes may warrant a higher level of experience compared to lower risk classes.

Option 2: a minimum experience requirement of 2 year for licensing in all main classes of plumbing

The opportunity cost is estimated to be \$1.84 million per year higher than the current arrangements. The additional administrative burden is estimated at \$40,000 per year. In total, the costs to plumbers of this option would be \$1.85 million per year, or \$16.7 million over ten years (NPV).

Over ten years, this option would likely affect 1,650 plumbers becoming licensed. In order to break even, the change would need to result in avoidance of 310 defective jobs. The department is not confident this break-even point would be likely: the estimates require, on average, that one in five affected plumbers performs one less job with a defect (in their first 2 years) as a result of this requirement.

While this break-even point may be reasonable in aggregate, without additional data, it is difficult for the department to justify that all classes of plumbing, including irrigation (non-agricultural) and drainage, require two years of additional experience. For this reason, this option is not preferred.

Option 3: a minimum experience requirement of 1 year for licensing in some classes and 2 years in other higher risk classes of plumbing

Applying the two years' experience requirement to the classes of fire protection, gasfitting, refrigerated air-conditioning, and water supply, with all other classes having a one-year requirement, will directly affect around 960 plumbers over the next ten years. The opportunity cost is estimated to be \$810,000 per year higher than the current arrangements. The additional administrative burden is estimated at \$20,000 per year. In total, the costs to plumbers of this option would be \$11.2 million over ten years (NPV).

This option would require avoidance of 249 defective jobs per year to break even, if relying only on reduced defects as the only benefit. Noting that this option has given special attention to areas of high risk, an equivalent break-even point would be where this proposal results in the avoidance of at least one death every 3-4 years. The department considers that this appears a reasonably likely result, although it is difficult to attribute such incidents to a specific underlying cause.

The department proposes to adopt Option 3 as the best balance between ensuring the safety of plumbers and the community while not placing an undue burden on the industry. The first year of additional experience (required for all classes) will formalise the existing practice of plumbers working registered before applying for a licence and ensure applicants have experience before taking on the additional responsibilities of licensing. The second year of experience for high-risk classes will create a risk-based approach ensuring that plumbers licensed in high-risk classes have additional experience.

4.4. Changes to work classes

The following table shows the changes to work classes that are proposed to be included in the new Regulations, with their associated cost impacts. The rationale for making these changes is discussed in relation to each specific work class in Part B of this RIS.

Table 23: Proposed changes to classes of plumbing work

Change to work classes	Impacts
A new main class for work on thermostatic mixing valves (TMVs).	This change is aimed primarily at sites that have mandated regular inspections and maintenance of TMVs, such as schools, hospitals and aged care facilities. The additional cost is estimated to be \$1,667 per practitioner entering this new class, but the number of plumbers in this class is unknown. The department considers the cost per practitioner (which is a once-off cost for each plumber) is justified based on the significant risk to vulnerable people if the TMVs are not properly maintained.
Establishing type B gasfitting as a main class (separate from type A gasfitting).	The department estimates that the change will save up to \$300,000 per year in avoided training and experience costs for type B gasfitters who no longer need to meet all the requirements of the current gasfitting main class. However, the actual impact will depend on how many plumbers choose to work only in the new class; some may continue to be registered in both classes, meaning there would be no change for those plumbers. The department considers that the quality of work under the new class will not be impacted, as relevant competencies for type B work would still be required to be demonstrated.
Establishing refrigerated air-conditioning work as a main class (separate from mechanical services).	The department estimates that the change will save up to \$100,000 per year in aggregate in avoided training and experience costs for refrigerated air-conditioning practitioners who no longer need to meet all the requirements of the current mechanical services main class. It is considered that the quality of work under the new class will not be impacted, as relevant competencies for refrigerated air-conditioning would still be required to be demonstrated.
Establishing a new ‘basic systems’ class for less complex refrigerated air conditioning systems.	This new class of work for the installation of ‘basic’ refrigerated systems (e.g., split systems) seeks to formalise arrangements where historically the VBA provided restricted registration or licensing for this work to meet demand. This approach provides transparency for industry, which may lead to a higher interest in this class of work.

The options for a new specialised class for recycled water is not proposed, nor is a new class of plumbing work for metal roofing—see Part B for discussion.

4.5. Other proposed changes

There are a number of other proposed changes to the current Regulations. These are detailed in Part B in relation to each class of work. Most of these changes are considered minor clarifications. Some changes expected to have a material impact are:

- Requiring a backflow prevention device for taps adjacent to water closet pans.** Currently, when a customer wishes to install a tap adjacent to a toilet, appropriate backflow prevention measures may be required depending on the use of the tap. If a tap is installed near a toilet for the purposes of cleaning the floor of a bathroom, no backflow prevention device is required. Should the use of this tap change in future (e.g., a flexible hose be installed), this scenario poses

a significant backflow risk to the household. The new requirement will require that a plumber install a high hazard protection measure when a tap is installed near a toilet. This aims to reduce the risk of backflow cross connection to fresh water supply, which poses significant risks to the health of consumers. Since the additional cost of a backflow device can be around \$400 per installation, the new requirement may cause the placement of taps to be further away from water closet pans, so as to not require a backflow device. As such, the department expects that the level of costs will be moderate to low in practice, with the cost per device being more than offset by the reduced risk of adverse health outcomes.

- **Changing the requirements for sanitary drains under buildings.** Currently, a below-ground sanitary drain cannot service more than one dwelling. This requirement is difficult to meet in some situations (e.g., sub-dividing an existing block to build a second building). In such situations, a plumber may apply to the VBA for a modification, which allows the VBA to approve works that can not meet the standard, but allows the VBA to set other conditions to mitigate risks. However, the department understands that there are instances of works being undertaken inconsistent with the standard, and without any approved modification overseen by the VBA. The time and cost of applying for modifications is likely to be a factor in this non-compliance. This means risks may not be being adequately mitigated. It is proposed to make a change to the Regulations to allow sanitary drains to service more than one dwelling in certain circumstances and if done according to specific conditions, removing the need for separate applications for modifications, and encouraging greater compliance. This is expected to result in an aggregate cost saving of around \$116,000 per annum, as well as better quality work.
- **New efficiency requirements for replacement hot water heaters.** This new requirement would require any hot water heating appliance being replaced in all Class 1 homes to meet minimum performance standards in relation to carbon emissions. The department has estimated that the proposed change will cost \$177 million over ten years (NPV) in additional costs of hot water heaters, but will have benefits in terms of cumulative energy savings of 6,417TJ by 2028, and a cumulative greenhouse gas emissions savings of 1.6Mt CO₂-e by 2028. The department has estimated the value of these benefits at \$443 million over ten years. This gives an estimated overall net benefit of \$266 million over ten years. A sensitivity analysis conducted by changing a number of assumptions (such as a carbon price set to zero, withdrawal of the STC incentive and increases in the cost of heat pump systems) found that the benefit cost ratio remains positive.²³

A minor change that will affect all work classes relates to manufacturers' instructions. The current Regulations state that where standards incorporated into the Regulations require compliance with manufacturer's instructions or requirements, that instruction or requirement is to be taken as if it were a requirement to comply with relevant best practice.

The phrase 'relevant best practice' is unclear as it is not defined. Further, the current Regulations may give rise to confusion where manufacturer's instructions are in conflict with the requirements of standards in the PCA or elsewhere in the Regulations.

The department proposes to amend this regulation to remove reference to best practice, and instead require that plumbing work comply with any written direction, instruction or specification of a manufacturer except in the case of conflict with requirements of the Act, the Regulations, or relevant standards or other documents incorporated by the Regulations. This will provide clarity as to the standard of work expected where there are manufacturer's instructions.

²³ Domestic hot water research and cost benefit analysis for Plumbing Regulations 2008 Regulatory Impact Statement—work commissioned by the department, available on request.

A.5 Summary of impacts of proposed Regulations

5.1. Impacts of proposed Regulations

The aggregate cost impact of the proposed Regulations is as follows:

Table 24: Summary of costs of proposed Regulations

Element of Regulations	TOTAL COST over 10 years (NPV)
Quantified costs	
Continuation of current arrangements	\$286.2 million
New experience requirements for licensing	+\$11.2 million
Changes to work classes	-\$0.2 million
Changes to below ground sanitary drains	-\$0.8 million
New efficiency requirements for hot water heaters	+\$177 million
Total (of quantified items)	\$473.4 million
Unquantified costs	
Continuation of minor work exemptions (tap repairs and shower heads)	<i>Significant savings to consumers. Possibly within a range between \$10 million and \$50 million, but subject to a number of unknowns that make an estimate highly uncertain.</i>
Continue threshold for Compliance Certificates at \$750	<i>Significant savings to consumers. Possibly within a range between \$10 million and \$50 million, but subject to a number of unknowns that make an estimate highly uncertain.</i>
Backflow prevention for taps adjacent to toilets	<i>Small cost impact</i>

The department believes that this cost will be more than offset by benefits in the form of:

- reduced 'search costs' for consumers, as they will be able to continue to rely on a plumber's registration or licence as evidence of competency. The department has estimated that the Regulations will reduce search costs by \$63 million (net present value) over their 10-year life
- reduced defects or poor quality plumbing work, reducing the incidence of damage to property, financial loss, or harm to people (injury or death). These benefits are difficult to quantify, and informed judgment by the department has been used to conclude that the benefits are likely to outweigh the costs. This conclusion relies on break-even analysis; that is the amount of defective work (work that leads to property damage, financial costs of rectification, and/or injury or death to people) that needs to be prevented by the proposed Regulations in order to justify the costs. The department has relied on advice from VBA to conclude that, in the absence of Regulations, the amount of defective work would be substantially higher than it is now, which is more than enough to break even
- particular reduced risk of harm to vulnerable users of TMVs, where regular inspections and maintenance of TMVs is required

- improved environmental and energy consumption outcomes associated with the new standard for replacement water heaters. The department has estimated these benefits will be worth \$443 million over ten years (NPV), more than offsetting the costs of the proposal. The modelling found that on average, all households will be better off under the proposed hot water standard—except those that choose to replace an electric storage water heater with an LPG storage system. The department expects that the majority of electric storage replacements will be with heat pump water heaters due to the expected lifetime energy saving benefits and awareness by many households and plumbing practitioners that LPG systems have higher running costs. Sensitivity analysis conducted by changing a number of assumptions found that the benefit cost ratio remains positive, even under less favorable scenarios than assumed under the core modelling assumptions.

5.2. Groups affected

The proposed Regulations directly affect plumbers, in terms of the requirements to become a plumber, or how they must perform their plumbing work. The costs of the Regulations therefore fall mostly on plumbers. However, it is expected that these costs are ultimately recovered through the ability of plumbers to pass on cost to consumers.

It is also noted that some of the cost of training is met by the government.

The beneficiaries of the Regulations are consumers generally, as well as plumbers, who benefit from being able to perform work as a plumber.

The proposed new requirements for replacement of hot water heaters will increase upfront costs for individual households of \$304 on average, offset by expected average energy savings of \$681 per household over the life of the regulation. Households in non-reticulated gas areas that choose to replace their electric storage water heater with an LPG storage water heater will be worse off over the life of the system—however this is an unlikely response (as consumers and plumbing practitioners are generally aware of LPG’s higher running cost and the availability of other compliant systems). The department expects these households to instead install a heat pump system which has a payback period of less than two years (with savings on energy bills of around \$360 per year). Households that ultimately choose to install an LPG storage water heater may experience some higher cost pressure. The department recognises that it will be important to ensure that the introduction of the standard is supported by good communications to consumers and plumbing practitioners to support informed choices and maximise the benefits to households and to understand the benefits in terms of reduced costs over the lifetime of the system.

5.3. Impact on small business

The proposed Regulations are not expected to have a disproportionate impact on small businesses. It is noted that most plumbers work in small businesses or as sole traders. The Regulations apply to individual plumbers, and as such the size of the business should not affect the compliance requirements or the relative scale of burden on plumbers.

The proposed change to hot water heaters may increase the sales of the smaller suppliers and therefore have a positive impact on small businesses in Victoria. See analysis of this proposal at page 118.

5.4. Impact on competition

This section considers whether the proposed Regulations are likely to lead to a material decline in competition in any market. Victoria is party to the Competition Principles Agreement, which requires that any new primary or subordinate legislation should not restrict competition unless it can be demonstrated that the government’s objectives can only be achieved by restricting competition and that the benefits of the restriction outweigh the costs. This is the ‘competition test’ also to be applied to remaking sunseting regulations. It is noted that the competition assessment does not

preclude any option being preferred, but requires that any decrease in competition should ensure that the benefits outweigh the costs and that the desired outcomes can only be achieved by affecting competition.

In some cases, regulation can affect competition by preventing or limiting the ability of businesses and individuals to enter and compete within particular markets. The primary cost of a restriction on competition is that it can reduce the incentives for businesses to act in ways that benefit consumers, that can result in lower innovation and productivity, reduced choice of products and/or higher prices.

The types of regulations that may be regarded as affecting competition either directly or indirectly are set out in the following table.

Table 25: Types of regulation that may affect competition

Category of restriction	Examples
Barriers to entry or exit	<ul style="list-style-type: none"> Governs the entry and exit of firms or individuals into or out of markets Creates or protects a single buyer or seller Limits the number of firms that can carry out a particular activity Restricts who can own or operate a business Gives existing firms access to information that is not available to new market participants
Conduct Restrictions	<ul style="list-style-type: none"> Controls prices or production levels Restricts certain activities, for example, advertising Imposes requirements on product quality Restricts the quality, quantity or location of goods and services available Restricts access to inputs used in the production process, for example, infrastructure and employment standards; restricts the price of or type of inputs used in the production process Limits consumer access to particular goods or services Restricts advertising and promotional activities
Increase in business costs	<ul style="list-style-type: none"> Imposes specific levies and/or imposts on a particular industry Imposes high administrative or compliance costs
Advantage for some firms over others	<ul style="list-style-type: none"> Imposes requirements on certain firms, but not on competing firms Sheltering some activities from the pressures of competition Advantages government businesses over the private sector Gives one firm access to infrastructure, but not others

Source: Based on *Assessment against the Competition Test*, guidelines published by NSW Department of Finance, Services and Innovation, 2017, with additional examples from *Legislation Impact Assessment Guidelines* published by Tasmanian Department of Treasury and Finance December 2016.

Some regulatory arrangements may impose more than one restriction, and some restrictions may fall into more than one category.

5.4.1. Do the proposed Regulations restrict competition?

The proposed Regulations restrict competition in three out of four of the above categories. While it is the Act that technically requires plumbing work to only be done by an authorised plumber, it is the Regulations that set the actual requirements to becoming a plumber (which are barriers to new entrants), and sets work standards (which limit the ability to compete on quality). Both of these add to business costs of being a plumber, which are expected to be passed through to consumers through higher prices.

However, compared to the base case (which is governed by the Act), the proposed Regulations reduce restrictions on competition by setting the threshold for Compliance Certificates at \$750 (above the \$500 that is otherwise set by the Act). This allows registered plumbers to do a greater amount of work that would otherwise require oversight by a licensed plumber.

The department believes the restrictions on competition are significant. From the point of view of the consumer, the proposed Regulations mean that there is less choice in selecting someone to do plumbing work and it is likely to cost more (than in the scenario where there were no Regulations).

The proposed new requirements for hot water heaters limit the products that can be installed, for one segment of the market, restricting competition in this segment. However, the proposed policy will only limit the installation of electric storage water heaters in existing class 1 buildings. They will continue to be able to be installed in a number of other market segments and jurisdictions. Moreover, the department's analysis suggests that the water heater manufacturers who supply products to the Victorian market should be able to supply compliant products without any reduction in the number of manufacturers, so the impact of the restriction on competition will be on consumers, with limited impact on suppliers.

5.4.2. Are the restrictions on competition justified?

The department considers the restrictions on competition are necessary to achieve the objectives of the Act, and in particular to overcome the market failures described in chapter A.1 of this RIS. Based on the analysis in this RIS, the department is satisfied that the benefits of the Regulations outweigh the costs. Further, within the framework established by the Act, making Regulations is the only way to give practical effect to regulation of the plumbing sector.

In addition, a risk-based approach (e.g., in relation to new experience requirements) has been adopted for some elements of the Regulations, which also aims to ensure the higher costs are imposed only where the likely risks justify them.

The department considers the proposed requirements for replacement hot water heaters is necessary to achieve the objectives of energy efficiency and environmental outcomes and to address a number of market failures that exist in this segment of the market. That is, when water heaters are being replaced, they are not necessarily replaced with a more efficient and cost-effective system, resulting in many households having higher total costs over the life of the system and higher greenhouse gas emissions. Further information on this is available from the *Domestic hot water research and cost benefit analysis for Plumbing Regulations 2008 Regulatory Impact Statement* report (available on request).

5.5. Fees

5.5.1. Setting fees to recover costs

The Act allows a number of fees to be set, for the purposes of allowing VBA to recover costs related to its activities. The fees allowed under the Act are set out in the following table, together with the fee level in 2017-18 and total revenue estimated for 2017-18:

Table 26: Fees included in the current Regulations

<i>Fee</i>	<i>Current fee amount</i>	<i>Value of fee in 2017-18²⁴</i>	<i>Total revenue expected in 2017-18</i>
Application fee for a licence, registration or endorsement	3.84 fee units	\$54.60	\$100,000
Licence fee	21.37 fee units	\$303.88	\$4.4 million
Fee for a temporary licence	5.29 fee units	\$75.22	
Registration fee	24.11 fee units	\$342.84	\$1.5 million
Fee for provisional registration	8.03 fee units	\$114.19	
Fee for a temporary registration	2.13 fee units	\$30.29	
Fee for an endorsement	2.13 fee units	\$30.29	Not used
Fee for a late renewal	5.29 fee units	\$75.22	\$90,000
Fee for duplicate licence or registration document	2.13 fee units	\$30.29	\$900
Fee for an application for a declaration modifying the Plumbing Regulations under section 221ZZO of the Act	8.03 fee units	\$114.19	\$60,000
Fee for a practical examination	11.71 fee units	\$166.52	\$216,000
Fee for a theory examination	4.27 fee units	\$60.72	
Fee for Compliance Certificates ²⁵	2.43 fee units	\$34.55	\$12.4 million
Total			\$18.7 million

This suggests that the current fees are broadly recovering an amount to offset the VBA's costs of regulating the plumbing sector (see chapter A.1), consistent with the government's policy on cost recovery. (There is around \$400,000 in other revenue sources that would make up the remainder.)

The fees are intended to recover VBA's costs related to regulating plumbing in total. While some of these will reflect the direct cost of the activity (e.g., the fee for sitting an exam), some fees are intended to be a general source of revenue to meet VBA costs in enforcing the regulations. For example, any VBA costs that are proportional to the number of practitioners should be recovered through annual licence and registration fees, while VBA costs that are proportional to the level of audit and enforcement activity should be recovered through the fee for Compliance Certificates. This

²⁴ Most fees in Victoria are expressed in terms of fee units. This allows fees to automatically increase in line with an annual rate determined by the Treasurer. The annual rate of increase in fees is intended to reflect the increase in underlying costs due to inflation, while taking account of productivity improvements. The value of a fee unit in 2017-18 is \$14.22.

²⁵ Under the Act, the VBA must not sell a Compliance Certificate form at a price greater than \$20, or any other amount specified by the regulations.

is an approximation only, noting that ultimately all fees are paid in the first instance by plumbers, the costs of which are likely to be reflected in the prices paid by consumers for plumbing work.

The *Cost Recovery Guidelines* state that cost recovery charges should be set according to an 'efficient' cost base. This means that costs should be the minimum necessary to deliver the good/service/regulatory activity to achieve the required quality. Ahead of the planned review of all VBA fees in 2020 (see below), testing of the efficiency of the cost base has not been undertaken for this RIS.

The individual fees listed above have not been reviewed for the purposes of remaking the Regulations. A comprehensive review of building fees is planned to be undertaken by 2020, and the department considers that it is appropriate to reconsider plumbing fees thoroughly as part of this process, as this will ensure:

- the attribution of costs between building and plumbing activities (which make up the majority of costs) can be properly reviewed at the same time
- the costs of regulatory activities can be benchmarked to demonstrate they are efficient
- the appropriate structure of fees can be reviewed on a consistent basis across building and plumbing sectors. This would include a more detailed cost analysis to determine which fees should recover which costs, and also identify opportunities for fees to be more risk-based (such as different fees for different types of work). This will draw on improvements currently being made by the VBA of its data collection systems.

In this context, ahead of this review it is proposed to continue the current fee amounts (in terms of fee units) for the next two years. All fee amounts will automatically increase by 1.6 per cent from 1 July 2018 in line with the value of a fee unit determined by the Treasurer,²⁶ and increase again from 1 July 2019.

²⁶ The value of a fee unit from 1 July 2018 is \$14.45.

PART B:
CLASSES OF PLUMBING WORK

About Part B

Part B of this RIS is structured according to individual classes of plumbing work.

Each chapter includes, for the relevant work class:

- a description of the current arrangements for the work class, including the scope of work, the current qualifications and experience requirements, and additional work standards
- the cost of continuing the current qualifications, experience and work standards
- the cost of the proposed new requirements for becoming licensed for the work class (i.e., being registered for one or two years before being eligible for a licence)
- the issues identified by stakeholders as part of the review of the current Regulations
- assessment of options for change that respond to the issues identified in the review, and the reasons why changes are being proposed (or not proposed) in the new Regulations
- a summary of minor changes related to the work class that seek to update or clarify the Regulations. These are not expected to have a material cost impact.

A number of issues identified through the review have not been formally assessed in this RIS, but have been identified by the department as issues to explore as part of future policy work after the Regulations have been remade. These are discussed in Part C of this RIS.

B.1 Drainage

1.1 Current arrangements

Drainage work is currently defined as the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a below ground sanitary drainage system or a below ground stormwater drainage system from the above ground sewage, stormwater or waste pipes to the connection with disposal system.

The risks associated with drainage work are water leakage that may damage properties, or cause a safety hazard (slips), or financial loss (wasted water, damage to appliances). Below-ground stormwater drainage has less risk but has potential for property damage from flooding.

The following table sets out the elements of the current Regulations that apply to the drainage class:

Qualification	Experience	Other work standards
Cert II (including approved competency units)	2 years' experience, OR Completion of apprenticeship	nil

As at 30 April 2018, there were the following number of plumbers in this class:

	Registered	Licensed
Drainage	11,904	8,667

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to drainage work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Drainage class
Continue current Regulations	\$1,872,156
Additional cost from new experience requirements for obtaining a licence	\$66,562
TOTAL	\$1,938,718

1.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, stakeholders did not raise any issues with this main class of plumbing work.

1.3 Proposed change: laying of below-ground sanitary drains

Background

Sanitary drainage systems serve to capture and remove wastewater from plumbing fixtures, such as toilets, basins, sinks, dishwashers, washing machines, showers, bathtubs and laundry troughs, from within the building and safely discharge to the reticulated sewage system or on-site wastewater management systems.

The requirements for the design and installation of sanitary plumbing and drainage systems are contained in Australian/New Zealand Standard 3500.2 (AS/NZS 3500.2). This standard is incorporated into the PCA.

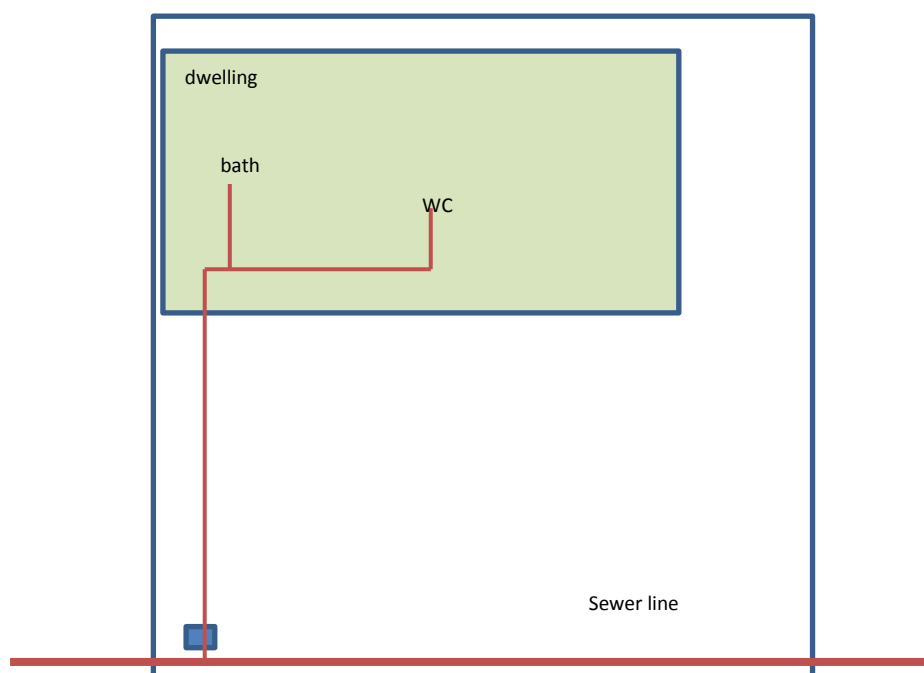
Clause 3.2 of AS/NZS 3500.2 refers to the location of drains and states that any drain located under or inside a building shall only serve plumbing fixtures (such as toilets and showers) within that building. Clause 3.2 also contains a note that drains should be located external to the building wherever practicable. For example, drains should not be laid under buildings where possible.

The purposes of these requirements are to:

- localise any sanitary drainage failure that may occur to the building it serves, thereby minimising impact to other dwellings on the same site
- provide for greater ease of access (from a property rights perspective) to the affected drainage system
- minimise the disruption of a plumbing drainage failure
- provide for more cost-effective means of rectifying the drainage failure
- minimise the loss of amenity to occupiers of the affected building
- minimise the risk to health and safety associated with a drainage failure.

Figure 3 shows a typical drainage installation for a detached house, in compliance with the standard. It shows one dwelling on an allotment, with one main drainage line and branches coming off it to serve various fixtures within the building. The main drainage line is located external to the building, and the drains located under the building only serve the fixtures within that building. This type of installation provides for relative ease to rectify any drainage problem that may occur, as the drain can be dug up and repaired.

Figure 3: Example of drainage installation on property with one dwelling



From time to time, sanitary drainage systems within or beneath a building can fail for a range of reasons, such as poor maintenance, incorrect installation, inappropriate items disposed into the system, blockage, ground and/or building movement. When this occurs, the remedial work required to correct the failure may be simple or complex, depending on the nature of the fault. In these instances, the location of a below ground sanitary drain and what it serves has a direct correlation to the ease of remedial work. The requirements provided for under the standard try to provide

assurance of a cost effective and efficient response, and to minimise the potential health risks from blocked or overflowing sewage.

The standard is generally easy to comply with in single dwelling allotments. However, the increasing prevalence of subdivisions for infill developments throughout Melbourne and regional centres is creating issues with compliance with the standard.

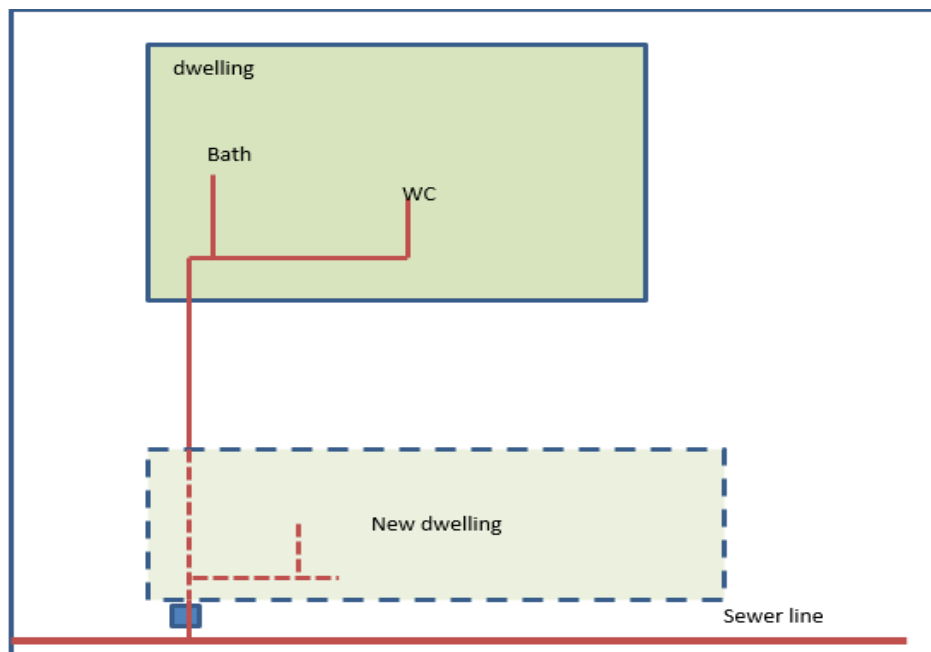
What is the problem with the status quo?

With subdivisions for infill developments becoming increasingly common, plumbing practitioners are commonly facing challenges with being able to comply with Clause 3.2. These compliance issues commonly arise in one of the following scenarios:

- where an existing external drain is built over
- where an existing drain located under a building is used to service both that building and an additional building on the same parcel of land that is subsequently subdivided from the original parent lot
- where a drain located under one building (i.e., a garage) does not serve any fixtures in that building but services fixtures in another nearby building.

As illustrated in Figure 4 below, a common scenario is where an allotment has been subdivided and an additional dwelling is constructed over the existing drain. In many circumstances, it is impractical or impossible for plumbing practitioners to comply with the requirements set out in the standard, and the one drain is used to serve multiple dwellings.

Figure 4: New dwelling built over existing drain



In many instances, a drain located under or inside one building will serve fixtures in more than one building, including its own building and a nearby building. In other instances, the drain will not serve any fixtures in the building under which it is located, but will serve fixtures in another building, e.g., property service drains, shared property service drains, combined property service drains and encroaching property service drains.

New dwellings frequently receive planning approval to be built right up to the boundary to the neighbouring lot to maximise available space, and it becomes impractical or impossible to relocate the existing drain. The current planning permit application process does not (and is not required to)

consider the setting aside of sufficient space within each allotment to construct the necessary sanitary drainage systems to service the additional dwelling(s). As a result, many plumbing practitioners are faced with the decision on how best to comply with the existing plumbing requirements.

The increasing prevalence of subdivisions for infill developments throughout Melbourne and regional centres ultimately presents two key issues. The first relates to the practical difficulties this presents for plumbing practitioners to comply with the standard and the associated risks (for instances where the requirements for the laying of below ground sanitary drains are not met) while the second key issue pertains to the costs to government and industry associated with ensuring compliance. Both are considered below.

Currently, where plumbing work cannot comply with Clause 3.2 of AS/NZS 3500.2, it appears that ultimately one of three scenarios result in practice. These include a plumbing practitioner doing one of the following:

1. Applying to the VBA for a plumbing modification to modify the application of the regulations (including the standard) in the particular circumstances under section 221ZZO of the *Building Act 1993*.²⁷ The VBA may approve a modification to the regulations in specific circumstances outlined in the application with certain conditions.
2. Applying a performance solution to the installation which complies with the PCA.
3. Not applying for either of the above and connecting the new dwelling's drains below an existing dwellings system in contravention of the plumbing requirements.

The costs and delays associated with seeking a performance solution typically exceed that of the plumbing modification process, so is generally not pursued by the plumber.

During 2016-17, the VBA received 521 applications for plumbing modifications relating to the application of Clause 3.2. This issue represented approximately 95 per cent of all modification applications received by the VBA for the year.

The cost of this process for the plumber is largely through delay costs. In terms of administrative costs, the need to apply for a modification in every instance results in aggregate costs of around \$122,700 per annum.²⁸ The time spent waiting for a modification application to be approved is an additional burden on industry as well as consumers waiting for the work to be done. Practitioners need to wait until they receive formal approval before they can undertake the modified work. This can create difficulties with other contractors as well as property owners, which may lead to the practitioner being pressured or even passed over for future work. The VBA advises that it typically takes around 10 business days for its internal process to determine and communicate its decision on most modifications applications.

A non-compliant installation may not be detected until many years after the construction of the additional dwelling/s. Where non-compliant work is installed, there are significant risks in the event of a drainage failure, which pose potential health risks from blocked or overflowing sewage and can result in significant cost to rectify property damage.

²⁷ The majority of modification applications received by the VBA involve either a dual occupancy (where a drain is serving two (or sometimes more) dwellings on a single lot) or land which has been subdivided (and the drain from one lot is being used to serve fixtures in a dwelling or dwellings on the other lot).

²⁸ This is based on 521 applications per year, each incurring costs of \$114.18 in application fee and around \$120 in time cost to prepare an application (based on anecdotal reports, the estimated time taken for most practitioners to prepare and acquire the necessary documentation and plans, complete and lodge the modification application is 120 mins per application. The hourly charge rate for a plumbing practitioner is assumed at \$60 per hour (\$41.10 in wage costs plus an allowance for overheads and oncosts—see Appendix C).

The nature of plumbing work associated with Clause 3.2 of AS/NZS 3500 means it is difficult to accurately determine where the failure has occurred due to lack of inspection shafts. This, in turn, significantly increases the risks that may arise in the event of a sanitary drainage failure. These risks include:

- blockage under the new dwelling affecting both dwellings (toilets in both houses backfilling, etc.)
- undetected leaks from a damaged section of pipe leading to excessive moisture beneath the concrete slab/ building which may lead to damage to the building fabric (foundation settling, etc.)
- significant accessibility constraints. Any rectification work in this area may require the floor and slab to be cut through to access the drain. Such work would be costly, highly disruptive and require a building permit to proceed
- unclear liability for each owner in the case of a fault.

The VBA does not have specific data on the possible number of installations where drains are laid in contravention of Clause 3.2 of AS/NZS 3500.2. However, planning permit activity data obtained by the department provides that there were 7,889 planning permit applications approved in 2016/17 for multiple dwellings. It is difficult to estimate from this data the exact proportion of these planning permit applications which would involve the location of drains under one building servicing fixtures in another building.²⁹ Despite this, the department considers it reasonable to assume that non-compliance is high and hence warrants the consideration of regulatory intervention.

Proposed change: amend the requirements to allow sanitary drains to service more than one dwelling

The proposed new regulation would effectively enable, in codified form, a simple modification to the requirements of Clause 3.2 of AS/NZS 3500.2 in relation to below ground sanitary drainage, provided that certain conditions are complied with. These conditions, which are proposed to address the risks associated with carrying out below ground sanitary drainage work that is unable to comply with Clause 3.2 of AS/NZS 3500.2, include ensuring that the below ground sanitary drain:

- be laid as a straight line of drain with no branches or changes in direction—this is to reduce the likelihood of any blockages in the section of built over drain where that drain services another building by removing known points of obstruction
- be constructed of a material which complies with the requirements in Section 2 of AS/NZS 3500—this makes it clear to plumbers that the appropriate fit for purpose material must be used in this work, whether this involves working on an existing drain or laying a new drain
- have inspection openings with shafts terminating at the finished surface level, installed in permanently accessible positions, in the open air at the upstream entry and downstream exit points—these are required to ensure that the drain is capable of being maintained from surface level throughout its serviceable life without having to excavate a drain laid within the curtilage of another property.

This approach would provide a clear codified requirement that would apply to the plumber in situations where previously the plumber would have to apply to the VBA for a modification to the requirements or worse nominate to not apply for a modification process, leading to non-compliance

²⁹ Data obtained from the planning permit activity from the Planning Permit Activity Reporting System unit of the department. Since the publication of *the Planning Permit Activity Annual Report 2014-15*, the categories of statistical information for planning permits recorded by the department have changed. In 2014/15 report, under the category “Dwelling related activity across Victoria”, the subcategories were: one dwelling, between 2-10 dwellings and more than 10 dwellings. Since then, the last two subcategories have been consolidated into a new subcategory, “multiple dwellings.” This slightly inflates the updated for 2016/17, compared to 2014/15.

with potentially significant risks to consumers. The impact of the proposed change to the Regulations would enable below ground sanitary drains to service more than one dwelling without application to the VBA for a modification in particular circumstances. The department notes this additional requirement would only apply to plumbing work in circumstances where a subdivision approval process had not sufficiently taken account of 'first best' requirements for sanitary drainage (i.e., one sanitary drain per property).

The department notes that the proposed regulation will only apply to below ground sanitary drains, not to stormwater drains. This is because Clause 3.2 of AS/NZS 3500.2 only specifies the requirements for the location of sanitary drains.

The VBA estimates that giving effect to this proposed regulation would eliminate about 95 per cent of modification applications it receives, resulting in a significant reduction in administrative burden for the VBA. In addition, it will mitigate the need for plumbers to apply for a modification in most circumstances, except in scenarios which did not meet the conditions set out in the proposed new regulation which is expected to occur in the minority of cases. It would also reduce the amount of resources the VBA allocate to assessing modification applications and the time of plumbers to apply for modifications. Based on the above assessment of costs of applying for modifications, the expected savings would be around \$116,000 per annum in avoided administrative costs to plumbers (95 per cent of the current total cost of modification applications of \$122,700), and a greater benefit to industry (and subsequently consumers) by reducing delays while applications for modifications are assessed.

In addition to the immediate cost savings to plumbing practitioners that currently pay for a modification application, there are wider societal benefits from enhanced compliance. Non-compliant installations would (it is believed) occur significantly less frequently, and the safeguards provided by the amended clause (including providing for inspection points and no branches or changes of direction) would limit the risks and consequences of drain failure. The department expects the impact will reduce the number of non-compliant installations because it will affect the behaviour of those who are currently not applying for modifications and doing the work anyway.

On the basis that this proposal reduces regulatory costs while reducing risks of damage to properties in the long-run due to a reduction in non-compliant work, the department considers this change provides a net benefit to the community as a whole and has included it in the proposed Regulations.

Question for stakeholders

Will the proposed requirement provide additional compliance clarity to practitioners when they are required to service more than one building with the same sanitary drain or are there any unintended consequences from the proposal?

1.4 Other minor changes proposed in relation to drainage work

Change proposed	Rationale
Inclusion of relining work as part of scope of work for drainage.	To reflect recent technological changes and industry best practice, clarify for industry practitioners that any relining work carried out on a drainage system is regulated drainage work. Relining technology is an increasingly common method of repairing damaged drains. It is a process which involves the placement of a lining material inside an existing pipe to repair any leaks or cracks and to smooth surfaces, without the need to replace the pipe. The absence of this term results in uncertainty for industry over whether this is captured in the scope of drainage plumbing work.
The term 'disposal system' has been replaced with specific terms relating to sanitary drainage and stormwater drainage.	To clarify for industry where drainage work begins and ends in relation to sanitary drainage and stormwater drainage. Previous drafting of scope of work was ambiguous for industry, which may lead to plumbers undertaking work that is not considered plumbing work.
Excavation work is explicitly excluded from the scope of work for drainage, including where trenchless technology is used.	To address industry uncertainty, trenchless technology associated with excavation work has been explicitly excluded from the scope of drainage work.

B.2 Fire protection

2.1 Current arrangements

Fire protection work is the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of fire protection systems and equipment requiring a water supply, including work on:

- a fire hydrant or hose reel
- a residential or domestic fire sprinkler system
- a commercial or industrial fire sprinkler system
- a fire system pumpset other than the commissioning of a fire system pumpset.

Fire protection work also includes any design work that is incidental to, or associated with, any work described above.

Fire protection systems are designed, installed, tested and maintained to ensure water can be reliably used to control the outbreak of a fire.

Defective or inadequately performing fire protection systems or equipment can result in a fire more quickly spreading throughout a building, which could lead to catastrophic consequences including serious injury or death, significant damage to property and assets, or environmental harm.

The following table sets out the elements of the current Regulations that apply to fire protection:

Qualification	Experience	Other work standards
Cert III in fire protection (including approved competency units)	Completion of apprenticeship OR 4 years' experience	AS/NZS 1530.3 AS 4118.1.1 to AS 4118.1.8 AS 2941 AS 2118.2/3/8/10 AS 1851 AS 1682.2

While there is agreement with all states and territories to ensure that there is a nationally consistent approach to plumbing standards work as provisioned through the PCA, at the state-level additional standards or changes to standards may be appropriate. In Victoria, there are specific types of regulated plumbing work that are not within the scope of the PCA and the department considers that additional specific standards need to be specified to apply to this work to ensure an agreed compliance standard for practitioners and the VBA.

The Australian Standards were introduced as part of the creation of the separate fire protection class during the Plumbing Regulations 2008 and have not been changed. They are intended to complement the requirements set out in the PCA. They cover a range of requirements, including the requirements for components of a fire protection system such as sprinklers, sprayers and valves. These Standards relate to the components of the fire protection system which in the view of the department is not sufficiently covered in the PCA.

The other Standards that are prescribed relate to systems not covered by the PCA such as drencher and deluge sprinkler systems, which the department considers are activities that have a high level of risk and warrant work standards to provide clarity on compliance for the VBA and practitioners.

As at 30 April 2018, there were the following number of plumbers in this class:

	Registered	Licensed
Fire protection	582	118

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to fire protection work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Fire protection class
Continue current Regulations	\$919,116
Additional cost from new experience requirements for obtaining a licence	\$2,336
TOTAL	\$921,452

2.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, stakeholders raised the following issues:

Issue raised	Department response
Introduction of a new class for routine servicing with lower level qualification and experience requirements for licensing and registration.	Considered below—the department is of the view that the level of knowledge and experience required to carry out all routine servicing work is set appropriately as part of status quo arrangements. In the absence of data on the risks associated with this change, the department considers that the potential for a new class for routine servicing could compromise intended fire safety outcomes for building occupants and the community. This proposal for change is detailed further in section 2.3 below.
Introduction of a new class of work for third party certifiers. Industry has proposed that under the new class, third party certifiers would assess completed work and certify that the fire system has been installed as per design parameters.	Out of scope—the department considers this proposal to be out-of-scope as a new class covering third party certification of fire systems would capture a type of work that is not substantive plumbing work.
Introduction of a new class for fire system designer.	Not progressed/out of scope—the department considered that amending the definition of ‘plumber’ to include a practitioner that works on the design of a plumbing system could lead to unnecessary confusion for consumers and industry. The department considers that to give effect to this proposal (e.g., provide for a scope of work for practitioners working on the design of any plumbing system), it would be prudent to amend the Act. See discussion on complex

	plumbing as part of the forward work program for more information.
Removal of the term 'construction' from scope of fire protection work.	Not progressed—the department considers that the term 'construction' should be retained to capture any on-site assembly carried out by the installing plumber.

2.3 Proposed change: new class of work for routine servicing

Background

Fire protection systems and equipment located within a building must be routinely serviced to ensure that they operate effectively in the event of a fire emergency. Regular servicing of fire protection systems and equipment (including fire hydrants, hose reels, sprinklers and pumpsets), involves inspection, testing and preventative maintenance work carried out in accordance with the requirements of 'Australian Standard 1851 2012: *Routine Service of Fire Protection Systems and Equipment*'.

It is essential that fire protection systems are correctly maintained so that they are able to perform effectively and efficiently to protect assets and people against the effects of a fire outbreak. Routine servicing work plays a critical role in reducing the risk of fire protection systems or equipment failing to perform as designed or installed. If routine servicing is not carried out on a periodic basis, or is not done correctly, there are a number of system failures that can occur in the event of an emergency. These include:

- a fire pumpset failing to supply water due to an engine fault, impacting the entire fire protection system
- a sprinkler system failing to supply water due to damage or obstruction
- water from a hose reel not flowing at optimum pressure due to a leak
- a fire hydrant failing to provide a continuous water supply due to a stuck cap (a plug that covers the opening to the water supply).

The routine servicing requirements of AS 1851 require various tasks to be performed on fire protection systems or equipment at specific intervals throughout the life of a building. All AS 1851 tasks are carried out to ensure that the fire protection systems and equipment continues to operate effectively to ensure life safety outcomes for building owners and the community.

Given the importance of routine servicing work and its impacts on safety and property, it is essential that individuals carrying it out have the appropriate level of knowledge, skills and experience to perform it correctly and competently.

Views of stakeholders

Both through the early consultation process run by the department in 2017 to inform the remake of the Regulations and through the VBA's Plumbing Stakeholders Reference Group Sub-Committee on fire protection over the last 12 months, industry stakeholders provided views on appropriate training and competency requirements to carry out routine servicing work. The stakeholders' views showed there is a clear division between those who consider that all routine servicing work should be carried out by fire protection plumbing practitioners and those who believe that less complex routine service tasks can be performed by individuals whose training and experience is significantly lower than that required under the main class of fire protection.

The Fire Protection Association of Australia (FPAA), Metropolitan Fire Brigade (MFB) and Country Fire Authority (CFA) propose that some aspects of routine servicing work can be carried out by

individuals other than fire protection plumbers, such as fire safety technicians. These stakeholders propose that a new class of plumbing work be introduced for the less complex aspects of routine servicing work for the monthly, six-monthly and yearly service schedules. They contend that a suite of competencies from the Certificates II and III in fire protection inspection and testing should underpin the required level of qualifications for the new class.

Alternatively, the National Fire Industry Association, Plumbing and Pipe Trades Employees Union (PPTU), Air Conditioning and Mechanical Contractor' Association of Australia (AMCA) and Master Plumbers, share the view that the required level of competency to carry out all routine servicing work is the completion of a Certificate III in fire protection and an apprenticeship in plumbing. They suggest that to ensure the integrity of the overall fire protection system and to maximise the effectiveness of those systems, an understanding of the operation of the fire protection system as a whole (e.g., installation, rectification etc.) is necessary to carry out routine servicing effectively. They contend that any lowering of the training requirements for routine servicing work would lead to serious life and safety impacts for building occupants.

Approach in other jurisdictions

In 2009, Queensland introduced inspect and test licences for work on particular equipment, and specific competencies from the Certificates II and III in fire protection inspection and testing qualifications to inform requirements for these licences. However, routine servicing licences do not include work on sprinkler systems so routine servicing work performed on a sprinkler system must be carried out by a trade qualified plumber regardless of the schedule involved.

In 2017, South Australia created a new licence category for inspect and test work, which was introduced with the aim of reducing the regulatory requirements for routine servicing work by removing the requirement for a full plumbing qualification. The South Australian approach includes routine servicing work performed on sprinkler systems.

In Tasmania, inspect and test permits have been available since 2003. However, the scope of the work that may be carried out under this permit is limited to certain pieces of fire protection equipment, such as fire hydrants, fire extinguishers and hose reels. Critically it does not include work on sprinkler systems which are required by the National Construction Code in buildings with an effective height over 25 meters.³⁰ The inspection and testing of sprinkler systems must be carried out by a person with specialist skills.³¹

In addition, the department considers that, given the differences in the scale and complexity of building stock between the jurisdictions, it is not necessarily appropriate to rely on Tasmania's approach as a guide for Victoria.

Option for change—include routine servicing in the scope of work for fire protection work

The activities regarded as routine servicing have been regulated as fire protection work since the introduction of the Plumbing Regulations 2008. As part of the introduction of the updated AS 1851 Standard in 2012, the term 'routine servicing' was created by the relevant technical standards committee and as such the department considers it is a technical term to cover the relevant regulated activities, including 'maintenance' and 'testing' and was not intended to capture any additional activity.

Although the term 'routine servicing' was not practically able to be part of the regulated scope of fire protection when the Regulations were introduced in 2008, the existing scope of work does include 'testing' and 'maintenance' which captures routine servicing work. Therefore, the

³⁰ This is reflected in the requirement for a person to complete competencies under the Asset Maintenance (Portable fire Protection Equipment) Training Package which does not include competencies related to sprinkler systems.

³¹ Director's Maintenance of Prescribed Essential Building Services Determination, July 2017, page 3.

department considers that the existing scope of fire protection work includes all aspects of routine servicing work.

For administrative clarity, the department proposes to include routine servicing explicitly as part of the regulated scope of fire protection to bring it in line with AS 1851. Key industry stakeholders, including members of Plumbing Advisory Council (PAC), acknowledge that this clarity and consistency with AS 1851 may be beneficial as part of the proposed Regulations.

The department considers that this specific change will have no or negligible cost impacts on the sector, or involve any behaviour changes, for the following reasons:

- Trade-qualified practitioners are expected to continue to provide routine servicing to the market—in line with the training and qualifications provided to fire protection plumbers, these practitioners have been providing routine servicing to the market since the current Regulations took effect. This is expected to continue with the proposed change.
- The VBA considers that routine servicing work is regulated as part of fire protection work—the VBA’s current operational policy reflects that they monitor and enforce all aspects of routine servicing work as part of class of work for fire protection. The VBA will continue this practice under the proposed change.

The department’s preliminary analysis indicates that a proportion of individuals who are currently providing routine servicing work to building owners are not registered or licensed in the class of fire protection.³² While the consideration of a new class for routine servicing outlined below provides a further discussion on labour supply risks, the outcome of unregistered/unlicensed individuals undertaking routine servicing work may have been caused by:

- an increase in Victoria’s building stock over the past 10 years, which may have led to a higher demand for routine servicing work
- the VBA’s plumbing audits program historically focusing on areas of higher perceived risk to the community
- a lack of consistency between the Building and Plumbing Regulations regarding who can undertake work on essential safety measures. For example, under the current Plumbing Regulations, fire protection work must be carried out by a trade-qualified plumber (i.e., successful completion of Certificate III in fire protection and an apprenticeship). Under the Building Regulations, work in relation to non-wet systems (such as smoke alarms or fire extinguishers) may be carried out by ‘competent persons’.

The department notes that the VBA has committed to increasing its proactive inspections of wet fire safety systems in buildings, including routine servicing work. The VBA’s increased activity of responding to, and identifying, non-compliant routine servicing work carried out on relevant fire equipment will reduce any ambiguity about who can legally undertake this work, and help identify the risks in practice of work being undertaken by unregistered parties. However, the department notes that this operational decision by the VBA is not contingent on the regulated scope of fire protection work including routine servicing.

Changes to the Building Regulations are out of scope for the remaking of the Plumbing Regulations and hence were not further considered or addressed as part of this process (please see further discussion on this as part of the forward work program in Part C—page 139).

³² The department acknowledges that further work is required to better understand the current labour supply picture, as well understanding the causes of unregistered / unlicensed individuals undertaking routine servicing work. This is further discussed in the section 2.6 of the forward work program (see page 151).

The department considers that the administrative clarification to include routine servicing work as part of fire protection is appropriate to bring it in line with the terminology used in AS 1851.

Options for change—introduction of new class for routine servicing work

Continue the status quo

The status quo (continuation of the arrangements in the current Regulations), would see people undertaking all routine servicing work continue to be required to hold a registration or licence in the fire protection class.

The current requirements for licensing or registration include the completion of a Certificate III in fire protection, an apprenticeship in plumbing and passing the VBA's exam.

The Certificate III in fire protection comprises 53 competency units which provide training in the full scope of fire protection plumbing work, including activities such as construction, installation, replacement, repair, and routine servicing for fire protection systems and equipment regulated under both the Building Regulations and Plumbing Regulations.

The apprenticeship in fire protection work typically involves practical, on the job training obtained over several years under the supervision of a trade qualified fire protection plumber. As part of their training, apprentices observe and take part in the full range of fire protection work. This includes all routine servicing tasks prescribed by AS 1851 carried out in a broad range of buildings across Victoria, such as aged care facilities and multi-storey towers. There are a number of reasons why a system-wide appreciation of a fire protection system can be important when undertaking routine servicing work. Trade qualified practitioners are likely able to do this work more efficiently than practitioners that could be trained under Option A (outlined below). This sophisticated knowledge will lead to the same trade qualified plumber being able to diagnose the issue should any problem be identified with the fire protection system through testing. Thus, the department considers that efficiencies and cost savings can result from having a trade qualified plumber undertake routine servicing.

A potential risk with the status quo is sufficient labour supply to perform routine servicing work. As part of early consultations, stakeholders from the FPAA undertook analysis to indicate that labour supply shortages may have led to individuals who are not licensed or registered fire protection plumbers undertaking this work. Stakeholders from the NFIA consider that the supply of fire protection plumbers is sufficient. They indicate that the apparent low number of licensed and registered fire protection plumbers is a result of practitioners failing to renew their expired licence or registration.

The department has undertaken preliminary analysis on the issue of labour demand and supply for routine servicing work. The results indicate that should routine servicing work only be undertaken by existing registered and licensed plumbers, the market may experience a 20 per cent shortfall in meeting demand. However, the department acknowledges that the analysis was limited and more comprehensive research is required. Moreover, the NFIA contend that there is a significant number of fire protection apprentices coming up through the system which will increase the number of licensed or registered practitioners in the near future—274 fire protection apprentices are currently in training with the industry's training provider Fire Industry Training (FiT) Melbourne campus. Given this, and the fact that the quality of the data used in the department's initial analysis could be improved by expanding the scope of data collected or by undertaking additional research, the department will monitor the market in the short term to identify any potential short-term supply issues. The department requests the input of industry stakeholders to better understand the dynamics in the labour market for routine servicing work.

The options for change considered by the department were:

Option A: create a new class of plumbing work—routine servicing (fire protection equipment)

In considering a new class of plumbing work for routine servicing, the department had to identify an appropriate scope of work and appropriate training and experience requirements.

Scope of work for new class

Under the new class, work would include routine servicing of equipment currently covered under the fire protection class of plumbing, including:

- a fire hydrant or hose reel
- a residential or domestic fire sprinkler system
- a commercial or industrial fire sprinkler system
- or a fire system pumpset.

The department considers that the scope of this option should be limited to the less complex routine servicing activities under the monthly, six-monthly and yearly service schedules in alignment with AS 1851. The department’s initial analysis is that the monthly, six-monthly, and yearly service tasks are generally less complex, involving work such as the application of lubricants, cleaning of strainers, sighting of relevant equipment and its associated labelling, and the like.

However, tasks that fall under the five-yearly, ten-yearly, twenty-five yearly and thirty-yearly schedules are generally more complex and would not inform the scope of this new class. Work under the five-yearly schedules and above involves more complex work such as hydrostatic pressure testing of the water servicing the equipment and simulating equipment failure and the department considers it is appropriate that this work be exclusively carried out by trade qualified plumbers. In addition, all other fire protection work (installation, rectification, alteration etc.) would be excluded from the new class to be retained as part of the broader class of fire protection work.

It is noted that trade-qualified plumbers registered or licensed in fire protection work would continue to be able to carry out all routine servicing work under the existing class of fire protection.

Training and experience requirements for proposed new class

The qualification requirement for registration or licensing would be a number of units of competency from the Certificate II or III in fire protection inspection and testing. These are nationally recognised qualifications under the National Training Package for property services, approved by the Construction and Property Services Industry Skills Council in 2009. There are nine units that appear in either the Certificate II or III that provide competency to carry out the less complex aspects of routine servicing work. These include:

CPCPFS3041A	Inspect and test fire pumpsets
CPPFES2037A	Inspect and test fire hydrant systems
CPPFES2010A	Inspect and test fire hose reels
CPCPFS304A	Conduct basic functional testing of water-based fire suppression systems
CPPFES2047A	Inspect and test control and indicating equipment
CPPFES2016A	Inspect, test and maintain delivery lay flat fire hoses
CPCPFS 3042A	Conduct annual functioning testing of complex water-based fire-suppression systems
CPCPFS3043	Conduct functional water flow testing
CPPFES2004A	Identify types of installed fire safety equipment and systems

Under this option, stakeholders from the FPPA have proposed that applicants would be required to demonstrate 12 months of practical experience in routine servicing work. The intention is to ensure that practitioners carrying out this work have a sufficient level of practical knowledge and skill, in addition to formal training through the relevant competency units, to carry out the work safely and in accordance with the requirements of AS 1851.

The identified training competencies above are broadly consistent with the competencies prescribed by South Australia and Queensland, noting some interjurisdictional differences outlined above.

Option B: remove the less complex aspects of routine servicing work from the Plumbing Regulations

This option would result in the complete deregulation of the less complex aspects of routine servicing work, undertaken at the monthly, six-monthly and yearly service schedules. Taking account of the more complex nature of routine service activities at the five-yearly or greater schedule, this work would remain regulated plumbing work under the remade regulations.

This option would be given effect through an amendment to the definition of fire protection work to exclude any routine servicing carried out in accordance with the yearly service schedule or below. The practical effect is that building owners would be left to identify the appropriate practitioner to undertake this work.

This is reflective of the current arrangements under the Building Regulations 2018 for work carried out on non-wet fire protection systems, such as smoke alarms or fire extinguishers. While the Building Regulations 2018 do not specify who may carry out essential safety measures work, there is an indirect requirement that this work be carried out by 'competent persons' if a maintenance determination specifies that AS 1851 applies to essential safety measures work.

Costs and benefits

The above options for change are assessed in relation to the current requirements (status quo). If an option does not demonstrate a net benefit compared to the status quo, the status quo remains preferred. This approach reflects that the department considers the current broad approach has a net benefit relative to a 'base case' of no regulation (see Part A of this RIS). This part only assesses if any potential departures from the current arrangements are justified.

Option A: new class for less complex routine servicing work

The change to the work classes would result in costs and savings to plumbers in two key ways:

- Costs for individuals not currently registered—New costs to people who are not currently registered in the fire protection class, or would not have pursued registration in the future, but will do so if the new routine servicing class is created. The additional costs of becoming registered in the new class would be around \$30,000 per practitioner.³³ However, the department is unable to ascertain how many additional people may become registered in the new class under this scenario. A preliminary analysis of demand for routine servicing work suggests that there may be between 50-80 people who may become registered under the new class upon its creation, with an ongoing additional 5-10 per year. However, there is significant uncertainty about these estimates. Further, it is not clear that all people currently performing routine servicing work outside the registration requirements would become registered.
- Substitution impact of practitioners nominating new class instead of exiting class—For new plumbers that would become registered for the first time, there could be around 5 plumbers per

³³ Although it is not known how many people not registered may already have the required competencies that would already satisfy the registration requirements.

year who would no longer need to register in the current fire protection class, instead only meeting the requirements of the routine servicing class.³⁴ These plumbers would each save around \$60,000 of the cost of meeting the registration requirements (drawing on the costs of being registered discussed in Part A of this RIS). This gives a total cost saving for this group of around \$300,000 per year. This costing component considers specifically the 'net impact' of practitioners who would have normally undertaken training in fire protection to undertake routine servicing work but will instead undertake training for the new class.

Therefore, on balance, the change in aggregate costs to the group of people performing routine servicing work is not known.

The new class would lower compliance costs for building owners. A new class for routine servicing could increase the labour supply of practitioners over the long term, which could put downward pressure on the cost to building owners.

Against this, the department is unable to determine the change in risk profile associated with routine servicing work under this option. In particular, the department has not been able to obtain evidence of any differences in adverse safety outcomes depending on whether routine servicing work has been undertaken by registered plumbers or unregistered providers.

In addition, the department notes that South Australia's approach for routine servicing work on all aspects of fire protection equipment, including the higher risk and more complex equipment of sprinkler systems, has only operated since 2017.³⁵ As a result, the advantages or disadvantages of this approach are yet to be evaluated and quantified.

Option B: remove less complex routine servicing work from the Plumbing Regulations

As there is an existing labour force of other individuals carrying out routine servicing work, it is anticipated that this option could increase the supply of services to building owners. However, given that the work would not be regulated, there would be no administrative or regulatory oversight for individuals performing the work. This could lead to perverse outcomes, including:

- a reduced ability for consumers to recoup costs for defective work under the practitioner's insurance policy, noting that the holding of insurance is required for all plumbing practitioners operating under a licence
- removal of the VBA's compliance and enforcement capabilities in relation to this work
- establishing the conditions for unqualified or inexperienced practitioners to enter the market, increasing the risk of non-compliant work.

The department notes that the VBA's ability to oversee plumbing work is exclusively provided through the registration and licensing scheme. This is based on the requirement in the Act that requires plumbing work to be carried out by a licensed or registered practitioner. For example, because a practitioner is registered or licensed, the VBA is able to discipline this practitioner for non-compliant or defective work. However, should a non-registered/non-licensed individual undertake work that is not regulated plumbing work there is no head of power in the Act to enable the VBA to either monitor the quality of this work or to impose additional obligations on building owners or non-registered/non-licensed individuals. The department notes that there are significant penalties and

³⁴ A small survey of plumbers in this group indicated around 20 per cent did work exclusive to routine servicing. There are around 25 new plumbers in this class annually. This change would only affect new entrants, as existing plumbers would be automatically transitioned.

³⁵ While Queensland's arrangements have been in place since 2009, they do not include work on sprinkler systems, which the department considers to be more complex and higher risk than routine servicing work on other fire protection equipment (e.g., hydrants, hose reels, etc.).

sanctions in place for unregistered or unlicensed individuals who are found to be undertaking plumbing work.

In light of the impacts to safety and property, it is essential that practitioners carrying out routine servicing work are appropriately qualified and experienced. Despite the nature of the work being less complex than other types of fire protection work, the consequences of a system failing to perform as intended as a result of incorrectly performed routine servicing is significant. In light of the risks, the department considers it is critical that the VBA is able to monitor and initiate disciplinary proceedings against practitioners who do not comply with the servicing requirements of AS 1851. The department considers that the adoption of Option B could significantly compromise these policy and regulatory outcomes, noting that under this option the VBA would not be able to monitor work undertaken by unregistered or unlicensed individuals in an operational capacity.

Preferred option

The department considers the safe and effective operation of fire protection systems to be paramount in meeting life and safety outcomes for building occupants and the broader community. As a result, the department's preferred option is the 'status quo' arrangement, with an amendment that explicitly includes 'routine servicing work' in the definition of the class of fire protection work to be aligned with technical language used in AS 1851.

The department considers the limited available information means the implications of proposing a new class for routine servicing cannot be fully understood. While there may be some cost savings associated with the changes, there may also be an increase in risk, the extent of which is unknown at this stage. Given the importance of protecting the life and safety of building occupants, the department considers that changing the competencies of plumbers performing this work could lead to serious life and safety impacts and hence represents an unacceptable risk. The department considers that this approach is justified, until further information can be obtained about the risks associated with work being undertaken by those who are not trade-registered plumbers

Consistent with the precautionary principle, the department considers the appropriate level of knowledge and skill required to ensure the integrity of fire protection systems should be acquired from the completion of a Certificate III in fire protection and the practical training gained from an apprenticeship. While Option A may have the additional benefit of bringing unregistered routine servicing workers into the regulated system, its effectiveness in achieving this is unknown. The department acknowledges that other jurisdictions have nominated to introduce categories of licence for routine servicing work to include competencies from the Certificate II or III in fire protection inspection and testing. However, the department has decided to await further data and evidence from South Australia's approach, particularly in light of the approach taken to sprinkler systems, which is more complex and higher risk relative to work on other fire protection equipment.³⁶

The department notes that, because some routine servicing work is currently undertaken by those who are not registered or licensed plumbers, the preferred approach in combination with the VBA increasing its proactive inspections of wet fire safety systems may increase the costs of this work, and create a risk in the short-term that the available number of qualified practitioners may not be able to meet the demand for the work (with possible implications for the maintenance of the systems). Nonetheless, the department considers that this approach—combined with the department and the VBA monitoring the situation to identify any short-term supply issues—is appropriate, until further information can be obtained about the risks associated with work being undertaken by those who are not trade-registered plumbers.

³⁶ This will assist to quantify the risks associated with an alternative approach that lowering the qualification and training for practitioners undertaking routine servicing work, particularly on changes to rates of non-compliant work and impacts on the health and safety of building occupants.

As fire protection systems are a complex series of interdependent components, the training obtained through the Certificate III in fire protection and apprenticeship equips trainees with the required level of foundational knowledge of how the overall system works and the interplay between each component of the system. The department considers that an in-depth understanding of the design and installation of the system is required to perform routine servicing work to a high standard. This level of knowledge and skill is particularly important when working on commercial high-rise buildings utilising complex fire protection systems.

While undertaking routine servicing work, trade qualified practitioners are able to:

- carry out the full range of servicing activities under each applicable AS 1851 schedule
- identify the existence of a problem as well as why the problem is occurring
- identify and respond to the effects of the problem on other components of the system
- perform timely, on-site rectification works to repair any defects identified.

To preserve intended fire life safety outcomes, the department believes that thorough and comprehensive training in fire protection work is required for all routine servicing work.

At this stage, the department does not wish to make changes to the class of fire protection work that could add a further layer of complexity in relation to who can carry out work on essential safety measures. As noted above, there is a requirement in the Building Regulations for a 'competent person' to carry out the work in relation to non-wet systems, while the Plumbing Regulations require a practitioner to be licensed or registered in fire protection. Introducing a third class of person entitled to carry out some, but not all, routine servicing work could create unnecessary confusion for consumers and industry. The department does not believe this is desirable given the life safety importance of essential safety measures.

In addition, the VBA has committed to increasing its proactive inspections of wet fire safety systems in buildings. The VBA's increased activity of responding to, and identifying, non-compliant routine servicing work carried out on relevant fire equipment will reduce any ambiguity about who can legally undertake this work, and help to identify the risks in practice of work being undertaken by unregistered or unlicensed parties. It will also increase building owners' awareness that routine servicing work can only be carried out by plumbers licensed or registered in the class of fire protection work.

The department notes a proposed forward work program outlined in Part C—page 139 for further input from stakeholders.

Questions for stakeholders

Are there other ways to ensure routine servicing work is performed to a high standard, with regulatory oversight, while also ensuring there is adequate supply of plumbers for this work?

Can stakeholders provide evidence of actual harms that have been caused by unlicensed or unregistered work?

B.3 Gasfitting

3.1 Current arrangements

Gas appliances can vary in size, operating pressure and complexity, ranging from small domestic gas space heaters to large industrial steam boilers or industrial furnaces. Victoria's *Gas Safety Act 1997* defines gas appliances as either type A or type B.³⁷

Gasfitting work with these two types differs in nature, complexity and risk. For this reason, gasfitters need to be qualified for and experienced with the type of appliance on which they are working.

The main class of gasfitting captures work on a type A appliance, but does not include the activities falling within the specialised classes of type A appliance servicing work or type A appliance conversion work. Gasfitting work also does not include any work on a type B appliance, as this work is regulated under the classes of type B gasfitting and type B gasfitting advanced work.

Gasfitting is a very high-risk activity that has potential for loss of life through gas leaks or inappropriately maintained gas appliances. Gas leaks may cause harm to people through exposure (inhalation) or may lead to fires or explosions (risk to people and property).

The following table sets out the elements of the current Regulations that apply to the gasfitting main class and the associated specialised classes, including type A appliance conversion work, type A appliance servicing work, type B gasfitting and type B gasfitting advanced work classes:

Class	Qualification	Experience	Other work standards
General gasfitting class	Cert III (including approved competency units)	4 years' experience, OR Completion of apprenticeship	nil
Type A appliance conversion work	Must first be registered/licensed in general gasfitting class		nil
Type A appliance servicing work	Cert IV competency associated with work	Must first be registered/licensed in general gasfitting class	nil
Type B gasfitting work	Cert IV competency associated with work	Must first be registered in general gasfitting class, AND hold restricted electrical worker's licence (Class 2) 2 years' experience in Type B gasfitting work	nil
Type B gasfitting advanced work	Must be first registered in Type B gasfitting class		nil

³⁷ The *Gas Safety Act 1997* defines type B appliances as appliances with a gas consumption in excess of 10MJ/h. Type B appliances use both natural and liquified petroleum gas (LPG), which are a major source of energy used for both heating and cooking in residential, commercial and industrial premises. Other appliances are deemed to be Type A.

As at 30 April 2018, there were the following number of plumbers in this class and specialised classes:

	Registered	Licensed
Gasfitting work	12,273	8,602
Type A appliance conversion work	172	588
Type A appliance servicing work	6,804	6,262
Type B gasfitting work	311	325
Type B gasfitting advanced work	40	128

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to gasfitting work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Gasfitting class
Continue current Regulations	\$1,892,151
Additional cost from new experience requirements for obtaining a licence	\$270,598
TOTAL	\$2,162,749

3.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, stakeholders raised the following issues:

Issue raised	Department response
Clarify the difference between the scopes of work falling under type B gasfitting and type B gasfitting advanced work.	Progressed—the department has reviewed the respective scopes of work to appropriately differentiate the activities that fall within each class (see below).
Insurance for type B gasfitting work should be limited to professional indemnity for design and installation work and public liability.	Out of scope—there is no regulation making power under the Act to prescribe the level of insurance for licensed practitioners.
The term ‘construction’ should be removed from scope of type B gasfitting work.	Not progressed—the term ‘construction’ is intended to capture the assembly of components for a type B appliance on-site. A type B appliance constructed off-site, for example in a factory, is considered a plumbing product and therefore not regulated plumbing work that must be carried out by a licensed or registered practitioner. ³⁸

³⁸ For further information on the distinction between on-site and off-site construction see the VBA Technical Solutions Sheet on off-site construction: http://www.vba.vic.gov.au/__data/assets/pdf_file/0013/50422/Fact-Sheet-Regulatory-requirements-for-the-off-site-construction-of-plumbing-systems.pdf

Issue raised	Department response
Proposed new additional specialised type B gasfitting classes, including electrical, instrumentation, industrial gas pipework, gas engines, gas turbine, specialist commissioning, microturbine and fuel cells.	Not progressed—the department considers that the identified amendments to the scopes of work for type B gasfitting and type B gasfitting advanced work are sufficiently reflective of industry practice.
Regulation 20(1)(a)(i) could be mistaken to mean that only appliances are included as ‘gasfitting work’ in a caravan and not the entire structural piping system that attaches to those appliances.	Not progressed—the department considers that the current wording is sufficiently clear regarding the scope of work for gasfitting.
A new class of plumbing practitioner should be created limited to carrying out plumbing work on caravans.	Not progressed—the department does not believe that there is sufficient justification to create a specific class limited to work on caravans at this stage, given that plumbing work on caravans is sufficiently addressed in the relevant scopes of work. See discussion on caravans and houseboats as part of the forward work program (see Part C—page 148).
In relation to the caravan industry, there is a lack of effective enforcement of the plumbing standards in relation to the caravan industry.	Out of scope—the enforcement of the regulations is an operational responsibility of the VBA. Any known instances of non-compliance should be reported to the Regulator. See discussion on caravans and houseboats as part of the forward work program (See Part C—page 148).
A new class of plumbing practitioner should be created limited to carrying out plumbing work on caravans.	Not progressed—the department does not believe that there is sufficient justification to create a specific class limited to work on caravans at this stage, given that plumbing work on caravans is sufficiently addressed in the relevant scopes of work. See discussion on caravans and houseboats as part of the forward work program (See Part C—page 148).

3.3 Testing of carbon monoxide spillage work remains regulated gasfitting work

In May 2018, a Coronial Inquest begun into the death of a woman who died from carbon monoxide poisoning resulting from the operation of an open flued heater within her home. The department understands that this inquest will consider a number of matters in relation to this death, including:

- the safety of existing open flue heaters for consumers and what steps can be taken to protect consumers from exposure to carbon monoxide spillage³⁹

³⁹ In April 2018, ESV issued a safety alert for open-flue gas heaters, urging individuals not to use them until they have them checked by the manufacturer. Despite this, ESV consider the if the heater is serviced and tested every two years it is safe to use.

- the appropriateness of the use of open flue gas heaters in high-rise units, including public housing, which tend to have limited ventilation, therefore increasing the risk of toxic levels of carbon monoxide in the home from the use of open flue heaters⁴⁰
- the appropriate qualifications and training for gasfitting plumbers undertaking the servicing and testing work on open flue heaters, including the testing of carbon monoxide spillage testing.

Work associated on open flued heaters must be undertaken by registered or licensed plumbers in the classes of gasfitting work or type A appliance servicing work.

In analysing the appropriate scope of regulated plumbing work associated for gasfitting practitioners, the department considered that the existing scope of work sufficiently provisioned for practitioners to undertake the installation, maintenance and servicing of gas heaters, which includes the testing of carbon monoxide spillage associated with this work. As such, the department nominated to continue the existing scope of regulated gasfitting work.

The department is committed to protecting the health and safety of consumers using gas appliances, as well as ensuring that practitioners are sufficiently qualified and trained to undertake gasfitting work safely and competently.

Once the findings of the Coroner's inquest are handed down, the department will work closely with the VBA and ESV should any additional changes be required to further strengthen existing protections for the health and safety of consumers and the broader community.

3.4 Proposed change: New class for type B gasfitting work

Background

Under the current Regulations, a person may apply to be registered in the specialised class of work for type B gasfitting only if they are first registered in the general gasfitting class. A registration in the specialised class of type B advanced gasfitting requires a person to have first obtained registration in general gasfitting and type B gasfitting.

type B appliances are generally used in commercial and industrial settings. Common examples of a type B appliance include:

- steam boilers
- furnaces
- incinerators
- gas fired turbines
- commercial dryers or ovens.

By contrast, type A appliances are generally used in residential settings, and have a smaller gas consumption than type B appliances. Common examples of a type A appliances include:

- space heater
- central heater
- water heater
- kitchen appliances.

⁴⁰ In addition to the testing and replacement program now in place by DHHS, relevant open flue gas heaters have been withdrawn from sale and their manufacturer has ceased production.

What is the problem with the status quo?

The VBA and Energy Safe Victoria (ESV) have raised concerns around the designation of gasfitting work as the main class for both type B gasfitting and type B gasfitting advanced work.

Due to the nature of type B appliances, it is common for applicants seeking registration and licensing in the specialised class to come from varied backgrounds including the electrical trades and instrument fitting. This causes issues when they apply to the VBA for registration/licensing in the specialised class as they are not registered or licensing in the prescribed main class of gasfitting, nor do they possess the necessary qualifications or experience to be licensed or registered in the main class, despite having the expertise and skills to do the work in the specialised class associated with type B gasfitting safely and competently. This creates an unnecessary barrier to practitioners performing the work, which does not appear to be justified on safety or risk grounds.

Proposal: reclassify type B gasfitting as a main class of plumbing work

To address this problem, the department proposes the removal of the designation of gasfitting work as the main class for type B gasfitting and type B gasfitting advanced, and that instead, type B gasfitting be made into a separate main class of plumbing work, with type B gasfitting advanced work to be the associated specialised class of type B gasfitting work.

The impact of this proposal includes:

- *reclassification of type B gasfitting as a main class*—type B gasfitting work will no longer be treated as a specialised class of gasfitting work, but rather its own main class of plumbing work, akin to the treatment of drainage, sanitary and water supply work and the like. The current general gasfitting work class would no longer act in the role of the ‘parent’ main class for type B gasfitting work for licensing or registration purposes
- *type B advanced gasfitting to be tied to type B gasfitting class*—type B advanced gasfitting work would likewise no longer be tied to the main class of gasfitting and instead be tied to the reclassified main class of type B gasfitting. However, no change is proposed to the classification of type B gasfitting advanced work as a specialised class. The department considers that the work covered under the type B gasfitting advanced class is more complex and involves a broader range of activities carried out on type B appliances as compared to the work captured by the type B gasfitting class. The department considers that a period of experience in type B gasfitting is appropriate for practitioners to build their knowledge and skill before being able to carry out the more complex work under the type B gasfitting advanced class.

Thus, persons seeking registration or licensing in type B gasfitting or type B gasfitting advanced will no longer need to be registered or licensed in the gasfitting class, nor will they require to demonstrate the knowledge and experience of persons in that class.

The department considers this change to the Regulations is appropriate, as it facilitates a more streamlined, targeted transition into these classes of works appropriate to the training background of individuals seeking to carry it out. It does not, moreover, pose any safety risks because individuals from these work backgrounds have the appropriate expertise to undertaking the work safely and competently.

Due to the nature of the type B gasfitting industry, this change will impact only a small number of practitioners entering the type B gasfitters industry. The department estimates that removing the unnecessary cost burden of undertaking training and qualifications associated with the gasfitting class for type B gasfitting practitioners will save up to \$300,000 per year in aggregate in avoided training and experience costs (see Appendix C for cost assumptions used to model costs for this RIS).

Consequential change: additional competency for type B gasfitting

As type B gasfitting work and type B gasfitting advanced work will no longer be tied to the main class of gasfitting, there is a need to ensure that practitioners working in these classes maintain the same quality of work when transitioning into the new arrangements. Noting that the prescribed competencies for registration and licensing in gasfitting cover 36 units, the VBA analysis identified only one competency that should be prescribed from gasfitting as part of the reclassified main class for type B gasfitting. This is required to ensure that practitioners working in these classes have the required level of knowledge and skill in the relevant aspects of gasfitting when working on type B appliances. Only one unit of gasfitting is required for type B practitioners is reflective of the fact that required knowledge for most work on type B appliances is delivered through the relevant type B training gained prior to licensing or registration.

Under the proposed approach, practitioners will be required to complete an additional unit of competency in gasfitting (which will be gazetted by the VBA) before being eligible for licensing or registration in the type B gasfitting and type B advanced gasfitting classes.

Clarifying the scope of work between type B gasfitting and type B gasfitting advanced work

The department has amended the scopes of work associated with the type B gasfitting and type B gasfitting classes to ensure that they are consistent with the relative risks associated with each class of work and that the classes accurately reflect the understanding of what industry, ESV and the VBA consider to fall into each. This approach will ensure that practitioners undertaking different types of work on type B appliances reflect the risks involved in the work and practitioners are sufficiently trained and skilled to undertake this work.

The department considers that the current existing scopes of work do not adequately address the distinction between the work covered under each class of work. In particular, the existing classes do not sufficiently delineate between those aspects of work involving a type B appliance that should only be undertaken by practitioners licensed or registered in the type B gasfitting advanced work class.

The department, ESV and the VBA have identified three areas of work that should clearly be designated as type B gasfitting advanced work and not be undertaken by type B gasfitters. These include:

- work involving the adjustment of input parameters on a programmable burner management system associated with a type B appliance
- commissioning a type B appliance in the absence of manufacturer-supplied commissioning data
- work on a type B appliance where the type B appliance is associated with volatile solvents or hazardous atmospheres.

These aspects of work on a type B appliance are considered more complex in nature and require a higher level of knowledge and skill more in line with practitioners who are able to perform work under the type B gasfitting advanced class. For example, the additional requirements for type B advanced work require knowledge and skill in advanced programmable logic controls, safety instrument systems, and explosion mitigation, dilution air and non-fuel combustible atmospheres. Practitioners in this area are most likely to have engineering design, process control and risk mitigation skills and knowledge in addition to their type B gasfitting competencies.

The department understands that industry broadly agrees that these activities fall outside the scope of type B gasfitting work, as the content delivered in the type B training course does not offer training in the areas above.

Question for stakeholders

Are the proposed changes for type B and type B advanced classes of work consistent with training pathways and industry best-practice? Are there unintended consequences from the proposed changes?

3.5 Other minor changes proposed in relation to gasfitting work

Change proposed	Rationale
Type A appliance and type B appliance to be worded to have the same meaning as under the <i>Gas Safety Act 1997</i> .	This definition should be rephrased for simplicity and consistency with other definitions.
Capturing work on a bio gas installation consistent with the Gas Safety Act.	Since ESV has confirmed that biogas falls under the definition of 'gas' under the Gas Safety Act, this amendment seeks to bring consistency between the relevant legislation and regulations for gas work, and provide clarity to gasfitting practitioners regarding the treatment of bio gas installations under the Plumbing Regulations.

B.4 Irrigation (non-agricultural)

4.1 Current arrangements

Irrigation (non-agricultural) work is the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of an irrigation system on a property from the connection point to any water supply in the system to the last valve or control to any pressurised zone in the system and includes any design work that is incidental to, or associated with, any such work. However, it excludes the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of an irrigation system used for the purposes of agriculture.

Irrigation (non-agricultural) work, although generally a low risk activity has the potential for health impacts particularly where properties have both drinking and alternative water supplies. Risk of water leakage that may damage properties, or cause a safety hazard (slips), or financial loss (wasted water, damage to appliances).

The following table sets out the elements of the current Regulations that apply to the irrigation class:

Qualification	Experience	Other work standards
Cert II (including approved competency units)	2 years' experience, OR Completion of apprenticeship	nil

As at 30 April 2018, there were the following number of plumbers in this class:

	Registered	Licensed
Irrigation	11,906	9,479

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to irrigation work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Irrigation class
Continue current Regulations	\$1,847,791
Additional cost from new experience requirements for obtaining a licence	\$64,097
TOTAL	\$1,911,888

4.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, no specific issues were raised by stakeholders in relation to the irrigation work class.

4.3 Minor changes proposed in relation to irrigation work

Change proposed	Rationale
New definition of 'connection point'.	This change is to clarify where work on the irrigation system begins and ends to ensure there is no confusion between irrigation work and water supply work for industry practitioners. The risk this change is seeking to address is that as part of the existing definition of 'connection point', an irrigation practitioner may undertake work on a plumbing system that should be undertaken by a water supply practitioner. This new definition of 'connection point' seeks to provide additional clarity to industry regarding which type of practitioner can do work on different parts of a plumbing system. The department considers that this change is likely to have negligible impact on practitioners as it simply seeks to clarify that the appropriately trained practitioner works on the relevant plumbing system.
Inclusion of relining work as part of scope of work for irrigation.	To reflect recent technological changes and industry best practice, this change seeks to clarify for industry practitioners that any relining work carried out on an irrigation system is regulated irrigation work. Relining technology is an increasingly common method of repairing damaged drains. It is a process which involves the placement of a lining material inside an existing pipe to repair any leaks or cracks and to smooth surfaces, without the need to replace the pipe. While the absence of this term results in some uncertainty for industry over whether this is captured in the scope of irrigation work, the department expects this change to have a negligible impact given that the VBA and industry broadly consider this to be part of the regulated scope of work for irrigation.

B.5 Mechanical services and refrigerated air-conditioning

5.1 Current arrangements

Mechanical services plumbing work is the main class and involves mechanically heating, cooling and ventilating residential and commercial buildings. It also includes plumbing work for medical gas equipment. The department considers that mechanical services work is medium risk and defective installations can result in high cost repairs, where rectification work is necessary and a common high failure rate activity. Bringing together work that involves management of water or gas with electrical appliances causes a risk of fires, electrocution, or explosions.

Refrigerated air-conditioning work is a specialised class of work that requires additional qualifications and experience in addition to those contained in the mechanical services class. Refrigerated air conditioning equipment utilises the properties of certain compounds to absorb heat from the air before discharging the cooled air into a room or building. Working with refrigerated air-conditioning systems is a complex and high-risk activity involving gas, water and electricity that has potential to cause loss of life or injury to both practitioners and customers due to defects in the installation or servicing and maintenance.

The following table sets out the elements of the current Regulations that apply to mechanical services and refrigerated air-conditioning work classes:

Class	Qualification	Experience	Other work standards
Mechanical services	Cert III (including approved competency units for mechanical services work)	4 years' experience, OR Completion of apprenticeship	The whole or parts of the following standards: AS/NZS 2918 AS 2896 AS 2473 AS 2568 AS 2902 AS/NZS 4859 HB 276—2004 A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling and Air Conditioning
Refrigerated air-conditioning	Cert III (including approved competency units for refrigerated air-conditioning work)	Must be first registered in the mechanical services class, AND hold a restricted electrical workers licence (Class 2) 4 years' experience in refrigerated air-conditioning work, or a refrigeration apprenticeship	The whole or parts of the following standards: AS/NZS 1677 HB 276—2004 A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling and Air Conditioning Plant and Equipment Australia and New Zealand refrigerant handling code of practice 2007 Vol 1 and Vol 2

As noted above, while there is agreement with all states and territories to ensure that there is a nationally consistent approach to plumbing standards work as provisioned through the PCA, at the state-level additional standards or changes to standards may be appropriate. In Victoria, there are specific types of regulated plumbing work that are not within the scope of the PCA and the department considers that additional specific standards need to be specified to apply to this work to ensure an agreed compliance standard for practitioners and the VBA.

The additional work Standards prescribed in the Regulations cover plumbing work that is not within the PCA, specifically in relation to:

- the supply or removal of medical gases—since the PCA does not prescribe standards for this specific type of mechanical services work, there would be no requirements for how practitioners can comply with this work and the department considers this outcome to be inappropriate
- domestic solid fuel heaters—these standards are prescribed since these devices are far more common in Victoria than in other jurisdictions due to the colder climatic conditions and hence standards for this work are appropriate in Victoria
- refrigerated air-conditioning scope of work—this reflects the fact that this work is entirely beyond the scope of the PCA and hence relevant standards are required for all aspects of refrigerated air-conditioning work. The department considers that the alternative of no standards to inform compliant work associated with this class of work to be unacceptable.

As at 30 April 2018, there were the following number of plumbers in these classes:

	Registered	Licensed
Mechanical services	13,376	2,581
Specialised class: refrigerated air-conditioning	824	1,150

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to mechanical services work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Mechanical services and refrigerated air-conditioning
Continue current Regulations	\$6,721,010
Additional cost from new experience requirements for obtaining a licence	\$64,518
TOTAL	\$6,785,528

5.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, stakeholders raised the following issues:

Issue raised	Department response
Reclassify the existing class of refrigeration air-conditioning work as main class rather than a specialised class of plumbing work. Hence, practitioners seeking work in refrigerated air-conditioning class will not require registration or licensing in mechanical services.	Considered below—the department intends to reclassify the existing specialised class of refrigerated air-conditioning into a main class of plumbing work.
Due to perceived duplication with the Australian Refrigeration Council (ARC) licensing scheme, it was proposed refrigeration work should not continue to be regulated plumbing work.	Not progressed—while the ARC licensing scheme applies to ozone-depleting substances, it does not apply to potentially dangerous natural refrigerants.
Clarify the scopes of work specific to mechanical services work as opposed to refrigerated air-conditioning work due to overlap and ambiguity, creating confusion for industry.	Progressed—the department has sought to clarify the respective scopes of work associated with mechanical services and refrigerated air-conditioning to provide additional clarity for industry.
Need to regulate the refrigerant compounds not captured under the ARC licensing scheme (e.g., through the Ozone Protection and Synthetic Greenhouse Gas Management Act).	Status quo arrangements—the department notes that the existing specialised class associated with refrigerated air-conditioning already captures work on refrigerated air-conditioning equipment using either natural or synthetic refrigerant compounds.
Inconsistency with the treatment of split systems across mechanical services and refrigerated air-conditioning has created confusion for industry. For example, mechanical services practitioners are undertaking work on multi-head split systems despite not being able to, while they are able to undertake work on single-head split systems.	Progressed—the department has clarified the scopes of work for refrigerated air-conditioning and mechanical services such that all work on split systems (single or multi-head) is associated with refrigerated air-conditioning work (further discussed below).

5.3 Proposed change: new classes for refrigeration work

Background

Refrigerated air-conditioning equipment has become an essential appliance in a majority of Victorian homes. The Australian Bureau of Statistics has reported that in 2014, 51.1 per cent of Victorian households had either a reverse cycle, heat pump or refrigerated air-conditioner and only 21.6 per cent of Victorian households did not have an air conditioner of some kind.⁴¹ This is significant growth in recent decades compared to 36.9 per cent of Victorian households who had air-conditioners in 1994.⁴²

⁴¹ Australian Bureau of Statics, 4602.0.55.001—*Environmental Issues: Energy Use and Conservation*—Table 5, March 2014. The remainder was made of either evaporative coolers or ‘other’ types of cooler.

⁴² Australian Bureau of Statics, 4602.0.55.001—*Environmental Issues: Energy Use and Conservation*, Mar 2008.

In recognition of the steadily increasing number of refrigerated air-conditioning installations in Victoria as well as the complexity of work and risks associated with this plumbing work, the Plumbing Regulations 2008 created a new specialised class of work covering refrigerated air conditioning work. Prior to the introduction of the 2008 Plumbing Regulations, work on refrigerated air-conditioning equipment had been captured under the broader class of mechanical services work.

The historically close association between mechanical services and refrigerated air-conditioning work is due to the similarities between the work undertaken by mechanical services plumbers and refrigerated air-conditioning practitioners. Both occupations work on equipment with the same broad functional aims: the heating and cooling of buildings. The critical difference is that refrigerated air-conditioning practitioners also work with potentially dangerous refrigerant gases.

Refrigerant gases

There are two types of refrigerant gases that are used for refrigerated air-conditioning equipment:

- Natural refrigerant gases—natural refrigerants are substances that are environmentally sustainable and are predominantly hydrocarbons, carbon dioxide or ammonia based. However, they are highly noxious and toxic and pose a significant risk to health and safety if they are not handled appropriately.
- Ozone-depleting gases—such gases are often fluorocarbon based. These refrigerant compounds are potent greenhouse gases and very damaging to the environment's ozone layer.

Over the last few decades, at both national and international levels there have been very successful interventions and programs to reduce the use of synthetic-based refrigerant gases due to their harmful impacts on the ozone layer.⁴³ This positive development has led to the market shifting towards the use of natural refrigerant gases.

Unless carried out by an appropriately experienced and qualified practitioner, the handling of any refrigerant gases can pose a serious risk to the practitioner, the public and the environment. For example, in June 2014 two Victorian men were killed while attempting to decommission and remove a refrigeration unit in the basement of a hotel in rural Victoria. The refrigerants involved pose a similar level of risk if not competently handled by an appropriately trained and experienced person.

Work on refrigerated air-conditioning systems using synthetic refrigerant gases still in use are regulated through the Commonwealth's Australian Refrigeration Council (ARC) licensing scheme. Practitioners working on a synthetic-based refrigerated air-conditioning piece of equipment must hold a Refrigerant Handling Licence issued by ARC.

However, this regulatory regime does not cover natural refrigerant gases. As the use of synthetic refrigerant gases continues to decline, without regulatory intervention through the Plumbing Regulations a larger percentage of refrigeration work in Victoria will be carried out without an effective licensing and registration scheme.

The regulatory treatment of refrigeration work in other states varies significantly.

⁴³ A 2015 report by the Commonwealth Department of the Environment which has oversight of Australia's implementation of the phase out concluded that: "Australia has met or exceeded all of its phase out obligations under the Montreal Protocol." Department of the Environment, *Australia's progress towards meeting its commitments under the Montreal Protocol on Substances that Deplete the Ozone Layer*, 2015.

Table 27 below outlines the regulation of natural refrigerants at the State level.

Table 27: Regulation of refrigerated air-conditioning work in other jurisdictions

State/ Territory	Is work on refrigerant gases regulated?	Individual class	Scope of work on refrigerated air-conditioning systems
Queensland	Yes	No—regulated through mechanical services class	Equipment in buildings not more than 3 storeys high (i.e., small buildings)
New South Wales	Yes	Yes—regulated as refrigeration work	Equipment in a building, vessel, container or vehicle
South Australia	Yes	No—regulated as electrical work	Determined at the discretion of the authority
Western Australia	Yes	No—regulated as electrical work	Work on refrigeration and air conditioning equipment
Tasmania	Yes	No—regulated under occupations and trade legislation	Work on refrigerated air- conditioning equipment
ACT	No	No	If equipment involves electrical work, need to hold a restricted electrical licence
Northern Territory	No	No	If equipment involves electrical work, need to hold a restricted electrical licence

The interaction of the ARC licensing scheme and state-based regulations means that there appears to be two layers of regulations for refrigerated air-conditioning work for practitioners. The department considers it appropriate for a state-based licensing and registration scheme to apply to both types of refrigerant gases for two key reasons:

- The need for Victoria to regulate work on natural refrigerants—the ARC licensing scheme only covers work on ozone depleting refrigerant gases. Hence the department considers it appropriate and necessary to continue to regulate refrigerated air-conditioning work as plumbing work in Victoria since if this was absent, there would not be a registration and licensing scheme for practitioners undertaking work on natural refrigerant gases and the department considers this is unacceptable given the risks involved in this work.
- A consistent and robust registration and licensing scheme for industry and consumers—the Victorian plumbing regime requires both stricter and broader work standard requirements on practitioners that allows the VBA to impose a range of penalties up to and including the suspension or cancellation of a practitioner’s license or registration. To ensure a consistent approach to work standards and to provide sufficient protections for consumers, the department intends to maintain the existing requirements for practitioners working on refrigeration equipment that use ozone depleting gases to be licensed or registered under the Victorian Plumbing Regulations.

Mechanical services and refrigeration

As discussed above, under the current Plumbing Regulations, refrigerated air-conditioning work is treated as a 'specialised' class and is associated with the 'parent' main class of mechanical services work. This means that any practitioner seeking to be eligible for registration or licensing in refrigerated air-conditioning work must first be registered or licensed in the main class of mechanical services work. Historically this was viewed as desirable because of the significant similarities between the two scopes of work, however it has become apparent in the years since that this arrangement is no longer appropriate.

The department has also been advised by the peak group representing the industry as well as ARC that the designation of mechanical services work as the main class for refrigerated air-conditioning work is inappropriate, as applicants for registration and licensing do not commonly come from a mechanical services training background. In particular, these groups have highlighted the confusion this is creating and the additional burdens that the arrangement imposes on the practitioners.

What is the problem with the status quo?

The department has been provided with significant evidence and consistent views from many quarters of the refrigerated air-conditioning industry to suggest that maintaining refrigerated air-conditioning work to be a specialised class of plumbing work associated with mechanical services is inappropriate as it does not reflect training pathways for practitioners entering refrigerated air-conditioning work.

This position has been supported by the a COAG National Licensing Steering Committee that examined licensing requirements across jurisdictions in 2012 and found that Victoria's requirement for mechanical services to be the main class for refrigerated air-conditioning work was "unnecessary" and out of step with the practice in other jurisdictions.⁴⁴

The department and the VBA understand that practitioners training in refrigerated air-conditioning work generally do so as a refrigeration and air-conditioning apprentice enrolled in a refrigeration and air-conditioning qualification. Unlike the majority of plumbing-related qualifications, the common refrigerated air-conditioning qualifications sit outside of the Construction, Plumbing and Services Training Package. For example, the Certificate III in air-conditioning and refrigeration (UEE32211) is part of the Electrotechnology Training Package.

The designation of mechanical services work as the main class causes issues when these practitioners apply to the VBA for registration or licensing in the specialised class. This is because the majority are not registered/licensed in the mechanical services work class nor do they have the necessary qualifications and experience to be granted registration in the main class. Accordingly, they are unable to satisfy the eligibility requirements for registration or licensing in the refrigerated air-conditioning work specialised class, despite having the skills and expertise to undertake this work. It is arguable that this creates the perverse outcome of penalising individuals best qualified to safely and competently carry out the work.

Proposal: reclassify the specialised refrigeration class into a main class of plumbing work

The VBA and the department consider that there is a strong case to re-classify the existing specialised class of refrigerated air-conditioning as a main class to ensure that practitioners become trained and qualified in a targeted and effective process without unnecessarily burdening practitioners.

⁴⁴ COAG National Licensing Steering Committee, Regulatory impact statement: Proposal for national licensing for refrigerated air-conditioning *occupations*, pg. xviii.

This would sever the existing relationship between mechanical services and refrigerated air-conditioning work and create a clearer separation between two similar but fundamentally distinct industries.

Impacts of proposed change

Re-classifying the existing specialised class of work associated with refrigerated air-conditioning as a new main class will enable practitioners to undertake appropriate qualifications and training without imposing a higher cost burden than is required or necessary. It is intended that all existing qualification and experience requirements remain the same for refrigerated air-conditioning work. The effect of this is that for practitioners to become eligible for registration or licensing in refrigerated air-conditioning, they will no longer be required to be registered or licensed in mechanical services work.

This will enable improved access to refrigerated air-conditioning work for persons coming from a non-mechanical services background while still ensuring that individuals are sufficiently qualified and trained to undertake the work. As a result, this is likely to lead to cost savings for practitioners undertaking qualifications and training, since they no longer have to complete competencies that are not directly relevant to their work in refrigeration. In addition, a more appropriate training pathway could lead to an increase in the supply of practitioners undertaking this work in the long term. This in turn could lead to greater competition with benefits for consumers.

This change also acknowledges that refrigerated air-conditioning work already contains the most wide-ranging scope of work compared to every other specialised class which are generally limited to work on particular types of devices, systems or activities. For this reason, it also has the most onerous qualifications and experience requirement of any specialised class of work.

The department notes that the existing qualifications and experience associated with the specialised class of refrigerated air-conditioning were appropriate for the complexity and risks of work involved. These requirements will continue as part of the re-classified main class associated with refrigerated air-conditioning work.

Consequential change: clarify scopes of work between mechanical services and refrigerated air-conditioning

The department understands there is a degree of uncertainty in industry regarding which aspects of work fall into each class. One stakeholder submission noted that the delineation between the activities covered under both classes is currently ambiguous.

In practice, the tasks performed by each occupation can overlap with regards to a single system. For example, the refrigeration and air-conditioning mechanic may install a high-rise building's centralised heating, ventilation, and air conditioning plant but mechanical services plumbers will be engaged to run the duct associated with the system. Although there is a great deal of commonality in the nature of the work each practitioner performs, there are clear areas of work that should only be carried out by a mechanical services plumber and other work that should only be undertaken by a refrigeration and air-conditioning practitioner.

Under the department's proposal to create refrigerated air-conditioning work as a main class, there is a need to clarify the scopes of work between refrigerated air-conditioning and mechanical services in the following areas:

- Refrigerated air-conditioning work will be limited to the heating and cooling of a building—this distinction was not explicit as part of the scope of work associated with the specialised class of refrigerated air-conditioning but was understood by industry given that the main class of mechanical services was limited to the heating and cooling of a building. The department intends to limit the scope of refrigeration work to installations in buildings until further work can be done to establish whether it may be appropriate and desirable to extend it further.

- Clarify that all work associated with refrigerant gasses is refrigerated air-conditioning work—in principle this seems appropriate. However, as part of the existing mechanical services scope of work, this includes work on any single head split system.⁴⁵ This approach reflected the lower risk profile associated with working on this equipment and hence remained within the scope of mechanical services work. This work this will now be brought into the main class of refrigerated air-conditioning work and excluded from mechanical services.

To provide additional clarity, the VBA will provide guidance material to industry on specific equipment and particular types of work to clarify when a mechanical services practitioner should undertake this work as opposed to a refrigerated air-conditioner practitioner. The department considers that guidance material is appropriate given the level of overlap and similarity of work for different practitioners on a system or a piece of equipment.

Related change: a new class for work on ‘basic refrigerated systems’

In response to the significant increase in consumers purchasing and using basic refrigerant air-conditioning systems (e.g., split systems), the VBA chose to offer restricted registration and licensing to appropriate qualified individuals to install and commission single head split systems.⁴⁶ This restricted scope of mechanical services work also included work on a small number of other basic refrigerated air-conditioning systems, including cassettes and add-on units to ducted systems. In considering the granting of restricted registration or licensing associated with work on these and associated split systems, the VBA would require applicants to have completed the three relevant units from the electrotechnology training package currently gazetted for this class.

Despite these restricted licenses or registrations being limited in scope, they proved a popular alternative for many practitioners. This can be demonstrated by the numbers of practitioners currently licensed or registered in this type of work:

- 614 persons registered in ‘Mechanical Services—restricted to single head split systems’ who did not hold a registration in the main class of mechanical services work.
- 1,830 persons licensed in ‘Mechanical Services—restricted to single head split systems’ who did not hold a licence in the main class of mechanical services work.

The department understands that split systems, cassettes and add-on units still represent a more technically straight forward type of work than work on other kinds of refrigeration equipment. Work associated with split systems and other basic refrigerated air-conditioning equipment can be done in domestic or commercial settings. Risks involved with working on basic refrigerated air-conditioning equipment include risks to health and safety due to work on refrigerant gases, particularly synthetic based ones. These risks are reduced, but not entirely eliminated, despite the work being on more ‘basic systems’.

Since the department proposes to define work on single head split systems as part of the general refrigerated air-conditioning class (excluding it from the mechanical services), the department has considered and analysed whether it is warranted to create a new class limited to working only on basic refrigeration systems in line with the VBA’s existing practice of issuing restricted registration and restricted licensing for this type of work. For the proposed new class, the scope of work would be confined to installation, replacement and commissioning⁴⁷ of single split head systems and other small basic refrigerated air-conditioning systems, including ceiling cassette systems and add-on units

⁴⁵ A split system consists of an outdoor and an indoor unit connected by piping that carries the refrigerants. The system avoids the need for ducting to be installed but consequently can only heat or cool the room it is installed in.

⁴⁶ It is noted that the scope of this work was confined to installation, replacement and commissioning and did not include testing, servicing or maintenance.

⁴⁷ Excluded from this scope of work will be the repair, alteration, testing or maintenance of basic refrigerant systems. This is because safe and competent maintenance, repair and alterations of an existing system often requires more skill, training and experience. This scope of this work is more appropriate for the main class of refrigerated air-conditioning.

to ducted systems. Competencies required would include the three identified competencies from the electrotechnology training package presently gazetted for this work. The gazetted competencies only deliver instruction in working with these basic systems where the refrigerant is already packaged with the appliance (i.e., the system comes pre-charged with refrigerants and there is no need for the practitioner to deal directly with the refrigerant gases).

As part of this class of work, the department considers that 2 years practical experience is appropriate prior to being considered for registration and a further 1 year as a precondition of becoming licensed. This is reflective of advice received from the VBA regarding both the risks associated with the work, and the technical complexity involved.

As discussed above (see section 3.3.1 on page 23) the prescribed experience requirements are informed by the potential risks caused by sub-standard plumbing work in this class. Classes like refrigerated air-conditioning (basic systems) work have a limited scope of work in comparison with other classes, and the work itself is less complex. This means that it takes less time for practitioners training in these classes to gain experience in the full scope of work and the likelihood and consequences of a sub-standard installation are not as high as those for other classes.

The creation of a formal class of work associated with basic refrigerated air-conditioning systems has the impact of formally regulating a scope of work that the VBA have historically provided via restricted registration/restricted licensing.⁴⁸ The department believes there are significant benefits in providing for a formal class of work in this circumstance where restricted licences and registrations have been consistently issued in relation to the same type of work and where a large of group of people have been able to undertake this work. These benefits include:

- providing transparency and equity for practitioners—by providing for a new class, this will provide a clear and transparent process for practitioners to apply for registration and licensing. The scope of work, the requirements in relation to qualifications and experience and the mandatory technical standards that practitioners must comply with will be publicly known by being prescribed in the Plumbing Regulations
- a higher number of applicants with potential competitive benefits for consumers—current arrangements rely on industry practitioners understanding the VBA’s current arrangements for restricted registration and licensing about work on split systems. By formally introducing a new class associated with this work, this may help industry and relevant practitioners be formally informed, which may lead to an increase in practitioners undertaking this work.

The proposed approach is also consistent with the ARC framework. ARC offers a distinct licence covering the installation and commissioning of split systems, ‘RSS03—Refrigerant handling licence’. Although still regulated, this licence requires a Certificate II level of knowledge. This is compared to the Certificate III requirement for a ‘RAC01—Refrigerant handling licence—qualified persons’ that allows a practitioner to carry out any kind of refrigerant work in the refrigeration and air conditioning industry. This distinction is reflected in the proposed differences in the minimum requirements between refrigerated air-conditioning (basic systems) and the refrigerated air-conditioning work.

Transitioning arrangements for the proposed new class for refrigerated basic systems

In recognition of the fact that any existing mechanical services practitioner will have been required to undertake the refrigeration-related competencies associated with work on single head split systems and that they would have been able to legally undertake this work, the department

⁴⁸ The creation of a formal class of work covering basic refrigerated air conditioning systems does not impact the VBA’s discretion to issue restricted registration or restricted licences. The discretion to issue restricted licensing and restricted registration is a useful instrument that allows the VBA to flexibly respond to specific demand in the market, or where types of work emerge that do not match existing work classes.

considered it appropriate to automatically transition all existing mechanical services practitioners into the new refrigerated air-conditioning (basic systems) class. This will occur upon commencement of the new Plumbing Regulations.

Questions for stakeholders

Are the proposed changes for the refrigerated air conditioning and mechanical services class consistent with training pathways and industry best-practice or are there unintended consequences from the proposed changes?

Is it reasonable to transition existing mechanical services practitioners into the new proposed class associated with refrigerated basic systems or are there any unintended consequences with this proposal?

5.4 Other minor changes proposed in relation to mechanical services work

Change proposed	Rationale
Removal of split systems work from the scope of mechanical services work. The approach is that appropriate work on refrigerants is regulated through the refrigerated air-conditioning class of work.	For the reasons discussed above the department believes that it is more appropriate for work on refrigerant gases (e.g., split systems) to be regulated through the two new refrigerated air-conditioning classes. As a consequence, the reference to split systems in the mechanical services class has been removed.
Inclusion of 'split system heat-pump water heaters' as part of refrigerated air-conditioning work.	To clarify that work on split system water heaters is refrigerated air-conditioning work. Normally, work on water heaters would fall within the scope of water supply work. However, a split system heat-pump water heater contains refrigerant gases and hence is more appropriate to be worked on by a practitioner registered or licensed in refrigerated air-conditioning work. The department expects this change will have a negligible impact on industry given that refrigerated air-conditioning practitioners undertake work on systems that contain refrigerant gases and this change is consistent with this approach.

B.6 Roofing (stormwater)

6.1 Current arrangements

Roofing (stormwater) work involves design and installation of a roof drainage system that collects and disposes of stormwater. Roofing (stormwater) work is defined as the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a roof drainage system involved in the collection or disposal of stormwater, which connects to ground level. The scope of this work includes the construction of any stormwater piping to a below ground stormwater drain or to an onsite retention or storage tank; and any incidental or associated design work. Roofing (stormwater) work includes associated work on any roof covering of flashing and includes metal roof coverings but not non-metal roof coverings.⁴⁹

The following table sets out the elements of the current Regulations that apply to the roofing class:

Qualification	Experience	Other work standards
Cert III (including approved competency units)	4 years' experience, OR Completion of apprenticeship	Parts of the following standards: SAA HB 39—1997 AS 1562 AS/NZS 4200 SAA/SNZ HB 114:1998

As noted above, while there is agreement with all states and territories to ensure that there is a nationally consistent approach to plumbing standards work as provisioned through the PCA, at the state-level additional standards or changes to standards may be appropriate. In Victoria, there are specific types of regulated plumbing work that are not within the scope of the PCA and the department considers that additional specific standards need to be specified to apply to this work to ensure an agreed compliance standard for practitioners and the VBA.

The work standards prescribed as part of Schedule 2 in addition to those prescribed through the PCA for this class are specific to metal roof coverings, which relates to work that is not covered in the PCA. The BCA contains standards in respect of metal roofing but, because Victoria classifies metal roofing as plumbing work, metal roofing standards are required to be inserted in the Plumbing Regulations. In particular, these additional work standards include design and installation standards for metal roof and wall cladding, pliable building membranes and underlays, and guidelines for the design of eaves and box gutters.

As at 30 April 2018, there were the following number of plumbers in this class:

	Registered	Licensed
Drainage	12,729	8,147

⁴⁹ The current Plumbing Regulations do not regulate non-metal roofs, such as the laying of concrete or terracotta tiles.

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to roofing work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Roofing class
Continue current Regulations	\$6,410,361
Additional cost from new experience requirements for obtaining a licence	\$62,453
TOTAL	\$6,472,814

6.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, stakeholders raised the following issues:

Issue raised	Department response
Exclude work on metallic roof coverings from the scope of work. The inclusion of this in the current Regulations means that metal roof work can only be undertaken by registered plumbers. Amend regulations to allow Domestic Builder Unlimited buildings practitioners to do metal roofing due to cross over of competencies.	Not progressed at this stage—due to impacts of change being unknown, the department has nominated to take a precautionary approach in maintaining the status quo. The department seeks additional evidence and data from industry stakeholders to support the case for change. To be investigated as part of the forward program.
There is a level of confusion about what work is included within the scope of roofing (stormwater) work.	Minor scope changes incorporated in proposed Regulations to provide clarity for industry. See section 6.3 below for minor changes proposed in relation to roofing work.

6.3 Possible change: metal roofing

Background

The department understands that the key rationale for the installation of metal roofing being regulated plumbing work rather than building work is because a plumber is required to complete the approved competency units relevant for selecting and installing appropriate and compatible materials for the stormwater drainage system. Should incorrect metal roofing materials be used for the stormwater drainage system, there is a risk that the run-off of water from the stormwater drainage system could be contaminated.

Due to changes in the availability of metal roofing products available on the market, the VBA believes there is a significantly reduced risk of the contamination of run-off water by metal roofing products. For example, the introduction of pre-painted and inert roofing material for metal roofing products in recent years has significantly reduced this risk.⁵⁰ However, materials currently available on the market for metal roofing can still lead to contamination of run-off water, including zincalume metal sheeting, lead (including bare and pre-painted) flashings, bitumised rubber and zinc flashings.

⁵⁰ In the past, a significant proportion of metal roofing products contained lead which if used as part of a stormwater drainage system would have a high risk of contamination for the run-off of water. The introduction of pre-painted and inert roofing material has meant the use of these lead products has reduced.

While the risk of contamination from inappropriate metal roofing products has been significantly reduced today, there are still important considerations with the installation of metal roofs relating to incompatible materials. Current issues are:

- ensuring that the materials used and joined will not result in corrosion. There are some metal-to-metal reactions that can cause this, this is known as galvanic corrosion
- changes in the building designs, which has seen an increase of flat roofs used in the construction of housing. A flat roof is a metal roof, which requires a box gutter to be installed. The VBA advises architects, draftpersons, builders and other practitioners responsible for designing a box gutter to work closely with the roof plumber that will install the box gutter to ensure that the overall design and installation will be compliant with relevant regulations.⁵¹

Important context in considering whether metal roofing continues to be regulated plumbing work is whether the rate of non-compliance would be reduced if this work was regulated as building work. The rate of non-compliance for work across the entire class is 8 per cent and the VBA has advised that inspections data has found current levels of non-compliance for metal roofing to be even higher.⁵²

Non-compliance specific to metal roofing involves incorrect installation and incorrect fixing of the metal sheets. Other causes are defective design and the non-compliant construction of the roofing structure—i.e., roof frame does not facilitate laying of roof covering at correct pitch.

What is the problem with the status quo?

The regulatory distinction between metallic roofing, which can only be undertaken by licensed or registered plumbers and non-metallic roofing, which can be carried out by registered or licensed builders, has periodically been raised as an unnecessary regulatory obstacle. The pre-RIS consultation submissions from stakeholders noted a lack of justification for the separate licensing regimes for roofing work based on the roofing materials used.

The Housing Industry Association (HIA) specifically argued that limiting the installation of metal roofs to roofing plumbers is causing delays in building work and leading to higher costs for building projects. The HIA has asserted that there is a lack of skilled labour to install metal roofing and the requirement to be a qualified plumber in this class is aggravating the situation. No further evidence or examples were provided to demonstrate the extent of this problem.

The construction, installation, replacement, repair, alteration, testing and commissioning of non-metallic tiles, slate or flat membranes on a roof can currently be undertaken by builders. It is noted that in these cases the installation of necessary flashings both before and after the roofing material is laid is undertaken by a plumbing practitioner.

There are currently 13,316 plumbers registered or licensed in the roofing class within the metropolitan area, and 6,821 in regional areas. The department considers this number of registered or licensed plumbers indicates that there is a sufficient supply of qualified plumbers to install metal roofs, including in the regional areas. The VBA notes that while there may be sufficient roofing plumbers across regional areas in aggregate, there may be particular regional areas where there is a shortage of roof plumbers required for the construction of new homes. As a result, building companies and property developers are likely to use their own plumbers, who may be brought in from other areas, rather than using local plumbers. A consultation question has been inserted to seek additional evidence and data on the adequacy of roofing plumbing practitioners in regional areas.

⁵¹ http://www.vba.vic.gov.au/data/assets/pdf_file/0020/60059/Box-Gutter-Design.pdf

⁵² VBA Compliance Certificate and audit data VBA from 2010—2017.

However, the department and the VBA do not know how much time plumbers in this category spend on metal roofing work.

Possible options for change

Instead of continuing the status quo (retaining metal roofing within the scope of roofing (stormwater) plumbing work, two possible options for change were examined:

- **Option A:** exclude metal roofing from the scope of plumbing work for roofing (stormwater); metal roofing would instead be regulated under the Building Regulations 2018 as roofing falls within the scope of building work with no additional changes required to the Building Regulations.
- **Option B:** introduce a new class of plumbing work specific to the installation of metal roofing to lower the requirements for categories of builders to be registered or licensed for this work.

These options were identified through submissions.

Option A may be justified on the premise that builders are sufficiently skilled and knowledgeable to install metal roofing. Under this option, the plumber would still have to undertake the final work on the flashings, guttering and downpipes before the work is completed. Potential benefits under this option include:

- an increase in labour supply and increased competition—existing builders would automatically be able to undertake this work, leading to a larger pool of labour automatically
- a reduction in delay costs—flexibility would be provided to contractors to enable suitably qualified builders or plumbers to undertake the metal roofing component of the project.

Under Option B the regulations would provide an alternative pathway for suitably qualified individuals to install metal roofing where they would be required to complete the approved competency units associated with metal roofing (e.g., no requirement to complete training and experience requirements associated with the main class of roofing (stormwater). Under this option potential benefits would be similar to Option A, although the extent of additional practitioners that would nominate to undertake metal roofing work is not known.

The consequences of change are not known

Most of the issues of non-compliance arise due to incorrect installation of metal roof sheets, incorrect pitch and incorrect fixing of the metal sheets.

The department is unable to determine what the consequences might be under either of the options for change. For example, whether these options could result in reduced burden for the building industry, or adversely increase of defects, resulting in higher levels of property damage and potentially health and safety risks.

The department notes that in-principle option B could deliver benefits including increasing the competition of providing this service in the market and potentially reduce delay costs for building projects, while ensuring that builders are provided with sufficient knowledge and training for the selection of appropriate metal roofing materials to be installed for a roof drainage system. However, the benefits may be small if builders already also hold a registration or licence to undertake roofing work.

On balance, the department considers that while there is likely to be a small cost saving under either of the options, the impact on risk is unknown and presents an undesirable trade-off given the uncertainty involved. Therefore, the department is nominating to take a precautionary approach in having metal roofing remain as part of the proposed Regulations subject to further investigation into the causes of metal roofing faults, and the nature of the delay costs experienced by the building industry. This work will be undertaken as part of the departments forward policy program.

Questions for stakeholders

Is there further data or evidence on the impacts of retaining the status quo arrangements or providing for a separate class of plumbing work for the installation of metal roofs?

Do building projects in regional areas experience delays because there is a shortage of licensed and registered plumbers in the class of roofing (stormwater) in regional areas?

6.4 Other minor changes proposed in relation to roofing work

Change proposed	Rationale
The reference to ground level connection will be removed. This is to clarify that each roof covering, flashing and drainage system is regulated under this class whether or not it is connected to ground level.	These changes are intended to clarify what is regulated under the class of roofing (stormwater) work.
Include new definitions to make it explicitly clear what types of roof coverings are included and excluded within this scope of work.	To explicitly exclude work on membranes and insulation from the scope of work.
To remove irrelevant technical standards associated with sarking and underlays will be removed from Schedule 2.	<p>These standards apply to building work, not plumbing work, which was adding to the confusion about the scope of work regulated under this Class.</p> <p>The incorporation of <i>AS 1562.1 Design and installation of sheet roof and wall cladding. Part 1: Metal</i> will be removed. The content of this technical standard is now largely covered by SAA HB 39. There is no longer a need for it to be referenced.</p>
The relevant technical standards relating to roofing (stormwater) work in Schedule 2 will be updated.	The incorporation of <i>SAA HB39—1997 Installation code for metal roof and wall cladding</i> will be updated. It was superseded on July 15, 2015 with <i>SA HB 39: 2015 Installation code for metal roof and wall cladding</i> . The updated version of this code updates technical information and reflects contemporary practices.
Exempt work on a Class 10a buildings with a floor area of less than 10m ² from being regulated plumbing work.	This approach brings plumbing work in line with the Building Regulations 2018, which exempts these types of Class 10a buildings from having to obtain a building or occupancy permit. These are generally small to medium size garden sheds and the like, and will not be regulated as a result of the change.

B.7 Sanitary

7.1 Current arrangements

Sanitary work is the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of an above ground sanitary plumbing system to connect sanitary fixtures and appliances to a disposal system or below ground sanitary drainage system and includes fixtures in, or on, a caravan or vessel that is connected to a disposal system or below ground sanitary drainage system.

Risks of sanitary work are water leakage and contamination. Sanitary work is a lower risk activity when carried out in residential domestic properties but large development work or commercial sites have a much higher risk of harms.

The following table sets out the elements of the current Regulations that apply to the sanitary class:

Qualification	Experience	Other work standards
Cert III (including approved competency units)	4 years' experience, OR Completion of apprenticeship	nil

As at 30 April 2018, there were the following number of plumbers in this class:

	Registered	Licensed
Sanitary	12,375	8,633

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to sanitary work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Sanitary class
Continue current Regulations	\$3,675,782
Additional cost from new experience requirements for obtaining a licence	\$74,743
TOTAL	\$3,750,525

7.2 Stakeholder views on this class of work

Issue raised	Department response
Amend the wording in relation to caravans in order to clarify what work on a caravan is regulated plumbing work.	Agreed—see ‘minor change’ below.
A new class of plumbing practitioner should be created limited to carrying out plumbing work on caravans.	Not progressed—the department does not believe that there is sufficient justification to create a specific class limited to work on caravans at this stage, given that plumbing work on caravans is sufficiently addressed in the relevant scopes of work. See discussion on caravans and houseboats as part of the forward work program (see Part C—page 148).
In relation to the caravan industry, there is a lack of effective enforcement of the plumbing standards in relation to the caravan industry.	Out of scope—the enforcement of the regulations is an operational responsibility of the VBA. Any known instances of non-compliance should be reported to the Regulator. See discussion on caravans and houseboats as part of the forward work program (See Part C—page 148).
A new class of plumbing practitioner should be created limited to carrying out plumbing work on caravans.	Not progressed—the department does not believe that there is sufficient justification to create a specific class limited to work on caravans at this stage, given that plumbing work on caravans is sufficiently addressed in the relevant scopes of work. See discussion on caravans and houseboats as part of the forward work program (See Part C—page 148).

7.3 Caravans and vessels

Where appropriate, the Plumbing Regulations capture certain kinds of plumbing work in both caravans and vessels. The treatment of specific types of work within caravans and vessels as regulated plumbing work is a long-standing requirement of the Plumbing Regulations.⁵³ These installations are based on an assessment that the risks posed to occupants of a caravan or vessel from defective plumbing work are similar in nature to those of the occupants of a building. The department believes that these risks remain and continue to justify the inclusion of caravans and vessels within the Plumbing Regulations.

While the department considered proposals raised by stakeholders, many of these could not be considered since they were out of scope for the Plumbing Regulations remake process. For a further discussion on matters that may inform the department’s forward work program, please see caravans and houseboats discussion in Part C—page 148.

Changes that are proposed through the current regulation remake process are set out below.

⁵³ For example, ‘vehicles’ and ‘vessels’ were included in the Plumbers Gasfitters and Drainers Registration Board Regulations 1988.

Prescribing specific technical standards for caravans and vessels

Stakeholders have raised concerns that the existing prescribed standards for the classes of plumbing work that include installations on caravans and vessels do not sufficiently address the complexities involved for plumbing work that is undertaken in caravans or vessels.

The department proposes to prescribe two additional technical standards for caravans and vessels. Each of these technical standards has been analysed by the VBA who has advised the department that the requirements are consistent with the existing standards prescribed in the Plumbing Regulations.

Caravans

The department believes that prescribing appropriate technical standards for industry to follow is a critical component in ensuring that the work is carried out in a competent manner. This seems particularly important in the context of the increasing number and complexity of sanitary systems that are being installed in caravans to integrate ever more sophisticated amenities. A submission provided by the Caravan Industry Association of Victoria (CAIVIC) as part of the department's pre-RIS consultation process indicated that in the mid-2000s toilets and showers with hot water services in caravans and RVs comprised less than 5 per cent of the market, but by 2017 caravans with toilets and showers represented 70-75 per cent of all caravans and motorhomes.

The department was unable to identify any current Australian Standard that specifically relates to sanitary installations in caravans. The department notes that it is not within the scope of the Plumbing Regulations remake project to develop a new technical standard outside of the process overseen by Standards Australia. The department would encourage stakeholders with a proposal to create such a standard to contact Standards Australia.⁵⁴

Nevertheless, to improve clarity and consistency the department proposes to prescribe a technical document that plumbers must comply with when carrying out work in caravans, 'Australian Design Rule (ADR) 42/00 General Requirements'. These design requirements are made by the Commonwealth under the *Motor Vehicle Standards Act 1989* and are mandatory for both imported caravans and those manufactured in Australia.⁵⁵ However, it does not currently form part of the mandatory requirements for plumbing work on sanitary systems in caravans as part of the Regulations. Prescribing this Standard for sanitary plumbing work in caravans will have the effect of requiring plumbers to comply with the same technical standards that are already in place for caravan manufacturers. The department understands that plumbers working for manufacturers would be required to be familiar with this Standard since they are required to provide a Compliance Certificate for the installation of plumbing systems on caravans as part of the assembly line process. Therefore, requiring plumbers working on sanitary systems on caravans to comply with the same standards eliminates any potential inconsistencies between the Victorian and Commonwealth requirements in relation to caravans at no or negligible additional cost imposed since existing practitioners would be required to be familiar with this standard through their work with manufacturers.⁵⁶

⁵⁴ For additional information on the process of submitting a proposal to amend or create an Australian Standard please visit their website: <https://www.standards.org.au/standards-development/developing-standards/proposal>

⁵⁵ The ADRs are published by the Federal Government under section 7 of the *Motor Vehicle Standards Act 1989* (Cth). They apply to all vehicles manufactured or sold in Australia, including caravans. The department considers that this additional standard will be well understood by the caravan industry.

⁵⁶ Practitioners working on caravans can freely access ADR 42/00 by visiting the appropriate Commonwealth website: <https://www.legislation.gov.au/Details/F2006L03251>

Vessels

In regard to vessels, the department has identified a relevant Australian Standard for installations on certain kinds of vessels, specifically houseboats and other craft designed to be used on in-land waterways. Australian Standard AS 4995:2009⁵⁷ sets out requirements for the capture, treatment and eventual disposal of waste water from sinks and showers. The objective of the Standard is to ensure that the water that is required to be disposed meets a level of cleanliness sufficient for it to be released into a body of freshwater.

Compliance with this standard is already mandatory for some houseboats under regulations made under the *Water Act 1989*, specifically for houseboats applying for a license to operate on Lake Eildon. As a requirement of the *Water Act 1989*, plumbing practitioners are already technically required to abide by this Standard and so formally incorporating it into the Plumbing Regulations is intended to provide additional clarity and consistency at no additional cost.⁵⁸ The department understands that sanitary plumbers working on vessels under the *Water Act* would be required to be familiar with this Standard. For this reason, the department considers that prescribing this Standard for the proposed Regulations reflects no or negligible cost for practitioners and the industry.

Questions for stakeholders

Is it reasonable to assume that existing requirements on caravan manufacturers placed on plumbing practitioners working on plumbing systems in caravans provide additional compliance clarity for practitioners at no additional cost?

Is it reasonable to assume that existing requirements for some houseboats extended to plumbing practitioners working on all vessels provides additional compliance clarity at no additional cost?

⁵⁷ Australian Standard AS 4995-2009 Greywater Treatment Systems for Vessels Operated on Inland Waters.

⁵⁸ Since the department understands that practitioners working on vessels on Lake Eildon would be familiar with the prescribe standard under the *Water Act 1989*, the department assumes that no additional cost would be required in practitioners purchasing and complying with this AS 4995.

7.4 Minor changes proposed in relation to sanitary work

Change proposed	Rationale
Inclusion of 'relining' in the scope of regulated sanitary work.	To reflect recent technological changes and industry best practice, this change seeks to clarify for industry practitioners that any relining work carried out on a sanitary system is regulated sanitary work. Relining technology is an increasingly common method of repairing damaged drains. It is a process which involves the placement of a lining material inside an existing pipe to repair any leaks or cracks and to smooth surfaces, without the need to replace the pipe. While the absence of this term results in some uncertainty for industry over whether this is captured in the scope of sanitary work, the department expects this change to have a negligible impact given that the VBA and industry broadly consider this to be part of the regulated scope of work for sanitary.
Providing additional clarity on regulated sanitary work for caravans and vessels.	To provide greater clarity to industry on regulated sanitary plumbing work on a caravan or a vessel. By providing a separate sub-regulation in respect to work on a caravan or a vessel respectively, this provides clarity that sanitary plumbing work on either a caravan or a vessel is regulated plumbing work. This is a mechanical change to improve clarity of the Regulations and the department considers this change will have no cost impact on industry given industry's understanding that this work is regulated under the scope of sanitary work.
Exclude the installation of a shower base or a bath from regulated sanitary work.	To provide clarity to industry that the installation of a shower base or a bath is not considered to be regulated sanitary work. This approach is consistent with industry practice and the risk profile associated with this work. Without this clarification, it may be expected that a plumber undertake this work but this would not be required. This exclusion does not apply to the connection of these systems to fixtures which remains sanitary plumbing work. The department expects that this change will have a negligible impact on industry since it is seeking to clarify that the requirement is consistent with industry best practice.

B.8 Water supply and backflow prevention

8.1 Current arrangements

Water supply work involves the supply of hot and cold water to domestic, commercial and industrial buildings. A plumber's work affects the supply of water to and from a building. Plumbers need critical knowledge and skills to protect the integrity of the drinking water supply, including the provision of alternative water supplies and the health and safety of building occupants.

Water supply work is the construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a heated or cold water service that is connected to a drinking water supply (from the point of connection to the water supply to the points of discharge), or any part of a non-drinking heated or cold water service or rainwater service (from the point of connection to the water supply to the points of discharge), any heated water service in or on a caravan or vessel.

Water supply plumbing work has particular contamination risks associated with work which could lead to serious health and safety risks. In addition, water supply work has risks of scalding and burns, which represent risks to health and safety. Also risks of leakage, with additional particular consequences on health due to possible exposure to unclean water and risk on contamination. With regard to potential property damage resulting from leakage, water supply work is a lower risk activity in residential domestic properties but a leak in a multi-story building has the potential for significant and expensive property damage.

Water supply work is also associated with the installation, replacement, repair, alteration, maintenance, testing or commissioning of hot water systems. Particular risks include the risk of scalding and burns (from uncontrolled hot water delivery), leakage, and health risks (such as legionella and exposure to contaminated water).

Backflow prevention work—a specialised class of plumbing work where water supply is the parent main class—involves work to ensure that water supply sources are not contaminated from various contaminants (toilet water, etc.) to mitigate risks to health and safety.

The following table sets out the elements of the current Regulations that apply for the water supply and backflow prevention work classes:

Class/specialised class	Qualification	Experience	Other work standards
Water supply	Cert III (including approved competency units)	4 years' experience, OR Completion of apprenticeship	Requirement to install a water meter in the water supply system supplying water to a cooling tower. Requirement for an automatic or manual interchange device that allows alternate use of water from the rainwater tank or the reticulated water supply for sanitary flushing. Requirements for rainwater tanks installed in a new Class 1 building. Requirements relating to solar water heaters.

Backflow prevention	Passing the exam reflects the Cert IV competency associated with commissioning and maintaining backflow prevention devices	Must be registered / licensed in general water Supply class	Standard of work prescribed for backflow prevention work associated with backflow devices
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As noted above, while there is agreement with all states and territories to ensure that there is a nationally consistent approach to plumbing standards work as provisioned through the PCA, at the state-level additional standards or changes to standards may be appropriate. In Victoria, there are specific types of regulated plumbing work that are not within the scope of the PCA and the department considers that additional specific standards need to be specified to apply to this work to ensure an agreed compliance standard for practitioners and the VBA.

A number of standards prescribed for water supply Schedule 2 in addition to those prescribed through the PCA have been included to:

- provide further details to operationalise existing PCA requirements (such as the requirements relating to solar water heaters where the PCA explicitly refers readers back to the Plumbing Regulations)
- capture Victorian specific variations to the PCA which are intended to be incorporated into the PCA at a later stage. For example, because it was not possible to include in the PCA at the time due to the three-yearly update cycle (such as the requirements relating to non-drinking water services)
- address gaps where standards in the PCA are not at the Victorian Government's desired level (such as the requirements relating to solar water heaters).

As at 30 April 2018, there were the following number of plumbers in this class:

	Registered	Licensed
Water supply work	11,861	9,450
Backflow prevention work	602	1,518

Based on the analysis of costs in Part A of this RIS, the costs of continuing the current Regulations in relation to water supply work, and the new proposed experience requirements for becoming a licensed plumber in this class, are estimated to be (as an annualised yearly cost):

	Water supply and backflow prevention
Continue current Regulations	\$5,278,448
Additional cost from new experience requirements to obtain a licence	\$224,649
TOTAL	\$5,503,097

8.2 Stakeholder views on this class of work

As part of the sunset review of the current Regulations, stakeholders raised the following issues:

Issue raised	Department response
Include recycled water and alternate water supply work in registration examination.	Operational matter for VBA—advice provided to department is that exams associated with water supply provide sufficient testing of all aspects of water supply work, including alternative water supply.
Changes to Compliance Certificate to include identification of work undertaken on recycled water systems.	Broadly considered—see discussion below.
Requiring a Compliance Certificate for any work relating to recycled water plumbing, regardless of the value of the work (i.e., remove \$750 threshold).	Out-of-scope since the trigger for issuing a Compliance Certificate is provided for through the Act. The regulations may only specify the monetary threshold at which a plumber must issue a Compliance Certificate.
Ensuring qualifications and training prescribed for plumbers working on recycled water systems sufficiently manages risks.	Broadly considered below—see discussion below.
Provide specialised plumbing classes associated with work on recycled water and alternate water supply work.	Considered below—see discussion below.
Consider the appropriateness of the standard of work prescribed for alternate water supply work.	Considered below—see discussion below.
Require mandatory additional training to be undertaken by plumbers carrying out recycled water work.	Out of scope—see discussion on continuous professional development’ as part of the forward work program (See Part C—page 139).
Under sector 221ZZY of the Building Act, it was proposed that designated water corporation inspectors be appointed by the VBA as plumbing inspectors with the power to issue notices relating to non-compliant work, specifically work on recycled water installations.	Out of scope—This power is provided via the Act rather than through Regulations so any changes to this are considered out of scope for the current process.
Encourage training and accreditation regime for recycled water plumbers.	Considered below—see discussion below.
Create a register for all backflow prevention devices in residential homes, with an annual testing reminder system.	Out of scope—see discussion on backflow device register as part of the forward work program (See Part C—page 139).
Creation of a specialised class of plumbing work to cover the installation, commissioning, servicing and maintenance of TMVs.	Broadly considered below.

Issue raised	Department response
The reference to 'caravans' in the scope of water supply should be more prominent to work on caravans as regulated plumbing work.	Not appropriate—the department does not believe that the order in which the regulations are set out should in anyway be perceived as reflecting the importance of the type of work covered.
Scope of water supply work in relation to caravans should be extended to include cold water installations in addition to hot water.	Not progressed—the department did not receive sufficient evidence to support this change.
In relation to the caravan industry, there is a lack of effective enforcement of the plumbing standards in relation to the caravan industry.	Out of scope—the enforcement of the regulations is an operational responsibility of the VBA. Any known instances of non-compliance should be reported to the Regulator. See discussion on caravans and houseboats as part of the forward work program (See Part C—page 148).
A new class of plumbing practitioner should be created limited to carrying out plumbing work on caravans.	Not progressed—the department does not believe that there is sufficient justification to create a specific class limited to work on caravans at this stage, given that plumbing work on caravans is sufficiently addressed in the relevant scopes of work. See discussion on caravans and houseboats as part of the forward work program (See Part C—page 148).

8.3 Possible change: recycled water

Background

The responsibility for management of recycled water schemes is shared by the Environment Protection Authority Victoria (EPA) and Department of Health and Human Services (DHHS) to ensure human health and the environment are appropriately protected.

The management framework for recycled water in Victoria is described in the EPA's 'Guidelines for environmental management—use of reclaimed water' and the 'Guidelines for environmental management: dual pipe water recycling schemes—health and environmental risk management'. This framework aims to ensure that recycled water schemes are safe and sustainable. It is the role of the EPA to ensure that these guidelines are effectively implemented.

Class A recycled water is derived from sewerage systems and industry processes, and treated to an appropriate standard. Class A recycled water is water designated for high-exposure uses, including:

- residential developments (for example, 'dual pipe' schemes for toilets and garden use)
- irrigation where access is public and unrestricted
- irrigation of edible crops intended for raw or unprocessed consumption.

In Victoria, all Class A water recycling schemes need to be approved by EPA. DHHS endorses the capability of the treatment process to meet the required microbial water quality objectives for Class A recycled water.

The significant investment in recycled water has been a government decision to reduce pressure on Victoria's water sources, particularly in times of drought. It also offers property owners greater protection for their gardens, and thereby encourages further green open space and canopy cover with the associated benefits.

Plumbing work on recycled water systems is performed by a plumber who is licensed or registered to carry out work in the main class of water supply.⁵⁹

The aim of relevant training and standards is to ensure plumbing practitioners are sufficiently competent to minimise the risks relating to cross-connection between recycled water and fresh drinking water. However, in recent years there have been a number of cross-connection incidents in relation to drinking water and recycled water

Case study: recent cross-connection incidents in Victoria⁶⁰

Over the last few years, there have been a number of cross-connection events resulting in Class A recycled water entering the drinking water supply. Investigations into three cross connections incidents in 2015 identified a range of plumbing and water main issues:

- A large school in Melbourne's northern suburbs reported a cross-connection incident that was caused by the incorrect installation of water supply and recycled water systems across water corporation assets and private plumbing property.
- A school in Melbourne's south-eastern suburbs had a cross-connection incident where a number of plumbing issues contributed to the cause, including incorrect piping colours, plumbing materials and inspection and testing procedures.
- Cross connections in Melbourne's south-east suburbs were identified resulting from a combination of plumbing errors, including incorrect connection to water mains, crossed property service lines and incorrect meter installation.

In response to the above, the Victorian Government required water authorities to audit all schools and other high-risk end users to ensure no other cross connections existed.⁶¹

Following this, in 2016-17 three cross-connection events were identified:

- Four residential properties in the Wyndham Vale area that had their drinking water supply incorrectly connected to the Class A recycled water supply at the water meter.
- A cross-connection event occurred within the private plumbing of a property in Melton South, which was identified during a scheduled pre-occupancy plumbing check.
- A cross-connection from the work on the water mains in the Epping area affected a number of properties.

While corrective action was taken by responsible authorities and agencies swiftly to protect the health of community members, further work was required by government to understand the underlying issues resulting in cross connection incidents.

⁶⁰ The following information has been extracted from various DHHS annual reports.

⁶¹ Additional auditing and inspection procedures are now required by water authorities for all future connections to similar installations, with schools required to implement additional testing and audits for all on-site plumbing modifications where Class A recycled water is supplied.

To improve government's understanding of causal factors of cross connections incidents, in 2017 an interdepartmental committee (IDC) was formed, comprising the department, DHHS and the EPA. The work program for the IDC includes assessing past incidents to identify root causes and corrective solutions, assessing compliance of existing schemes within the regulatory framework, and identifying opportunities to improve the regulatory framework. Part of this work has included undertaking a systematic review of a number of cross-connection occurrences with the intention to, amongst other things, identify and report on possible strategic interventions to reduce risk, prevent recurrences and improve safety. The work of the IDC remains ongoing.

The department notes there are different monitoring and compliance arrangements for recycled water systems at the installation stage and at the commissioning stage:

- At the installation phase of recycled water systems, water corporations have put in place a comprehensive system of plumbing inspections for residential and some non-residential properties to mitigate cross-connection risks. The department understands the regime of inspections varies by water corporations but generally at the final R3 approval stage the plumbing work is inspected by the relevant water corporation to ensure the installation of recycled water systems meets required plumbing standards.
- At the commissioning stage (e.g., plumbing work occurring post-installation) the water corporation is generally not involved and the compliance regime falls to the VBA, which audits around 5 per cent of Compliance Certificates based on its risk-based auditing program. An example of plumbing work that can be undertaken at the commissioning stage includes subsequent modifications, maintenance or rectification works to an existing recycled water supply network.

Stakeholder views

Stakeholders have raised concerns with plumbing work on a number of alternative water supplies in addition to recycled water systems. However, the department received data and evidence on issues concerning plumbing work on recycled water. Hence the focus of analysis in this RIS is on recycled water systems.

Cross-connection incidents have raised concerns regarding current plumbing requirements, training, competencies and the effectiveness of existing policies and procedures for mitigating the risk of cross-connections.

Water corporations have broadly indicated that the installation phase of recycled water plumbing work was being effectively monitored and rectified by water corporations, despite its reliance on informal relationships with plumbers, where presumably the commercial incentives of plumbers to secure further work from the water corporations drives outcomes.

However, water corporations have suggested that the main risks in the system occur at the commissioning phase of the recycled water system. Data from the Yarra Valley Council collected at the installation phase indicates that, of the 15,000 inspections conducted since 1 July 2015, there is a non-compliance rate of 8 per cent.

Given the level of observed non-compliance of recycled water work by water corporations at the installation phase (noting that the water corporations are able to rectify prior to completing work), it is possible that a similar level of non-compliance at the commissioning stage (i.e., post-installation) could also be occurring, however, as noted, there is insufficient data to confirm this.

As part of consultations, several water corporations raised concerns that non-compliance seemed to occur more frequently with plumbers who were less familiar with recycled water systems, particularly with plumbers that had received their qualifications and training over 20 years ago. In addition, water corporations reported that observed non-compliant work was being undertaken by plumbers who were not necessarily aware of relevant standards for recycled water work.

To reduce cross-connection risks associated with recycled water systems, water corporations have proposed the following options:

- Introduce a continuous professional development scheme for plumbers with specific regard to cross connections risks.
- A specialised class specific to work on recycled water.
- Additional qualification requirements for the main class of water supply work to provide broader foundational knowledge and training in recycled water work prior to registration and licensing.
- Changes to standards of plumbing work to be more relevant to recycled water standards.

The department notes that the introduction of a continuous professional development scheme for plumbers would require an amendment to the Building Act and hence is out of scope for consideration for the remake of Plumbing Regulations (see Part C—page 139 of this RIS for a discussion on a continuous professional development scheme).

What is the problem with the status quo?

Given observed cross-connection incidents and rates of non-compliance at the installation phase for plumbing work on recycled water systems, the department has analysed whether existing plumbing standards and qualifications are sufficient as part of the existing water supply class or if additional action needs to be taken to address more effectively the risk of cross-connections from plumbing work on recycled water systems. As part of this, the department considered:

- whether existing competencies forming part of water supply were sufficient in providing relevant training and skills to work on recycled water systems
- whether existing standards informing work on recycled water systems were sufficient
- whether a specialised class was warranted.

Analysis of specific issues

Adequacy of current competencies

Competency units that a person must complete to gain registration or licensing in the class of water supply are gazetted. These competency units come from the Certificate III in Plumbing as part of the National Training Package for plumbing. Noting that there are number of competencies that would provide foundational knowledge on working with drinking water systems, the gazetted competency unit which provides specific training for recycled water is CPCPWT3028A—Install water service.

Following analysis undertaken by the VBA, the department agrees that the current required list of competencies provides sufficient training to meet industry requirements for the work associated with recycled water systems. This means that plumbing practitioners should be sufficiently equipped with the required knowledge and skills to protect the integrity of the drinking water supply, including work on recycled water systems.

The department recognises that there may be stakeholders who will consider existing competencies do not sufficiently provide the necessary qualifications required for a plumber to comply with the relevant recycled water requirements. However, the department notes that as part of the existing National Training Package for plumbing, there are currently no additional units of competency available that could be used to further train or upskill practitioners to undertake work on recycled water systems. A review of the National Plumbing and Services Training Package is currently underway and is expected to be completed in July 2018.⁶²

⁶² The review of National Training Package is being run by Artibus Innovation. For further details, see <http://www.artibus.com.au/index.php/projects-cpc-plumbing-services-components/>

Sufficiency of standards

AS3500.1 specifies the performance requirements related to the installation of non-drinking water services, which are detailed and prescriptive. The VBA have also published a Technical Solution Sheet to assist practitioners carrying out this work.⁶³ The VBA and the department consider that these requirements and guidance material provide sufficient material for practitioners working on these systems to meet compliance standards.

The department has not identified any evidence which suggests that there are underlying issues with the prescribed requirements in their current form which may inadvertently increase the risk of cross-connections occurring.

Introducing a specialised class

While the department considers that establishing a new specialised class for 'recycled water' is not preferable because practitioners qualified in the water supply class of plumbing are sufficiently trained in recycled water systems work, it is also noted that there are no competency units at the Cert IV level that are currently available through the plumbing National Training Package that addresses work on recycled water systems.

Hence, the department considers it undesirable and impractical to establish a new specialised class for 'recycled water' since there would be no appropriate competencies to underpin the specialised class which is a key driver for creating a specialised class.

Non-regulatory approaches to improve compliance for work on recycled water systems

While the department and the VBA analysis indicates that existing training requirements and standards are sufficient, plumbers who completed their training a number of years ago may not have received training directly related to work on recycled water, noting that foundational training and knowledge for work on drinking water systems would have been undertaken.

In addition, the department is aware that in 2015, South East Water developed a specific training module for recycled water and offered a training course, as a refresher course for plumbers, and that at that time there was a low uptake of this course. The department also understands that South East Water are expecting to conduct seminars again this year. This represents a significant investment by water corporations in developing and seeking to deliver a specific training module for plumbers working on recycled water systems.

Given the above, the department considers that there appears to be benefit in pursuing non-regulatory approaches to improving compliance for plumbing work on recycled water systems.

Improved collaboration and data sharing between water corporations and the VBA

Through the ongoing work of the IDC on cross-connections, in recent months the Victorian Water Industry Authority (VicWater) has facilitated a series of workshops to foster better co-operation, collaboration and information sharing between the VBA and the water corporations. As a result of the workshops, the VBA and water corporations have agreed to develop a Memorandum of Understanding which outlines a collaborative approach to data sharing and a better understanding of the key causes of cross-connections. Key actions for the VBA and water corporations include:

- improved data sharing between VBA and water corporations—water corporations to share data with the VBA on inspections associated with the installation of recycled water systems and the VBA to share appropriate Compliance Certificate data (at properties serviced with recycled water) with water corporations

⁶³ Technical Solution Sheet 91. Recycled Water available at http://www.vba.vic.gov.au/__data/assets/pdf_file/0014/22460/91.02-Grey-or-Recycled-Water-Grey-or-Recycled-Water-non-drinking-water-supply.pdf

- protocol for recycled water plumbing incident response—the development of a recycled water plumbing incident response notification protocol and agreement
- communication of relevant training, seminars and guidance material—ensuring that relevant training and workshops are communicated to the network of plumbers associated with the VBA and water corporations in a co-ordinated and targeted way to maximise participation of plumbers working on recycled water systems.

The department notes that matters to be considered by the VBA and water corporations as part of its improved collaboration work program may include the further investigation of potential issues with other alternative water supplies.

Proposed changes to the Compliance Certificate

An additional non-regulatory measure includes modifying Compliance Certificates to provide a ‘check box’ for licensed plumbers to certify that they have conducted a cross-connection test when they undertake water supply work on a property that has a recycled or other alternative water supply. The requirement to undertake a cross-connection test is an existing requirement under the standards. Therefore, adding this “check box” will not impose any new or additional requirements but will remind plumbers of their existing obligations, particularly plumbers that may not be as familiar with alternative water systems.

The department considers that emphasising this obligation by including it on the Compliance Certificate could reduce the incidences of cross-connection. The VBA anticipates that this change to the Compliance Certificate will commence at the same time as the new Regulations.

Conclusion

While the department and the VBA acknowledge industry stakeholder concerns regarding the need to further reduce cross-connection risks associated with recycled water systems, the department’s analysis considers that existing qualification requirements and standards associated with plumbing work on recycled water systems is sufficient and appropriate.

The department considers that non-regulatory approaches are the most appropriate mechanism to mitigate the risk for cross-connections associated with recycled water work, including:

- improved collaboration and data sharing between water corporations and the VBA
- as part of proposed changes to the Compliance Certificate, a ‘check box’ provided for cross-connection test be completed when work is undertaken on recycled water systems.

Questions for stakeholders

Will the proposed non-regulatory approach to addressing concerns about cross connection of recycled water be effective? Are there other steps that could be taken? Please provide reasons.

8.4 Proposed change: thermostatic mixing valves

Background

To prevent accidental scalding the mandatory Australian Standard specifies the temperatures that water must be delivered at, with a lower temperature being required for installations designed to cater to vulnerable people, such as in hospitals, schools and aged care facilities (i.e., no more than 45 degrees Celsius).⁶⁴

Publicly available data indicates a clear reduction in the number of hospitalisations of children between the ages of 0 and 4 since the temperature control requirements were introduced in 1996, dropping from 236 cases in 1999-2000 to 125 cases in 2012-13.⁶⁵ Although there may be other contributing factors, it seems reasonable to assume that the steadily increasing number of installations fitted with temperature control devices has played a key role.

In addition to preventing scalding, the Australian Standard also requires that water is stored at an elevated temperature to prevent the growth of harmful bacteria such as legionella. To simultaneously ensure that a water user is not scalded, but also not at risk of infection from harmful bacteria, a plumbing practitioner must install a device to intervene and cool the water supply at the point of delivery.

One such device is a thermostatic mixing valve (TMV). TMVs are mixing valves in which the temperature of the water from the mixed water outlet is automatically controlled by a thermostatic element or sensor to deliver water at a preselected temperature that is suitable for direct contact with the skin.

Although TMVs have been available since the early 20th century, it was the introduction of Australian Standard AS 3500.4-1990 that led them to become a specified method for protecting those with disabilities from scalding.⁶⁶ In 2010 an amendment to the relevant Australian Standard strengthened these provisions to clarify that for hot water systems intended for vulnerable people, a TMV was the only acceptable method of controlling water temperature.

The rationale for requiring the use of TMVs is due to their ability to respond more quickly to temperature or pressure variations compared to other devices such as tempering valves. Although less important in installations servicing ordinary homes or businesses, minimising variations in temperature is critical for the protection of vulnerable people.

To ensure that it continues to function reliably a TMV must be periodically inspected, tested and maintained. Failing to do so can result in the TMV ceasing to function and risking the possibility of untempered water being delivered to the outlet. The consequences to the user may be as serious as having no TMV in place at all.

This was demonstrated by a 2015 case in Western Australia when a resident of a facility catering to people with physical disabilities was badly scalded when an aging TMV burst causing untempered hot water to be delivered to a shower outlet. Because of the patient's reduced mobility and the nature of their disability they suffered severe scalding. It seems clear that if the TMV had been regularly and competently maintained the chances of such an incident occurring would have been significantly reduced.⁶⁷

⁶⁴ The specific clause of AS/NZS 3500.4:2015 refers to installation used "primarily for personal hygiene purposes for the aged, the sick, children or people with disabilities in healthcare and aged care buildings, early childhood centres, primary and secondary schools and nursing homes or similar facilities for the aged, the sick, children or people with disabilities"

⁶⁵ Australian Institute of Health and Welfare, *Trends in hospitalised injury, Australia 1999-00 to 2012-13*, Injury Research and Statistics Series No. 95, 2015, p. 92.

⁶⁶ Australian Standard, *AS 3500.4-1990 National Plumbing and Drainage Code—Part 4: Hot Water Supply Systems*, p. 66.

⁶⁷ Consultation Regulatory Impact Statement, *Reform of Plumbing Regulation in Western Australia*, Government of Western Australia, Department of Mines, Industry Regulation and Safety, 1 May 2018, page 58.

While the relevant Australian Standard recommends that TMVs should be inspected ‘periodically’, the VBA recommends that all building owners should ensure the testing and maintenance of TMVs at least once each year. However, there is no legal obligation for building owners to do this. Despite this, some Victorian departments have chosen to enforce the VBA’s recommendation through self-regulation:

- The Department of Health and Human Services (DHHS) requires that within state managed hospitals and health services TMVs are maintained every 12 months. This requirement is outlined in the DHHS’s 2010 publication ‘Maintenance standards for critical areas in health facilities.’
- The Department of Education and Training (DET) also requires for state-managed schools TMVs are maintained every 12 months and makes reference to the VBA’s requirements.

The department understands that this approach has been taken by DHHS and DET to protect the health and safety of these vulnerable individuals in sensitive settings receiving state care or services. Although scalding is a serious injury at any age, the elderly are particularly at risk due to their reduced mobility and prolonged periods of recuperation which increases the possibility of the patient developing life threatening complications.

The department has been advised that this is a long-standing requirement of DHHS and DET and that plumbing practitioners have been regularly engaged to undertake the maintenance of TMVs. A review of publicly available data suggests that in Victoria there are at least 3,500 facilities where TMVs are required by AS/NZS 3500.4 to be installed, many of which will require multiple valves. Based on this, it is reasonable to assume that there are a number of practitioners currently carrying out the testing and maintenance of TMVs on behalf of Victorian departments.

What is the problem with the status quo?

A key objective of regulating a scope of plumbing work is that practitioners are sufficiently trained and qualified to undertake the full scope of work they are responsible for. This requires that appropriate training competencies are prescribed from the National Training Package for plumbing for the scope of work a practitioner is responsible for undertaking. In addition, prescribing appropriate standards through the regulations can help to provide practitioners with a clear and transparent benchmark for compliance.

However, despite the fact that as part of the regulated scope of work of water supply a practitioner can legally undertake the maintenance of TMVs, the department’s analysis determined that there were two critical components missing in the safe maintenance of TMVs being achieved:

- The prescription of the relevant competency—there is an existing competency as part of the National Training Package for plumbing that provides for the maintenance of TMVs at the Certificate IV level. ‘CPCPWT4023A—Commission and maintain hot and heated water temperature control devices’. However, this is currently not prescribed through the class of water supply.
- The prescription of the relevant standard—The existing Australian Standard is AS 4032.3.⁶⁸ This publication sets out a standard procedure for maintenance that is appropriate for all TMVs regardless of the manufacturer.

The department considers that the ‘status quo’ arrangements reflecting an absence of a mandatory training competency and the lack of a prescribed standard for the maintenance of TMVs poses a risk

⁶⁸ AS 4032.3 Water supply—Valves for the control of heated water supply temperatures Part 3 Requirements for field-testing, maintenance or replacement of thermostatic mixing valves, tempering valves and end-of-line temperature control devices.

for the safety of TMVs since practitioners may not be appropriately trained to undertake this work, while acknowledging that some practitioners may nominate to undertake the identified competency associated with the maintenance of TMVs.⁶⁹ The department expects that this may manifest itself in variability of the quality of work undertaken by practitioners. This has been confirmed by DHHS and DET, which report that some practitioners engaged were very competent, while others were not suitably trained and were unaware of the requirements of the standard.

The department considers that it is essential that every practitioner undertaking this work should meet a minimum level of competency given that the people most likely to be impacted by inappropriately maintained TMVs are the elderly, the very young and those in state care. These water users depend on TMVs to function effectively to ensure their safety. Hence, the department considers it appropriate to ensure that practitioners undertaking work on the maintenance of TMVs are required to undertake the appropriate competency and are required to comply with the relevant standard to ensure the health and safety of vulnerable individuals who are often in the care of the state.

Potential options for change

To address this problem two options have been identified:

- **Option A:** Create a new Specialised Class of TMV work within the water supply class
- **Option B:** Add an additional competency to the existing list of competencies for receiving a license in water supply work

Option A—Create a new Specialised Class for the maintenance of TMVs

To address potential issues around the safe operation of TMVs, the department proposes to create a new specialised class associated with the main class of water supply work. As part of this new class it is proposed to:

- limit the scope of work to be on TMVs and only for the ‘repair, alteration, maintenance and testing’ of TMVs
- prescribe the appropriate competency for the testing and maintenance of TMVs (i.e., ‘CPCPWT4023A—Commission and maintain hot and heated water temperature control devices’)
- prescribe the appropriate standard related to the testing and maintenance of TMVs (i.e., Australian Standard is AS 4032.3)

Limiting the scope of work to post-installation work, including the testing and maintenance of TMVs will allow practitioners licensed or registered in the water supply class to continue to carry out the installation and commissioning of TMVs. Although the new competency provides instruction on the commissioning as well as maintenance of TMVs, the available evidence strongly suggests that the installation and commissioning is being carried out competently and there is no need to prescribe additional training⁷⁰ and this approach targets the specific problem. In addition, including commissioning within the new specialised class would impose additional costs on consumers by potentially requiring them to engage multiple practitioners to complete the same installation. For example, a practitioner who is licensed or registered in water supply would be able to carry out the initial installation, but another licensed or registered in the new specialised class would be required to complete it by carrying out the commissioning.

⁶⁹ The department notes that it does not have data on the number of practitioners that are nominating to undertake the identified competency. Presumably some practitioners would undertake the identified competency, particularly to gain a competitive advantage in the market over other practitioners.

⁷⁰ This is supported by data provided by the VBA which indicates that between 2010 and 2017 non-compliant installation and commissioning of TMVs may account for as little as 4 per cent of all water temperature non-compliance noting that the exact rate is difficult to determine due to the limitations of the available data.

The department considers that creating a specialised class is the most effective option for ensuring that customers can easily identify which practitioners have completed the additional training and are sufficiently competent to undertake the work in accordance with the new prescribed standard. Hence, the creation of a specialised class provides a reliable market signal for customers like building managers of DHHS and DET assets who have reported difficulty in identifying competent practitioners currently.

The department has estimated the introduction of this new specialised class to cost \$1,667.26 per practitioner.⁷¹ As a specialised class, this represents an additional cost to practitioners in addition to becoming registered and licensed in the water supply class and any other existing costs. However, as discussed above there is already an established and sizeable market for these skills amongst buildings catering to vulnerable people. The department considers that it is reasonable to believe that the presence of an existing market will encourage a number of practitioners to invest this comparatively minor amount in order to continue servicing this demand.

It is also reasonable to assume that practitioners will pass on their costs to consumers, which will place the bulk of the cost of this option on consumers such as schools, hospitals and aged care facilities. It is noted that these costs are comparatively low for the establishment of a new class and the department does not anticipate that these costs will be substantial to individual customers. The net cost to some customers may be further reduced by the time saved in attempting to identify practitioners who are competent in this particular type of work, in addition to any potential reduction in defective work.

The department also considers this cost to be justified to ensure the safe operation of TMVs following maintenance work undertaken by a plumber.

The department notes that jurisdictions are seeking to strengthen requirements in relation to this type of work. For example, in Queensland there is already the equivalent of a specialised class in relation to the commissioning and maintenance of TMVs and must have completed the same competency that the department is proposing to introduce in Option A. In addition, the West Australian Government is currently considering whether to impose a mandatory obligation on owners or occupiers of buildings catering predominantly to vulnerable people that they must “test and service” all TMVs once every 12 months.

Option B—Add competency associated with maintenance of TMVs as part of water supply class

An alternative option is to introduce the identified additional competency alongside the existing mandatory competencies required to be licensed in the water supply class. This option will also prescribe the relevant Australian Standard, AS 4032.3 which specifically covers the testing and maintenance of TMVs.

The inclusion of the certificate IV level ‘CPCPWT4032A’ as a licensing competency reflects a similar certificate IV level competency that is required in order to be licensed in fire protection work, ‘CPCPFS4022A Commission and maintain special hazard fire suppression systems’. Like CPCPWT4023A this competency is also designed to complement and supplement material taught in competencies approved as a condition of registration in fire protection.

The additional cost under this option is estimated to be \$1,436.66 per practitioner.⁷² If every licensed practitioner was required to complete this competency and purchase the new Standard the

⁷¹ This estimate is based on the additional cost of enrolling in the competency (\$450), time cost of completing the course (20 hours at \$41.40 per hour plus superannuation—see Appendix C), time cost of preparing for and sitting the VBA exam (\$230.60), and the cost of purchasing the Standard (\$80).

⁷² This estimate is based on the additional cost of enrolling in the competency (\$450), time cost of completing the course (20 hours at \$41.40 per hour plus superannuation—see Appendix C), and the cost of purchasing the Standard (\$80).

total cost would be \$13,585,057. It is reasonable to assume that these costs would be passed on to consumers.

This option seeks to reduce any knowledge or training gaps that exist in the industry are addressed over time as all new licensed plumbers would have undertaken the new competency. However, because the requirement to undertake the competency would only apply to future practitioners, it would take a number of years before a substantial number of practitioners had undertaken the relevant competency. This is because there is no existing requirement to ensure that existing practitioners undertake newly prescribed competencies.

In addition, this option would impose an additional burden on a whole sector of the industry whether or not they intend to service the specific market for the repair and maintenance to TMVs which is likely to remain a limited market. The department notes that water supply is one of the main classes of plumbing work with one of the biggest numbers of practitioners registered or licensed in any class.

Conclusion

The department acknowledges that there are gaps in evidence and data regarding potential problems with the existing servicing and maintenance work on TMVs. However, the department considers that regulatory action is justified to reduce potential safety risks in the operation of TMVs given the consequences of defective work to the health and safety of vulnerable individuals often in sensitive settings.

While Option B would ensure that all practitioners in water supply are able to continue to undertake the servicing and maintenance of TMVs, the department notes that only new entrants to water supply would be required to undertake the additional competency. Hence, Option B would have a relatively limited impact on the safe operation of TMVs. In addition, the department considers that it would not provide an effective market signal in relation existing practitioners being sufficiently trained to undertake the maintenance of TMVs.

Moreover, a new requirement for all practitioners in water supply to complete an additional competency before being eligible to be licensed would increase training and opportunity costs for these individuals, regardless of whether or not they intend to work on TMVs. Given that the majority of this work will apply to vulnerable individuals in sensitive settings and the objective to ensure the safe operation of TMVs, the department did not favour this approach.

The department's preferred position is Option A. Individuals under the care of state-run facilities are particularly vulnerable to scalding and injuries from inappropriately delivered water from TMV systems. The creation of a specialised class will mean practitioners are required to undertake relevant training and are required to comply with the relevant Standard, and also creates a signal for clients (DET and DHHS asset managers) about the qualifications of potential providers. This approach has already been adopted in Queensland based on similar considerations of protecting life safety.

Appropriate transitioning to new class

To ensure that practitioners are given sufficient time to complete the additional competency the department intends to delay the commencement of this new class for 12 months after the regulations commence. The department considers this reasonable to provide sufficient time for practitioners to understand the regulatory requirements and undertake the training competency, noting that the department understands there is sufficient capacity in the market currently to provide this training.⁷³ Under this proposal, no practitioners will automatically transition to the new

⁷³ The department understands there are several RTOs who currently offer this course as an elective. Given the expected nature of the demand and the delay in the introduction, the department does not anticipate a shortfall. The competency requires around 20 hours of contact hours to complete.

class once it commences from November 2019. Prior to November 2019, practitioners licensed or registered in water supply will continue to be allowed to carry out this work.

Questions for stakeholders

Does it take a significant amount of time to identify appropriately trained and skilled practitioners for the servicing and maintenance of TMVs?

In engaging the services of a plumbing practitioner for the servicing and maintenance of TMVs, were you satisfied of the skills and knowledge of the plumber? Please explain the reasons for your response.

Have any scaldings or serious injuries occurred due to a TMV being inappropriately maintained?

Is it appropriate to provide for 12 months for practitioners to undertake the relevant competency? Is the department's understanding of sufficient capacity in the training sector to service the expected demand for this training accurate?

8.5 Proposed change: backflow prevention device for taps adjacent to toilets

Background

A key objective of Plumbing Regulations is to mitigate the risk of backflow cross connection with drinking water supply due to significant risks to health for consumers. Backflow is the undesirable reversal of water flow or mixtures of water and other substance back into the drinking water supply system.⁷⁴ For example, a toilet flush cistern and its water supply must be isolated from the toilet bowl. As any potential cross connection between a home's drinking water supply and human waste is considered a serious health risk, appropriate Australian Standards prescribe a series of measures and backflow prevention devices to sufficiently prevent backflow.

The Standard 'AS/NZS 3500.1—2015 Plumbing and Drainage—Water Services' requires that where plumbing devices or systems are connected which carry a risk of cross contamination of the water supply, a backflow prevention control is installed suitable for the degree of hazard. Essentially, the plumber must consider the degree of hazard associated with the installation of a system. Should the plumber determine, based on the Standard, that the installation carries a high backflow risk, the plumber is required to install a testable backflow prevention device (at a cost of around \$400).

When a customer wishes to install a tap adjacent to a toilet, appropriate backflow prevention measures may be required depending on the use of the tap. Possible uses of this tap and associated backflow prevention controls required under the Standard include:

- charging a floor waste gully (i.e., using the tap to clean the floor of the bathroom)—no backflow prevention measure is required. The department considers this appropriate as there is little risk of cross contamination
- bidets and bidettes—these devices are considered to carry a high-hazard backflow risk, because if there is insufficient space between the nozzle of the water outlet and the rim of the toilet, backflow cross contamination is a significant risk. Therefore, the Standard requires the plumber

⁷⁴ Backflow protection devices installed at the main water meter and beyond (including other water corporation assets) protect neighbourhoods and communities from backflow incidences. These backflow controls are specified and monitored by the relevant water authority through the Water (Estimation, Supply and Sewerage) Regulations 2014 and are out of scope for the Plumbing Regulation remake process. On the other hand, backflow protection devices installed within private residences are in scope for the Plumbing Regulations remake process.

to also install a testable backflow prevention device when installing these systems. The department considers this appropriate

- flexible hose sprays (attached douche sprays)—these devices are considered to be a high-hazard backflow risk, because if a flexible hose spray falls into a toilet bowl, backflow could allow contaminated water from the toilet to enter the fresh water supply. Therefore, the Standard requires that the plumber install a testable backflow prevention device on taps which are intended for this use. The department considers this appropriate.

The department notes that the installation of bidets and bidettes is regulated plumbing work which a consumer cannot easily (or legally) undertake, meaning that these systems will generally always be installed with a backflow prevention device. However, the installation of a handheld hose can easily be undertaken by a consumer and does not require a plumber to install. Furthermore, an increase in the number of people contacting the VBA about handheld hoses indicates that the installation of these hoses in homes is a growing trend.

What is the problem with the status quo?

The ability for consumers to install handheld hose causes two scenarios where the risks of backflow may not be sufficiently mitigated for consumers:

- The consumer fails to inform the plumber they wish to use the tap for a handheld spray. This could be done intentionally by the consumer to avoid the cost of the installation of the backflow prevention device, or the consumer may not intend to use the tap for this purpose initially but change their mind in future.
- A new tenant or new owner installs a handheld spray onto an existing tap. If the existing tap was not installed with any backflow prevention measure (e.g., the plumber installed the tap previously under the understanding that it would be used for charging a floor waste gully) and the new tenant or owner installs the handheld spray themselves, this represents a high-hazard backflow risk where no backflow prevention device is in place.

Although the department is not aware of evidence to enable a cost-benefit analysis of this issue, the department considers that the public health risk warrants the consideration of regulatory intervention. The risk of backflow associated with use of flexible hoses has been widely accepted by water authorities and regulators both within Australia and overseas. In addition, the department understands that it would not be feasible to collect data on the occurrence and severity of adverse health impacts caused by backflow in the home, particularly resulting from flexible hose sprays that do not have backflow prevention devices installed. This is because when consumers suffer illnesses such as gastroenteritis, is difficult to isolate the cause and attribute the illness to the contamination of the water supply in the home due to the number of potential causes.

Proposed change

The department proposes to address this issue by inserting a requirement in the proposed new Regulations, which clarifies that:

- where a water point is to be installed adjacent to a water closet, but is not connected to a sanitary fixture, the water point must be protected by a high hazard protection measure
- if the water point is connected to a bidet or other sanitary fixture, this requirement will not apply (as stated above, the bidet itself will be protected by a high-hazard backflow prevention measure and therefore a backflow prevention device at the hose tap is not required)
- the requirement will not apply to hose taps provided in men's public toilets adjacent to urinals (this inclusion of this hose tap is a requirement under the Victorian variation to the Plumbing Code of Australia BP1.2 and only presents a low a cross contamination risk).

The advantage of the proposed amendment is that it will ensure that the risk of backflow is sufficiently mitigated should there be any changes in use of the tap following installation (e.g., if a new tenant or owner decides to install a handheld spray without engaging a plumber, because an appropriate backflow control would have been installed when the tap was installed).

When installing taps, plumbers will no longer have to consider what the water point is used for, only whether or not the water point is *adjacent* to the water closet. The use of the term 'adjacent' in this context means *near*, or *next to*. It is recognised that this term will still have a subjective element. In this case it is intended that a plumber will use their judgement to determine whether a tap is reasonably close by, or close enough that a flexible hose tap is accessible from the water closet.

The department considered a more prescriptive requirement of 'within 3 meters of a water closet' based on the understanding that there are no flexible hoses sold in Australia which are longer than 3 metres. However, the department did not consider this appropriate—while it provides greater certainty and transparency, the small size of most bathrooms would mean this requirement would likely have the effect of imposing a blanket requirement that backflow prevention devices be installed on water points for most bathrooms. In addition, there is the possibility of longer hoses entering the market in the future.

The department acknowledges that the proposed prescriptive approach may result in circumstances where a consumer wishes to install a tap in a bathroom to assist with cleaning purposes only and will be required to pay the cost of the installation of testable backflow prevention device. This is particularly likely in small bathrooms. Where consumers have reasonably large bathrooms, they may have the option to install the water point far enough away from the toilet as to not trigger the 'adjacent' requirement.

However, the intended outcome of the proposal is to reduce the instances of high-hazard toilet fixtures being non-compliant with the required Standard.

Conclusion

While the department acknowledges gaps in data and evidence of the problem, a key policy objective of plumbing work is to ensure that high-hazard backflow risks are sufficiently mitigated. Hence, the department considers it appropriate to require that any tap adjacent to a toilet that could be used at some point in the future as a source of water for a handheld spray be required to have installed a testable backflow prevention device. This may result in some costs being absorbed by individuals that do not use a handheld spray. However, the department considers that this approach is warranted given the need to protect consumers from the significant health risks from backflow to future tenants or owners that may choose to install a handheld spray. There are serious health consequences to contamination within the home and the department considers that this preferred approach sufficiently mitigates against these risks.

Questions for stakeholders

Does the proposed change provide sufficient clarity to plumbers? Are the changes reasonable, or would they add significantly to costs?

8.6 Hot water standard for existing Class 1 buildings

Background

Water heating is the second largest energy end-use in Victorian residential buildings, accounting for 19 per cent of total energy consumption in the residential sector in 2017 and expected to rise to 20.5 per cent in 2028 under business as usual. It is a significant factor in household energy bills and in household impacts on Victoria’s greenhouse gas emissions. Hot water heating in Victoria contributes to the production of 2.4Mt CO₂-e emissions annually in Class 1 buildings⁷⁵ (representing 13 per cent of the total emissions for the residential sector in Victoria⁷⁶ of 16.6Mt CO₂-e).

Due to the long service life of water heaters, the choice made at the point of installation can lock in the running costs for households, and greenhouse gas emissions, for significant periods of time (between 12 to 15 years depending on the type of system installed). Measures that drive uptake of more efficient hot water systems—when replacements must be made—are a key opportunity for government to improve energy affordability for Victorian households and support emissions reduction outcomes.

Decisions on hot water systems are determined to a large extent by the availability of access to natural gas. A further important factor in these decisions is that they are generally made only when the existing system fails, and are subject to pressing time constraints due to the essential nature of hot water services. This means that households may not consider the full range of system options (including fuel type) at the point of replacement and may not take into account the respective running costs of systems over their lifetime.

Natural gas fuelled water heaters (storage and continuous flow) are the predominant type of water heating in Victoria (67 per cent of Class 1 households) and have relatively low emissions (natural gas water heaters account for 43 per cent of GHG emissions). By contrast, electric storage water heaters represent 20 per cent of Class 1 Victorian households but contribute 49 per cent of the total greenhouse gas emissions for water heating, having amongst the highest running costs.

Table 28: Comparison of performance of hot water heaters available on the market

Type of water heater	Purchase & install costs	Annual Energy cost	GHG emissions
Electric storage	Low	High	High
Gas continuous / storage (NG)	Low—medium	Medium	Low—medium
Gas continuous / storage (LPG)	Low—medium	High	Low—medium
Solar—electric boosted	High	Low—medium	Medium
Solar—gas boosted	High	Low	Low
Heat Pump	Medium	Medium	Medium

Despite the wide availability of energy efficient hot water heaters, there is evidence that relatively few consumers, when faced with a need to replace their water heater, upgrade to a more efficient system. In particular, many consumers continue to replace their existing hot water heater systems

⁷⁵ See the Plumbing Code of Australia for the full definition of Class 1 building. Generally, it is taken to mean a detached house, terrace house, town house, villa unit, or boarding house/guest house/hostel.

⁷⁶ Victoria’s Climate Change Framework, DELWP 2016, page 34.

with electric storage systems, despite their high energy costs and high GHG emissions. This is occurring even for consumers that have access to natural gas.

Table 29: Summary of water heater types by gas access in 2017 in Victorian Class 1 buildings

Water heater type	Reticulated gas areas	Non-reticulated gas areas	Total
Electric storage	10.2%	9.4%	19.6%
Gas continuous flow (LPG)	0.1%	0.5%	0.6%
Gas continuous flow (NG)	35.7%	0%	35.7%
Gas storage (LPG)	0.1%	0.4%	0.55
Gas storage (NG)	31.4%	0%	31.4%
Heat pump	0.5%	0.9%	1.4%
Solar electric	0.2%	1.6%	1.8%
Solar gas	8.5%	0.4%	8.9%
Wood	0%	0.1%	0.1%
Total	86.8%	13.2%	100%

LPG means liquified petroleum gas

NG means natural gas

Given the above, the department considers that the performance characteristics of water heaters available for the replacement market warrant further consideration in relation to both their environmental and energy cost impacts during their lifetime, particularly in regard to decisions that consumers make.

Current arrangements

The department notes that there are no Victorian specific standards for the replacement of hot water heaters (e.g., performance-based, GHG based, or otherwise), since Victoria has not adopted the existing PCA standards in relation to hot water heaters. Therefore, households are generally free to choose any system that is available on the market compliant with installation requirements (e.g., existing national standards), including inefficient and emissions intensive water heaters.

The department notes that for new Class 1 buildings, there is a water heater requirement under the existing 6-star Building Standard (expressed as a variation to the National Construction Code). Under this requirement, new Class 1 buildings need to have either a solar water heater, or a rainwater tank connected to toilets. When a rainwater tank is installed to comply with the 6-star Building Standard, any type of water heater can be installed. In 2016, 76 per cent of new Class 1 buildings installed a solar water heater.⁷⁷

Regarding the replacement of a hot water heaters, under the national Equipment Energy Efficiency program, there are minimum energy performance requirements that apply to electric storage and gas water heaters which limit what can be sold into the Australian market. In addition, there are two schemes (the Small-scale Renewable Energy Scheme, and the Victorian Energy Upgrades scheme) that provide incentives for certain water heaters. Both schemes aim to incentivize the installation of low emissions water heaters. Despite these national hot water heater requirements, the department notes the availability and continued use of hot water heaters that are energy and emissions intensive.

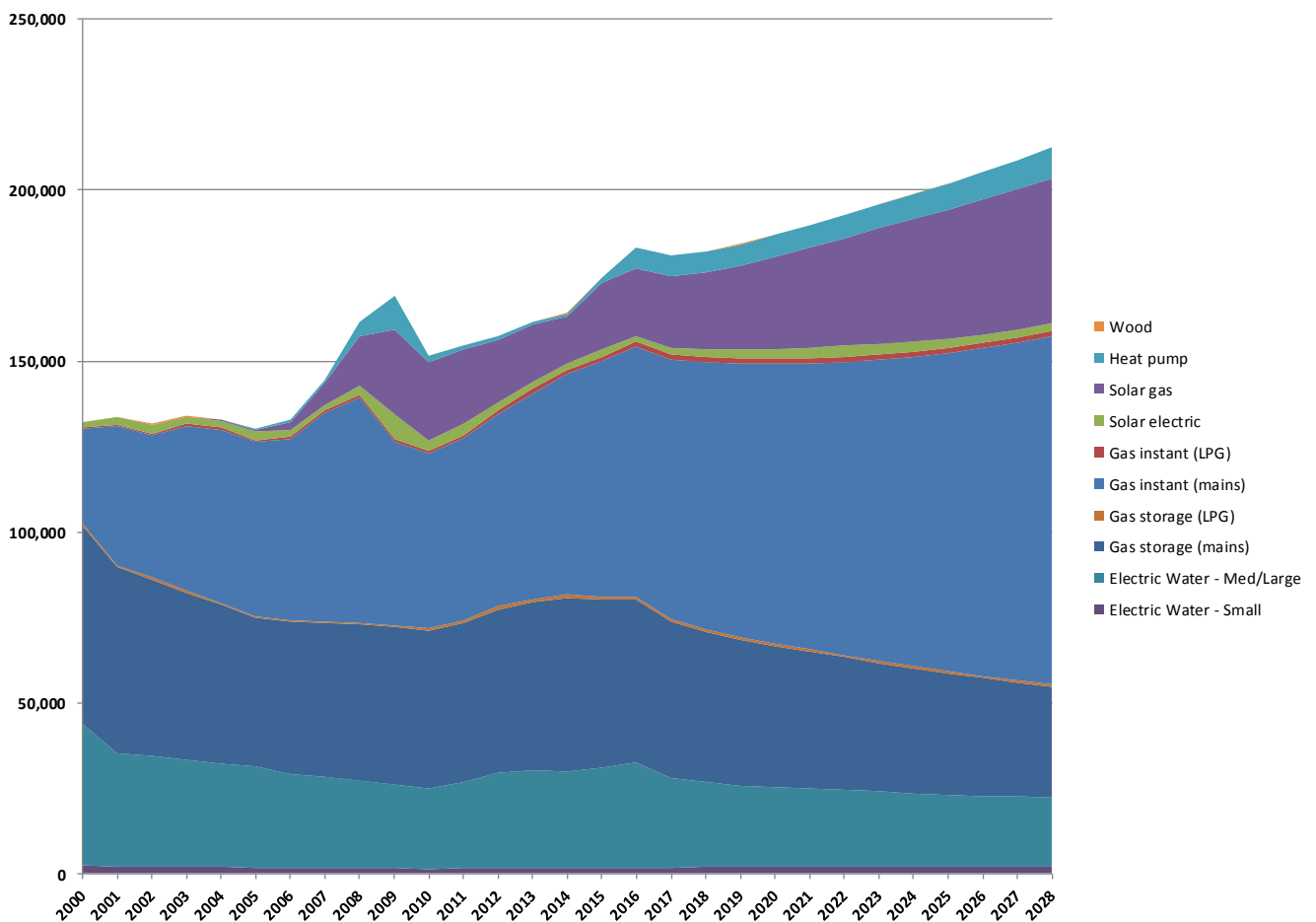
⁷⁷ Domestic Hot Water Research and Cost Benefit Analysis for Plumbing Regulations 2018 Regulatory Impact Statement

What is the problem with the status quo?

There is evidence to suggest that when a domestic hot water heater needs to be replaced, it is not necessarily replaced with a more efficient and cost-effective system. Many households are replacing existing water heaters with systems which have higher lifetime energy running costs and higher greenhouse gas emissions than others that are available in the market. Moreover, based on information gathered for this work, product installation of the less efficient systems had plateaued, rather than declined.

As illustrated in the following figure, there has been only a very modest decline in sales of these greenhouse intensive (electric storage) water heaters over the past 8 years, and this is not projected to change significantly. For example, in 2010 electric storage water heaters represented 16 per cent of Class 1 sales, and in 2018, this has declined to 15 per cent. Analysis by the department has estimated based on existing consumer trends, the proportion of electric storage sales in 2028 will be 11 per cent, suggesting that on a no policy change basis, households are transitioning very slowly from electric storage water heaters to lower emission water heaters.

Figure 5: Installations by hot water heater group—Victoria Class 1 buildings



Note: Estimated to 2017 and projected to 2028, Source Residential Energy Baseline Study model adjusted for latest Victorian trends in energy performance data and installations based on the VEU program data and Clean Energy Regulator data to 2017. Projections assume that VEU and STCs will continue to 2028 as described in their program guidelines.

The slow transition towards high performing and low emissions technology impacts households by increasing the running costs over the life of the system as well as contributing to increased greenhouse gas emissions. In the absence of intervention, the slow decline in sales of greenhouse intensive water heaters is projected to continue.

The department considers that there are a number of market failures that have contributed to the ongoing installation of inefficient, high greenhouse intensity domestic hot water heaters at the point of replacement. These are:

- present Bias—the tendency to over-value immediate rewards at the expense of our long-term intentions means that, due to limited time or financial problems, buyers may make choices that are not in their long-term best interest. Present bias, for example, can arise because the choice of a replacement water heater is often made when a water heater fails and the householder or tenant requires a quick solution to return hot water to the house. The quickest solution to returning hot water to the house is typically to replace the water heater with a similar fuelled and type of water heater. A further issue is that many householders in low socio-economic groups might have difficulty in resourcing the necessary funds for the replacement and will choose the system with a lower upfront cost even if they bear higher costs through energy bills over time
- information deficiencies—the lack of consumer information (labelling, energy bills) can lead to poor decisions. Although other options do exist that provide lower running costs and can be replaced within similar timeframes as the original water heater type, this is not always known by the consumer. It is not known why plumbing practitioners don't pass this information onto consumers. The information deficiency is exacerbated by the lack of comparison rating systems to allow consumers to easily compare the running costs or GHG emissions of different types of water heaters, such as with the Energy Rating Label which applies to other household appliances
- split incentives—this applies particularly to rental housing (rather than owner-occupied) where the landlord or property manager is making the decision on system replacement (taking into account the upfront cost only, with little incentive to reduce running costs) but the tenant is paying the bills and is impacted by the running cost of the system. This split incentive can also occur for owner occupiers, where the decision on replacement system is left in the hands of the plumber (who seeks to provide a timely replacement) and the issue of long term running costs is not referred back to the household. Analysis by the department suggests a greater proportion of rental properties have electric resistance water heaters compared to owner occupied dwellings.

Given the above, the department considers the case for regulatory change is worth considering to improve the uptake of more energy and emissions efficient water heaters in the Victorian market.

Determining proposed standard for replacement of hot water heaters

In terms of considering regulating a new standard for hot water heaters in existing buildings, the department considered and assessed:

- the category of building a proposed new standard applies to
- the approach of a proposed standard
- the level at which the standard should be set
- what type of water heaters would be compliant and which would not
- which options were appropriate to assess the introduction of a new standard.

Category of building for proposed new standard

In considering to which category of buildings the proposed new standard could apply, the department has decided to limit consideration to existing Class 1 buildings only. Class 2 buildings are excluded from the proposed regulation due to the current retrofitting challenges associated with the lack of space, body corporate restrictions, and communal hot water systems. The department also notes the scarcity of data on hot water system installed in Class 2 buildings.

Due to a parallel process, the department did not further consider applying a proposed new standard to new Class 1 buildings. Current requirements for new Class 1 buildings are expressed as a variation to the National Construction Code. The Victorian Government's *Energy Efficiency and Productivity Strategy* (November 2017) outlines a commitment to review the 6 Star standard, including consideration of the current variation which requires new Class 1 buildings to install either a solar water heater, or a rainwater tank connected to toilets. This work is proceeding in alignment with national policy processes which are considering the future trajectory for new buildings and proposals for NCC 2022.

Characteristics of the proposed hot water heater standard

The PCA contains a hot water performance standard which is currently not adopted in Victoria. The department believes the PCA requirements were not adopted for existing buildings due to concerns around household affordability impacts. However, the department considers the PCA requirements warrant fresh examination in the context of increasing energy prices, technological improvements and price reductions in systems on the market

Regarding the key characteristics of a proposed hot water standard, the department considered two possible approaches:

- a performance benchmark—this approach is intentionally technologically neutral and is consistent with how other requirements in the NCC are expressed, enabling a range of potential compliance pathways and therefore not limiting new and emerging technologies
- a standard that prescribes specific technologies—this approach is the one currently used for the solar water heater requirements under the 6-star Building Standard. The advantage with this approach is that it provides a clearer standard to determine compliance but does not readily accommodate new and improved technologies.

In considering the two options, the department proposes that a blend of the two be used, where a performance standard is prescribed, followed with a set of 'deemed to satisfy' hot water systems that meet the performance standard. This approach captures the advantages of both approaches by allowing new and emerging technologies to be considered at any time, whilst also providing clear compliance for particular categories of hot water systems. In addition, should there be significant changes to the emissions intensity of the energy market over time, this approach enables these changes to be reflected easily via regulation at the appropriate time, in particular the emissions factor used in the greenhouse calculation.

The level at which the standard should be set

Regarding the performance-based component of the standard, the department determined that it was appropriate to frame this in terms of grams (g) of carbon dioxide equivalent (CO₂-e) per megajoule (MJ) of hot water delivered. The department notes that this approach allows a mix of fuel-use water heaters to be considered and also complements the government's greenhouse gas emissions reduction commitments.

Regarding the level at which the performance-based component of the standard should be set at, the department determined that the level specified in the PCA—a performance limit of 100g CO₂-e/MJ of hot water delivered—was appropriate. Since this is the level specified in the NCC since

2011, it is generally understood by industry.⁷⁸ This proposed greenhouse performance standard would require that the replacement water heater must not exceed the performance standard of 100g CO₂-e/MJ of thermal energy load determined in accordance with AS/NZS 4234.

For gas water heaters, this performance standard would not significantly change the average performance levels— noting that lower performing gas water heaters would be non-compliant under the standard. This standard would not allow electric storage water heaters to be installed.

Regarding the ‘deemed to satisfy’ component of the standard (e.g., products that meet the standard) to provide compliance clarity for different types of hot water systems, the department determined that the following standards were appropriate:

- Gas water heaters—minimum 5.0 star for water heaters based on the Australian Gas Association (AGA) rating.
- Solar and Heat Pump Water heaters—at least 60 per cent solar savings when evaluated with Australian Standard AS/NZS 4234 in Climate zone 4. While this is inconsistent with some requirements in the PCA79, the department considers it necessary to provision for a 60 per cent solar savings to maintain consistency with the requirements for new Class 1 buildings under the NCC for Victoria. This is also consistent with the department’s general objective that requirements for existing homes should either be aligned with or lower than those of new homes, as compliance for new homes are generally easier than for existing homes.
- Heat Pump Water Heaters—when installed in Climate Zone HP5, at least 50 per cent solar savings when evaluated with AS/NZS 4234 in Climate Zone HP5. For heat pumps installed in Zone 5 (Alpine climate), it is important that they be assessed and rated for performance in that zone to ensure that there will not be frosting problems that could significantly impact the performance. It is proposed that a minimum of 50 per cent savings in Zone 5 (HP5-AU) should be required. This ‘deemed to satisfy’ requirement is not currently part of the PCA and the department considers it necessary to provide a Victorian specific climate zone for heat pump water heaters.

In considering the potential role of a combined hot water/photovoltaic (PV) system, the department notes challenges in quantifying the performance of all PV connected configurations for compliance with the proposed standard. These challenges include variables relating to additionality, load variations, consumption patterns, and capacity constraints. For the two possible configurations the department notes:

- Indirect connection—this is where PV is connected to the house with excess electricity used to power household appliances including electrically powered hot water systems.
- Direct connection—this is where PV is directly connected to the hot water system. There is greater scope under the deemed to satisfy requirements to determine an appropriate combined PV/hot water system for direct connection configurations.

Currently, there is a lack of an appropriate test standard and performance measurement that can assess the emissions intensity of combined hot water/PV systems. This creates challenges from a compliance perspective, noting that this may change if AS/NZS 4234 is updated in future. Given the current difficulties in identifying how combined PV/hot water comply under the standard, further work would be required, which could take advantage of potential changes to AS/NZS 4234 and potential changes in the market (see Evaluation section at page 137 for further discussion).

⁷⁸ The department considered a lower and upper limit for the performance-based component of the Standard but this not seen as appropriate. For further analysis see the department’s cost-benefit analysis, ‘Domestic Hot Water Research and Cost Benefit Analysis for Plumbing Regulations 2018 Regulatory Impact Statement’.

⁷⁹ The PCA provides for at least a 40 per cent solar savings for a ‘small’ system when evaluated with AS/NZS 4234.

Options for change—New hot water standard for existing Class 1 buildings

All the options identified are compared to the business as usual case, where no standard is required through regulation for the replacement of hot water heaters in Class 1 buildings.

Regarding the identification of appropriate options, the department determined it was necessary to assess all options against the same business as usual case. Given the department's analysis, three appropriate options were identified.

Option 1—standard applies to all existing Class 1 buildings

Option 1 applies the proposed standard to replacements in all existing Class 1 buildings. This option would require all Class 1 homes in Victoria to meet the proposed standard when replacing a hot water system.

In 2017, there were estimated to be up to 581,337 households in Victoria that could be affected by the potential policy (those are households who have electric storage water heaters, or a potentially non-compliant gas storage water heater).

Option 2A—standard applies to existing Class 1 buildings with a gas water heater (product-based)

Option 2A requires the proposed standard is applied to Class 1 buildings only with an existing gas water heater. Therefore, this option limits the consideration of those in scope by product.

This option is a sub-set of Option 1, as Option 2A only considers the replacement of gas water heaters where Option 1 considers replacement of all hot water heaters, in addition to gas hot water heaters.

Since option 2A only applies to existing households with natural gas (storage or continuous flow) water heaters, it is estimated to affect approximately a third of the 373,000 households with natural gas storage water heaters since the modelling assumes this proportion of households will be required to upgrade to a minimum 5-star rated system when it is replaced. This option would not apply to households with electric hot water heaters.

Option 2B—standard applies to existing Class 1 buildings with access to gas supply (access based)

Option 2B requires the proposed standard to be applied to Class 1 buildings with access to natural gas supply. This option limits the consideration of those in scope by access to gas supply.

This option is a sub-set of Option 1, as Option 2B only considers the replacement of hot water heaters in gas reticulated areas where Option 1 considers replacement of all hot water heaters.

Option 2B applies to a larger set of homes since Option 2A is a sub-set of option 2B.

In 2017, there were estimated to be up to 476,223 households in Victoria that could be affected by Option 2B.

Option 3—enhancement of existing Victorian Energy Upgrades program

This option relies on improving voluntary uptake of incentives offered through the existing Victorian Energy Upgrades program (VEU) (as legislated through the Victorian Energy Efficiency Target Act).

Under this option, the department proposes to leverage this existing program with:

- further promotion of the program to plumbers, raising awareness of the program through targeted communication with the support of the VBA
- streamlining access of the program for plumbing practitioners. The department understands that there may be barriers for plumbing practitioners to participate in the program and the department can seek to further investigate how this may be addressed.

This approach is aimed at increasing the uptake of VEU for water heating activities, which ultimately leads to consumers having access to more energy efficient water heaters at reduced cost.

Summary of Cost Benefit Results

The department assessed these options against the base case in terms of:

- costs and benefits for consumers—particularly regarding the upfront cost of purchasing and installing the new replacement hot water heater as well as the estimated energy savings from the water heater over the life of the regulations
- estimated changes to greenhouse gas (GHG) emissions
- estimated energy savings.

The costs and benefits of the three options from a state-wide perspective and an individual household perspective were modelled by the department. The full report that details the cost-benefit analysis associated with the hot water heater standard can be provided by the department upon request through the Engage Victoria website, '*Domestic Hot Water Research and Cost Benefit Analysis for Plumbing Regulations 2018 Regulatory Impact Statement*'.⁸⁰

To effectively model costs and benefits associated with the identified options, key assumptions were required to be made regarding decisions faced by consumers purchasing a new replacement hot water heater under the proposed standard. The following modelling assumptions were made regarding the consumer's behaviour when a hot water heater is replaced under the proposed hot water standard:

- Replacement of existing electric water heater—as noted above, the proposed standard will deem these hot water heaters non-compliant. Regardless of whether or not the consumer has access to natural gas, the modelling assumes that around 80-85 per cent of consumers seeking to replace an existing electric water heater will replace it with a heat pump water heater. This is based on heat pump water heaters having the lowest combined purchase/install cost and operating costs from the list of compliant hot water heaters.
- Replacement of existing gas water heater—the department notes that the majority of gas water heaters would be replaced with another gas water heater due to ease of installation and the existing gas infrastructure. The majority of continuous gas water heater replacements already meet the deemed to satisfy requirement under business as usual. For gas storage water heaters, the modelling assumes some of these households will need to upgrade to a more efficient system.
- Replacement of existing solar and heat pump water heater—there is no impact since these hot water heaters are compliant under the standard and it is assumed that consumers will replace them with the existing type of hot water system.

The department considers the assumptions used in the modelling to be reasonable and appropriate. In addition, the department has carried out sensitivity analysis for a number of negative and positive scenarios to test the variability in the cost benefit results.

Additional assumptions informing the cost-benefit analysis are provided in Appendix D of this report.

⁸⁰ The full cost-benefit analysis for the hot water heater standard proposal is available on request—please visit the Engage Victoria website and send a request for the report at the email provided.

Cost Benefit Modelling Results

The summary of state-wide cost benefit impacts associated with the introduction of the proposed standard for the three identified options are provided in Table 30. The department notes that for all three options, the Benefit Cost Ratio (BCR) is positive (ranging from 2.5 to 3).

Table 30: Cost and benefits and energy/GHG Impacts of the options

Option	1	2A	2B	3
<i>Description</i>	<i>All existing Class 1</i>	<i>Only Class 1 with existing gas water heater</i>	<i>All existing Class 1 in gas reticulated areas</i>	<i>Voluntary—Enhanced VEU</i>
Costs (\$m)	\$177	\$10	\$80	\$25*
Benefits (\$m)	\$443	\$23	\$239	\$62*
NPV (\$m)	\$266	\$13	\$159	\$37*
BCR	2.5	2.3	3.0	2.5
Energy Savings in the year 2028	1,113	115	575	146
Cumulative Energy Savings to 2028 (TJ)	6,417	678	3,317	842
Cumulative GHG Reductions to 2028 (kt CO₂-e)	1,645	37	835	236

NPV = Net present value BCR = Benefit cost ratio GHG = Greenhouse gas

* For Option 3, modelling assumes that VEET costs and benefits are passed through to consumers as costs and benefits.

The costs and benefits in the above table are the totals for the period 2019 to 2028, expressed as present values. The average costs and benefits for individual households are summarised in the table below.

Table 31: Average cost benefit per household for options over 10 years

Option	1	2A	2B	3
Average upfront cost to household	\$304	\$26	\$167	\$82
Average benefit to household	\$681	\$58	\$452	\$232
Average net benefit to household	\$377	\$32	\$286	\$150

* Based on discounted costs (4 per cent) for Option 1, 2A and 2B.

As these values are for averages, some households will experience higher purchase and install costs than the household average—these households would also experience higher benefits on average (such as for households replacing electric storage water heaters with heat pump water heaters). On the other end of the household average spectrum, some households (such as those replacing a low efficiency gas water heater with a minimum 5-star rated gas water heater) would experience lower upfront costs, and lower savings.

Option 1—Greenhouse performance standard for replacements in all existing Class 1
The summary of the cost benefit analysis and impacts of Option 1 is shown below.

Table 32: Summary of costs, benefits and energy/GHG impacts (real costs) for option 1

Cost and Benefits—2019-2028 (\$m)		
CBA	Victoria	Household
Costs (\$m)	\$177	\$177
Benefits (\$m)	\$443	\$396
NPV (\$m)	\$266	\$219
BCR	2.5	2.2
Energy Savings (TJ)		
Year	2020	2028
Annual	248	1,113
Cumulative	373	6,417
GHG Emission Reduction (kt CO₂-e)		
Year	2020	2028
Annual	66	276
Cumulative	103	1,645

Given the department’s estimates, Option 1 is expected to impact around 580,000 households in Victoria. This includes households who have electric storage water heaters or a potentially non-compliant gas water heater.

As outlined above, the key households that will be impacted under this option include:

- consumers replacing an existing electric storage water heater (non-compliant)—The department estimates that the number of households replacing electric storage water heaters will reach 23,000 in 2019 and steadily reducing each year, to be 19,000 in 2028. This is a total of 208,000 households over the ten-year period, consisting of 103,000 in gas reticulated areas and 105,000 in areas without access to reticulated gas. Given the assumptions of the model, consumers in this category are most likely choose a heat pump water heater and this represents a (discounted) average net benefit of \$995 to the household over 10 years, with a payback period of less than two years
- consumers replacing an existing gas storage water heater—this option is estimated to impact around a third of the 373,000 households that will replace a gas storage water heater and would be required to upgrade to a minimum 5-star-rated system. For households replacing an existing gas storage water heater, the assumptions of the model show that the consumer is likely to replace with a similar gas hot water system that is compliant with the 5-star rating due to the existing gas infrastructure and modest cost increase.⁸¹ The cost savings for these households is modest since the (discounted) average net benefit is \$32 to the household over 10 years, with a payback period of 4.3 years.

⁸¹ The average upfront cost for a 5-star gas hot water system is \$1,600 compared to \$1,475 for a 4-star gas storage hot water system.

At the state-level, modelling of Option 1 was calculated to result in a net benefit of \$266M and save 1,100TJ of energy in 2028 alone, with cumulative reduction of GHG emissions of 1.6Mt CO₂-e. In addition, this option is estimated to provide an average incremental net benefit per household of \$377 over the life of the Regulations.

Under Option 1, all households will be better off on average off due to reduced energy bills noting:

- the majority of benefits accrue to the segment of the market replacing an electric storage water heater due to the significant energy cost savings for this group of consumers
- the segment of the market replacing a gas storage unit accrue modest benefits on average
- the only households that will be worse off are those that choose to replace an electric storage water heater with an LPG storage hot water heater. The department is of the view that this is an unlikely choice as consumers and plumbing practitioners are generally aware of LPG's higher running costs, particularly in rural and regional areas.

The department notes that the upfront cost may be an issue for households with limited choice of systems because of gas availability and for some low socio-economic households who may have difficulty being able to pay the higher upfront costs of these heaters.

The BCR is 2.5. A sensitivity analysis, conducted by changing a number of assumptions, found that the BCR remains positive:

- Under a zero-carbon price scenario the BCR is 2.2. Note that under a carbon value of \$35 per tonne, the BCR rises to 2.7.
- If Small-scale Technology Certificates (STCs) were withdrawn and costs of heat pump and solar technologies increase, the BCR remains positive at 1.5.
- Even if heat pump water heaters increased in price by 25 per cent, the BCR would be 1.7.
- A combination of the above unfavourable scenarios would still result in a BCR of 1.01.

Option 2A—Standard for existing Class 1 buildings with a gas water heater (product-based)
 The summary of the cost benefit analysis and impacts of Option 2A is shown below.

Table 33: Summary of costs, benefits and energy/GHG impacts (real costs) for option 2A

Cost and Benefits—2019-2028 (\$m)		
	Option 2A	
CBA	Victoria	Household
Costs (\$m)	\$10	\$10
Benefits (\$m)	\$23	\$22
NPV (\$m)	\$13	\$12
BCR	2.3	\$2.2
Energy Savings (TJ)		
Year	2020	2028
Annual	27	115
Cumulative	41	678
GHG Emission Reduction (kt CO₂-e)		
Year	2020	2028
Annual	1.5	6.3
Cumulative	2.3	37.4

Given the department’s estimates, Option 2A would only apply to around 373,000 households, since this is the estimated number of households replacing a gas storage hot water heater. Consistent with this group analysed in Option 1, under Option 2A this option is estimated to materially impact around a third of the 373,000 households (approximately 123,000) replacing a gas storage water heater, since the modelling assumes this is the number of consumers that are required to upgrade to a 5-star rated system (i.e., their existing system is below 5 star). The department notes that around two thirds of the potential households that this option applies to would meet the requirements of the policy without the introduction of the standard since they would install a 5-star rated system under business as usual.

For households replacing an existing gas water heater, the assumptions of the model show that the consumer is likely to replace with a gas hot water system that has a minimum 5-starrating due to the existing gas infrastructure and modest cost increase.⁸² From a householder’s perspective, the costs and benefits associated with the upfront cost and energy savings of option 2A are modest.

The cost savings for these households is modest since the (discounted) average net benefit is \$32 to the household over 10 years, with a payback period of 4.3 years.

Given the group of consumers this option impacts, the modelling found significantly lower benefits compared to Option 1. The analysis calculated a net benefit of \$13 million, energy savings of 115TJ in 2028 alone and a cumulative greenhouse reduction of 37Mt CO₂-e.

⁸² The average upfront cost for a 5-star gas hot water system is \$1,600 compared to \$1,475 for a 4-star gas storage hot water system.

Due to the modest impacts from an NPV, energy savings and greenhouse gas reduction perspective, there is limited value in applying a set of hot water regulatory requirements to only this cohort.

The BCR is marginally lower than Option 1, at 2.3 compared to 2.5.

Option 2B—Greenhouse performance standard applies to replacements for all households in reticulated gas areas

The summary of the cost benefit analysis and impacts of Option 2B is shown below.

Table 34: Summary of costs, benefits and energy/GHG impacts (real costs) for option 2B

Cost and Benefits—2019-2028 (\$m)		
CBA	Victoria	Household
Costs (\$m)	\$80	\$79
Benefits (\$m)	\$239	\$215
NPV (\$m)	\$159	\$136
BCR	3.0	2.7
Energy Savings (TJ)		
Year	2020	2028
Annual	128	575
Cumulative	192	3,317
GHG Emission Reduction (kt CO2-e)		
Year	2020	2028
Annual	33	141
Cumulative	52	835

Option 2B would apply to homes in gas reticulated areas (estimated to impact 476,223 households), irrespective of whether reticulated gas is connected to the home or not. This option includes all those individuals currently own gas hot water systems (i.e., Option 2A) and those households who have an electric hot water heater but have access to a natural gas supply for their hot water heater system, which is a sub-set of Option 1 households (103,000 households).

As outlined above, the key households that will be impacted under this option include:

- consumers replacing an existing electric storage water heater (non-compliant)—since this group of households is smaller than those part of Option 1, the benefits on average per household is assumed to be similar⁸³ but the total pool of impacted will be less (approximately half). For example, this option includes a total of 103,000 households in gas reticulated areas. Given the assumptions of the model, consumers in this category are most likely to purchase a hot water heater pump and this represents a significant (discounted) average net benefit (e.g., around \$1,000 over 10 years) to the household, with a payback period approximately less than two years
- consumers replacing an existing gas storage water heater (same as Option 2A)—consistent with this group analysed in Option 2A this option is estimated to materially impact around a third of the 373,000 households (around 123,000) replacing a gas storage water heater, since the

⁸³ The assumptions for consumers transitioning from electric storage hot water heaters are broadly similar whether or not they have access to natural gas hot water systems.

modelling assumes this is the number of consumers that are required to upgrade their existing hot water system to a 5-star rated system (i.e., their existing system is below 5 star). The department notes that the remaining two thirds of the households that have a gas storage hot water heater would meet the requirements of the policy without the introduction of the standard since their replacement water heaters would meet the 5-star 'deemed to satisfy' standard. For these households replacing an existing gas water heater, the assumptions of the model show that the consumer is likely to replace with a similar gas hot water system that is compliant with the 5-star rating due to the existing gas infrastructure and modest cost increase.⁸⁴ The cost savings for these households is modest since the (discounted) average net benefit is \$32 to the household over 10 years, with a payback period of 4.3 years.

The department's modelling estimated that Option 2B found lower benefits compared to Option 1, but higher benefits than those associated with Option 2A. The analysis calculated a net benefit of \$159 million, cumulative energy savings of 3,317TJ by 2028 and a cumulative greenhouse reduction of 835Mt CO₂-e.

Option 2B has an improved BCR of 3.0. This is because this option also affects electric storage water heaters which have higher impacts from both a cost and benefit perspective.

The average net benefit for households under this option is estimated to be \$286, noting that—similar to Option 1—the benefits will largely accrue to individuals replacing an electric storage hot water heater.

Option 3—Driving change through incentives (enhanced Victorian Energy Upgrades)

The summary of the cost benefit analysis and impacts of Option 3 is shown below.

Table 35: Summary of costs, benefits and energy/GHG impacts (real costs) for option 3

Cost and Benefits—2019-2028 (\$m)		
CBA	Victoria	Household
Costs (\$m)	\$25	\$24
Benefits (\$m)	\$62	\$55
NPV (\$m)	\$37	\$30
BCR	2.5	2.3
Energy Savings (TJ)		
Year	2020	2028
Annual	32	146
Cumulative	49	842
GHG Emission Reduction (kt CO₂-e)		
Year	2020	2028
Annual	10	40
Cumulative	15	236

** Due to the difficulty in quantifying VEET costs and benefits, modelling has assumed that costs and benefits are passed through to the consumer.*

⁸⁴ The average upfront cost for a 5-star gas hot water system is \$1,600 compared to \$1,475 for a 4-star gas storage hot water system.

An incentive-based approach using the Victorian Energy Upgrades scheme was found to result in a net benefit of \$37 million, cumulative energy savings of 842TJ of energy by 2028, and cumulative GHG savings of 236Mt CO₂-e. These benefits are lower than Options 1 and 2B but higher than Option 2A.

The average net benefits to individual household is \$150. Again, these benefits are lower than Options 1 and 2B and higher than Option 2A.

Conclusion

Based on the modelling of costs and benefits, Option 1 has the largest NPV, energy savings and greenhouse gas reduction of all the options, and affects the most number of households. For individual households, this option would likely deliver the greatest benefits in terms of overall energy affordability. On this basis and due to the policy objective to accelerate households' take-up of more efficient and low emissions water heaters, Option 1 is the department's preferred option. The department's analysis concludes that the proposed standard of Option 1 is the most effective regulatory intervention of those examined to address identified market failures and to improve households take up of energy efficient and low emissions hot water heaters.

The department notes that Option 1 has the greatest benefits since it has the largest population of households that will be replacing the particularly inefficient electric storage hot water heater (non-compliant under the standard) and this segment of the households will accrue the greatest benefits given the relative energy savings over time. The department considers it appropriate that the proposed standard prohibit the installation of electric storage hot water heaters when replacing hot water heaters in existing Class 1 buildings due to their high running cost and emissions intensity.

Under the proposed hot water standard, households will be better off on average due to reduced energy bills—except those who choose to replace electric storage with an LPG storage water heater. Whilst households will have the option of installing a minimum 5-star rated LPG storage water heater under the standard, the department is of the view that this is an unlikely outcome (as consumers and plumbing practitioners are generally aware of LPG's higher running costs, particularly in rural and regional areas). The department expects that the vast majority of electric storage water heaters are likely to be replaced by heat pump water heaters (which has a payback period of less than 2 years), noting that households have the choice to install any compliant system. The sensitivity analysis suggests that the proposed option would return a positive benefit cost ratio even under all combined negative assumptions.

The proposed hot water standard is estimated to deliver an average net benefit to households of \$377, the effect of this will vary across households and is largely contingent on the existing hot water system the consumer is replacing.

The department recognises that it will be important to ensure that the introduction of the standard is supported by good communications to provide suitable information to consumers and plumbing practitioners to encourage informed choices and maximise the benefits to households, particularly prior to the implementation of the hot water standard. Although the details are yet to be decided, the communications campaign will likely include information on: the benefits to households from reduced running costs over the lifetime of a more efficient system and likely reduced energy bills; and how to access incentives available under VEU for certain water heater upgrades prior to the introduction of the proposed standard.

Transitional arrangements

To allow sufficient time for industry to transition to the new water heater standard, the department proposes that the new standard will commence from 1 May 2019, although a longer transition time (approximately 6 months) may also be considered depending on feedback from stakeholders. Aligning the implementation date to the PCA 2019 commencement date also provides an

opportunity for the VBA to communicate the hot water changes at the same time that PCA changes are communicated.

The department considers this transition period will allow industry sufficient time to manage existing water heating stock that would not be compliant under the new standard. As noted earlier, it is estimated that the hot water standard will impact approximately 208,000 electric storage water heaters over the life of the regulation, with 23,000 to be affected in 2019 and reducing over time to 19,000 in 2028. Noting that all major manufacturers currently offer heat pump water heaters in their product offering, the capacity of the hot water industry to meet the expected increased demands for heat pump water heaters across metropolitan and rural and regional Victoria in the short term needs to be considered. The department notes that previous rebate schemes targeting solar water heaters demonstrated the ability of the industry to supply tens of thousands of solar and heat pump water heaters. The proposed Regulations provide for a temporary water heater to be installed for a period of up to 60 days, should there be difficulty in sourcing compliant systems. In addition, the department notes that manufacturers of electric storage water heaters will be able to continue to service other existing markets, including new Class 1 buildings, new and existing class 2 buildings and interstate markets.

Questions for stakeholders

Is it appropriate to require heat pump water heaters installed in cold areas (defined as Climate Zone 5 under AS/NZS 4234) to meet a minimum 50 per cent solar savings in Zone 5 (HP5-AU)?

Do you have any views on the proposed implementation date of 1 May 2019 for the hot water standard? Will this allow manufacturers and plumbing supply stores sufficient time to adjust, particularly around expected changes to demand for low emissions water heaters?

Will there be differences between metropolitan and regional areas in their ability to meet this demand and have stock available? Please explain the reasons for your view.

8.7 Other minor changes proposed in relation to water supply work

Change proposed	Rationale
Inclusion of relining work as part of scope of work for water supply.	To reflect recent technological changes and industry best practice, this change seeks to clarify for industry practitioners that any relining work carried out on a water supply system is regulated water supply work. Relining technology is an increasingly common method of repairing damaged drains. It is a process which involves the placement of a lining material inside an existing pipe to repair any leaks or cracks and to smooth surfaces, without the need to replace the pipe. While the absence of this term results in some uncertainty for industry over whether this is captured in the scope of sanitary work, the department expects this change to have a negligible impact given that the VBA and industry broadly consider this to be part of the regulated scope of work for water supply.
Exclude the treatment of water in a heated or cold water system.	To clarify to industry that the treatment of water in a heated or cold water system is not regulated plumbing work. The existing scope had some ambiguity regarding the scope of this work. The department considers that this change will have no or negligible cost impact since plumbing practitioners do not currently undertake this work.
Exclude the scope of work associated with the specialised class of backflow prevention work.	To clarify to industry that the scope of work associated with backflow prevention is out of scope for water supply practitioners. The department considers that this change will have no or negligible cost impact since plumbing practitioners do not currently undertake this work.

**PART C:
IMPLEMENTATION AND FORWARD
WORK PROGRAM**

C.1 Implementation and evaluation

1.1 Implementation

The vast majority of the proposed Regulations continue the same requirements as per the current Regulations, and as such will require no new special implementation arrangements.

A number of activities are planned to support the implementation of the proposed changes for plumbing practitioners and the broader building industry to ensure all affected parties will be able to make the necessary changes ahead of the commencement of the proposed Regulations. These activities include:

- in the lead up to the commencement of the new Regulations, the VBA and the department will organise meetings with key industry stakeholders, including peak bodies to explain the impact of the changes in the Regulations (as well as the administrative changes that will occur outside of the Regulations). This will help ensure that industry stakeholders can assist the government in ensuring a smooth and efficient transition for industry and practitioners to operationalising the proposed Regulations. Submissions on the proposed Regulations may also provide views on implementation matters
- once the new Regulations are made, the VBA will implement a communications plan to support practitioners in understanding new requirements under the proposed Regulations. The VBA has a number of existing tools to assist industry and practitioners to better understand how the changes will affect operational requirements. To ensure a targeted approach, these tools will be used on a case-by-case basis. Mechanisms that the VBA can use include publishing fact sheets, practice notes or technical solutions. In addition, the VBA can provide information sessions for industry and practitioners which can be distributed online to maximise participation. The department and the VBA will work with peak industry bodies to ensure necessary communications material reach as many practitioners as efficiently as possible prior to the commencement of the regulations.

The proposed Regulations will include transitional provisions to ensure that people who are currently registered and licensed to undertake plumbing work under the current Regulations can continue to undertake that work legally under the proposed Regulations. This will be limited to the types of work that they can do under their existing licence and registration.

The only new class of plumbing work where there will not be an automatic transition is the new proposed specialised class for thermostatic mixing valve work associated with the main class of water supply. The proposed new specialised class will commence on 18 November 2019 (e.g., 12 months after the proposed Regulations commence). Prior to this, water supply practitioners will be able to continue to undertake the scope of work associated with the new proposed specialised class for the repair and maintenance of TMVs. Once the new proposed specialised class commences, water supply practitioners will no longer be able to undertake the work associated with the specialised class for TMVs and practitioners undertaking this work will be required to meet the associated qualifications and experience prescribed in the proposed Regulations. The department seeks feedback from stakeholders on the existing capacity of the training sector to provide sufficient supply for practitioners seeking to be registered or licensed in this new class of plumbing work and will review the commencement date for this new class should feedback received through the consultation process indicate risks with the proposed commencement date of 18 November 2019. In addition, the department will work with the VBA to monitor demand and supply once the proposed Regulations commence.

The proposed new hot water standard requirements will operate from 1 May 2019 to enable industry sufficient time to transition and manage existing water heating stock that would not be compliant under the new standard. A longer transition time (approximately 6 months) may also be

considered depending on feedback from stakeholders. In addition, to support the implementation of the standard, targeted communications by the VBA will be required for consumers and plumbing practitioners to encourage informed choices and maximise the benefits to households, and to explain the benefits from reduced running costs over the lifetime of more efficient systems.

Licensed and registered plumbers will be required to meet the requirements introduced in the proposed Regulations upon commencement. Given the limited scope of the proposed changes across classes of plumbing work, no special arrangements are required for the renewal process.

In terms of administrative arrangements necessary to support implementation of the proposed Regulations, the VBA intends to ensure that Compliance Certificates available from the commencement of the proposed Regulations will include a 'check box' to certify that plumbers conducted a cross-connection test when undertaking water supply work involving recycled or other alternative water supply.

The VBA has existing systems in place for all other administrative arrangements necessary for the proposed Regulations including:

- processes to support the licensing and registration of individuals
- processes to support the compliance and enforcement of the proposed Regulations. No new systems or mechanisms will be required to be developed, although the changes in the Regulations may affect the focus of compliance activities.⁸⁵

1.2 Evaluation

The proposed Regulations will operate for a period of ten years from their commencement, and will be reviewed prior to expiry to evaluate effectiveness and any requirements for remaking the Regulations. However, it is proposed that the impacts of the Regulations (in particular the changes from the current arrangements) will be evaluated after five years to ensure the actual impacts are in line with the intended objectives.

The plumbing evaluation program over the next five years will be focussed on:

- assessing the impacts of introducing additional experience requirements to be eligible for licensing in the main classes of plumbing work
- assessing the impacts of introducing new classes of plumbing work (thermostatic mixing valves and refrigerated air-conditioning—basic systems) and reclassifying existing classes of plumbing work (refrigerated air-conditioning and type B gasfitting)
- assessing the impacts of introducing new requirements and standards, including new requirements for water heaters (including whether sufficient changes have occurred in relation to test standards⁸⁶ for combined PV/hot water systems to warrant consideration of updates to the Regulations). The evaluation will also consider issues raised through the consultation process that require further work and well as other known information/data gaps
- assessing the impacts of introducing new requirements for sanitary drains that service more than one property and additional backflow prevention requirements
- gathering evidence to understand the causes contributing to non-compliance rates discovered through VBA audits, particularly for high-risk classes of plumbing work.

⁸⁵ The department considers that existing compliance activities associated for solar hot water requirements can support the introduction of the requirement to replace hot water heaters.

⁸⁶ VBA's involvement in plumbing standards development processes (including AS/NZS 4234) allows close monitoring of expected changes which can input into the evaluation process.

Evaluation of the proposed Regulations will include a review of how the provisions of the Building Act can be improved to support the proposed Regulations. In consultation with the Plumbing Advisory Council (PAC)⁸⁷, the department has reviewed the pre-RIS submissions to inform a potential forward policy program and has prepared a list of consultation questions to support consideration of these matters. Following approval of the department's forward policy work program, these approved areas will influence the focus of the midterm evaluation of the proposed Regulations. This may include the provisions related to Compliance Certificates, which are a key source of data to monitor the types of plumbing work that is being undertaken in Victoria.

During the first three years of the proposed Regulations (2018–20), the department will ensure that additional changes identified above will inform the mid-term evaluation of the proposed Regulations. The department acknowledges that changes may be needed in the intervening period.

The department notes that over the next 2 years a comprehensive review of fees will be undertaken in accordance with the principles of cost recovery outlined in section 2.3 of the Department of Treasury and Finance's *Cost Recovery Guidelines*.

The evaluation of the proposed Regulations will be integrated into the departments' broader monitoring and evaluation program of the Building Regulations 2018.⁸⁸ The department is currently working with the VBA to develop a baseline dataset, which will be used to support governments ongoing responsibility for administering the Building Act and the mid-term evaluation of the proposed Regulations.

The proposed Regulations are only one component of the regulatory framework in which the industry operates, which means the ongoing evaluation of the proposed Regulations will take account of factors that may affect outcomes in the plumbing regime more broadly (such as the effect of national legislative reforms and changes in the economic environment). To better understand these factors, the department will:

- invite stakeholders to comment on the effectiveness of the Regulations and raise issues relating to the practical implementation or to identify aspects that require further investigation
- work with the VBA and other regulatory authorities, and industry, to determine the extent to which the objectives of the proposed Regulations are being achieved
- monitor and contribute to the development of national reforms, particularly in relation to mutual recognition, the ABCB processes, which includes the review of the PCA and administration of the WaterMark Certification Scheme.

The department will review the evaluation priorities on an annual basis with the assistance of the VBA and with input from the PAC to ensure it remains relevant to the incremental changes occurring through the broader industry reform program. The review of the evaluation strategy will also be informed by stakeholder input, taking into account feedback obtained through the RIS consultation period. This will enable a systematic and efficient approach to assess the effectiveness of Regulations.

Given that the proposed Regulations will adopt the PCA across the life of the proposed Regulations, the department will actively participate in the forthcoming review of the PCA to ensure that any changes to be given effect in Victoria have a clear net benefit for industry and consumers, while seeking to further the objective of nationally consistent plumbing standards.

⁸⁷ The Plumbing Advisory Council is established through *the Building Act 1993* to provide advice to the Minister for Planning and the VBA on the administration of Act and the Regulations that impact the plumbing industry. The current membership of PAC includes key industry stakeholders: the Plumbing and Pipe Trades Employees Union, Master Plumbers, the National Fire Industry Association and the Air-conditioning and Mechanical Contractors Association.

⁸⁸ The evaluation plan is set out in Part A of the Regulatory Impact Statement for the sunset review of the Building Regulation 2006: <https://engage.vic.gov.au/buildingregulationsreview>

C.2 Forward work program

Throughout the consultation process, a number of issues were raised which have been identified as outside the scope of the sunset review and/or have been assessed by the department as more effectively addressed through potential changes to the broader regulatory framework. This means that these issues have not been considered or addressed as part of the review process for the proposed Regulations, but the department considers that there may be merit in investigating these further.

The department is seeking views from stakeholders on the following key matters which could be further investigated:

- continuing professional development for plumbers
- complex plumbing (e.g., plumbing work in high-rise buildings, etc.)
- pre-fabricated plumbing modules
- backflow prevention device register
- caravans and houseboats
- consistent regulatory approach to essential services measures work across Plumbing and Building Regulations.

Stakeholders are invited to comment broadly on these matters or in response to specific questions set out below for each topic. Input and data from stakeholders will assist the department in understanding whether these issues require intervention and what form this could take.

Following analysis of submissions received on the above matters (or additional matters), the department will identify priority areas for change that could inform the department's forward work program to be incorporated into the midterm review or earlier, if possible. This will ensure that the department's resources are targeted to further investigate matters that are critical to industry and of highest impact to contributing to a more effective and efficient plumbing industry for the benefit of practitioners, consumers and the broader community.

2.1 Area for future consideration: continuing professional development

During initial consultation on the review of the Plumbing Regulations there was interest in requiring plumbers to undertake mandatory continuing professional development (CPD) from various stakeholders, including the VBA and key industry associations such as the Plumbing and Pipe Trades Employees Union, Master Plumbers and the Air-conditioning Mechanical Contractors Association.

Currently, there is no regulatory requirement for plumbing practitioners to undertake any form of CPD. The VBA encourages building and plumbing practitioners to undertake CPD to maintain the currency of their skills and knowledge. However, CPD activities are not mandatory.

To positively prescribe CPD requirements in regulation, there must be a relevant power within the authorising Act. At this stage, there is no such power in the Building Act to prescribe CPD requirements. Consequently, the Plumbing Regulations cannot prescribe mandatory CPD at this time.

[Does this proposal warrant further consideration?](#)

A plumber's ability to do their job is assessed on application for registration or licensing based on meeting the relevant requirements, including the successful completion of an apprenticeship, completion of relevant competency units and passing an exam administered by the VBA. Following the granting of registration/licensing, there is no further or ongoing assessment of a practitioner's skill or competency.

However, in the absence of activities aimed at reinforcing and updating a practitioner's professional knowledge, a practitioner's level of competence may deteriorate over time, both due to the atrophy of rarely used skills and, importantly, a lack of familiarity with new techniques, materials and professional practices.

Additionally, the Plumbing Regulations require plumbers to comply with a number of Australian Standards and the Plumbing Code of Australia, which are amended from time to time. To ensure that a plumbing practitioner is up to date with these requirements, they must actively review and update their knowledge. CPD will align with a plumbing practitioner's goals in maintaining their knowledge and increase their opportunities to do so.

A CPD scheme could assist practitioners to:

- keep up to date with changing technology and regulatory practices, ensuring their skills are kept up to date and that they are informed of new developments
- improve standards and professionalism by promoting awareness of good behaviours and practices.

This could result in an overall benefit to the community, by improving the quality of plumbing work, and increasing consumer confidence in the industry.

But there is limited information on the overall benefits of CPD at this time. Further investigation will therefore be required to determine whether the benefits of a mandatory CPD scheme would outweigh the regulatory burden.

Next steps and further consideration

Until the Building Act is amended, there is no power to regulate CPD for plumbers as part of this the proposed Regulations and hence this proposal was considered out of scope for the regulation remake process.

However, the department intends to examine the benefits of both mandatory and voluntary CPD schemes. Further consideration regarding the increase in regulatory burden in comparison to the long-term benefits will need to be explored further, as well as any necessary legislative amendments that would be required to implement a CPD scheme.

The work program will also consider various design considerations which may impact the cost and regulatory burden on the industry and the consumers, if CPD is pursued.

Questions for stakeholders

Stakeholder may wish to comment on the following questions:

- *Who should administer CPD?*
- *Should CPD be compulsory for all plumbers?*
- *What subjects align with the CPD goals?*
- *Should particular CPD topics be compulsory?*
- *How many hours of CPD should be required?*
- *What CPD delivery formats will best align with the CPD goals?*
- *Who should deliver CPD? And should there be any oversight or accreditation?*
- *What consequences are appropriate for non-compliance with CPD?*

Please provide reasons for your answers.

2.2 Area for future consideration: complex plumbing

Background

Master Plumbers, the Air-conditioning Mechanical Services Association and the PPTU consider that 'complex plumbing' is a set of inter-related matters that impacts plumbing work specifically undertaken in complex buildings, including multi storey developments (over 5 stories) and public buildings (e.g., schools and hospitals). The number of technically complex plumbing installations has been on the rise, as Victoria's building stock has come to include significantly more high-rise development.

The stakeholders above have identified a set of inter-related matters that form part of 'complex plumbing' that they consider are not sufficiently addressed by the existing regulatory requirements, including:

- the lack of a distinct class of plumbing work associated with 'complex buildings' means there is no regulatory barrier to relatively inexperienced or unskilled practitioners carrying out this plumbing work
- insufficient provisioning for clear accountabilities and responsibilities for practitioners involved in the design of plumbing systems. Previous submissions indicated that there is a potential for designers of plumbing systems (e.g., hydraulic engineers) to avoid accountability for the non-compliance of their designs due to licensed plumbers installing systems requiring to be accountable for the plumbing system to meet required standards through the issuance of a Compliance Certificate
- inflexibility with the current Compliance Certificate and auditing regimes with regard to high-rise buildings. For example, under current arrangements, a multi-storey apartment building will typically have issued one Compliance Certificate and is not afforded any special status as part of the auditing regime despite impacting many more members of the public compared to plumbing work that would occur on a residential property.

Identified risks associated with complex plumbing includes the increased chance of non-compliant or sub-standard plumbing work, which increases the risks of bacterial outbreaks, uncontrolled fires and water damage.

Under the Building Code of Australia, building standards increase in stringency based on size or the number of storeys a building has. The greater the size or the higher the building, the more likely it is that the Building Code of Australia will impose additional standards. Although plumbing work done in these types of buildings varies in scale to plumbing work done at smaller-scale, both types of work are governed by the same regulatory framework and technical requirements.

In consultation with PAC, the department determined that the above set of inter-related matters considered as part of 'complex plumbing' was most appropriately considered as part of a package of changes through potential changes to the Act. As such, these matters were not addressed or considered through the review of the Plumbing Regulations. Each individual matter as part of the 'complex plumbing' issue has been further outlined below to assist industry and practitioners to provide submissions on specific issues.

Class of complex plumbing

Stakeholders proposed introducing a new class of plumbing work for 'complex' buildings associated with high-rise buildings. Industry argues that this new class will ensure that practitioners are sufficiently experienced in undertaking more complex plumbing work, reducing the chance of sub-standard plumbing work occurring. Under the proposal, registration and licensing in this class would require applicants to demonstrate suitable experience in the relevant class of work.

The department acknowledges that the building stock of Victoria, particularly in Melbourne, is increasingly being driven by more high-rise apartments and buildings. Given this, it is reasonable to

consider whether these changes, which have accelerated in the life of the Plumbing Regulations, require any changes being made to the way plumbing work is regulated in Victoria.

The department notes that the existing plumbing classes are not differentiated by class of building but rather type of work. The department's assessment is that the technical requirements/standards for plumbing do not differ for different types of building stock, and to date no evidence has been provided to indicate why the nature of the plumbing work undertaken in high-rise buildings is inherently more technically complex.

Design of plumbing systems

The plumbing industry has argued that licensed plumbers installing systems are taking on responsibility (through issuing Compliance Certificates) for plumbing design work which they have had no role in the development of, and are not trained to assess the sufficiency of.

These stakeholders' position is that to address this issue, a new category of plumbing work should be created ('plumbing designer'). The purpose of this would be to ensure that only individuals who have demonstrated competence in designing plumbing systems would be able to legally carry out the design aspects of plumbing work in complex buildings (and elsewhere), hence reducing the risks associated with sub-standard hydraulic design and designating clear responsibility between the designer of the plumbing system and the plumber that installs the system.

While giving effect to a new class of a plumbing work for design work is technically possible through the proposed Regulations, the department assessed that this approach was inappropriate. Should this approach be pursued, the term 'plumber' would be interchangeable for individuals undertaking design work and installation work, causing confusion for consumers and industry regarding the responsibilities associated with a registered/licensed plumber which would lead to sub-optimal outcomes. The department considers that should this proposal be given effect, it would be prudent to amend the Act to redefine 'plumbing practitioner' to include responsibility for design work of plumbing systems. This would provide clarity and certainty to consumers and industry. In addition, the provisions of the Act relating to plumbing regulatory mechanisms such as the issuing of Compliance Certificates would need to be reviewed to consider their application to design work.

A mandatory inspection system for complex plumbing installation/increased auditing

Under the current legislative framework and the proposed Plumbing Regulations 2018, Compliance Certificates must be issued for any plumbing work with a value of \$750 or higher. These certificates are issued by a licensed plumber who is responsible for carrying out or supervising the plumbing work. However, there is no limit on the value, nature or volume of work that can be certified by each Compliance Certificate. This means that a single licensed plumber can hold responsibility for supervising and issuing the Compliance Certificate for all plumbing work undertaken in a large-scale plumbing project. Under this framework, the large scale of plumbing work on 'complex' buildings may be more vulnerable to sub-standard plumbing work or supervision by the licensed plumber.

The Act specifies the enforcement measures available to the VBA to regulate the plumbing industry. These measures include appointing plumbing inspectors and compliance auditors, as well as issuing infringement notices. Further, the Act provides mandatory notification processes for inspections, albeit in limited circumstances in relation to sanitary drainage. However, there is no power to specify mandatory inspections or audits of particular types of plumbing work in the Regulations.

Hence, this proposal is out of scope for the Plumbing Regulation remake project since it requires an amendment to the Act to give it force.

Questions for stakeholders

Please provide more detail on what types of building, or buildings with specific uses, are high-risk with regard to the plumbing systems used in them, and why.

Please provide an explanation of why plumbing work carried out in 'complex' buildings might be more technically complex than in regular buildings.

Please explain and provide examples of the nature of risks to the community/consumers and how these issues are caused by, or related to, sub-standard hydraulic design work.

Why is the issue of clear accountabilities for the design of plumbing systems specific or more acute for 'complex plumbing' work?

Please provide case examples of instances where responsibilities between the practitioner designing the plumbing system and the plumber that installed the system were unclear.

Please provide examples of instances where responsibility for the design of a non-compliant plumbing system was incorrectly attributed to the plumber installing the system despite them not being involved in the design work.

Would requiring additional Compliance Certificates per apartment/residence create a significant burden on the plumbing industry and if so, what would that burden be? What might the possible benefits be?

What would be an appropriate method of capping Compliance Certificates? What would be the appropriate level? How would this address potential risks of the current system, particularly with regard to work in high-rise buildings?

Are the supervision requirements set out in the Act sufficient to ensure plumbing undertaken under the supervision of licensed plumbers is of an acceptable standard? Please provide reasons for your answer.

Are any problems arising as a result of a lack of mandatory inspection system for plumbing work associated with high-rise buildings? Please provide examples.

To what extent are high-risk areas captured by the mandatory inspection stages already required under the Building Regulations? Would introducing mandatory inspection systems for plumbing work associated with high-rise buildings reduce adverse outcomes? What would be the costs of doing this? Are there any other possible ways to improve outcomes?

If plumbing work undertaken in high-rise building was subject to increased auditing, what would be reasonable criteria to trigger a higher level of auditing?

What would be a sufficient level of auditing for plumbing work associated with high-rise buildings?

2.3 Area for future consideration: pre-fabricated plumbing modules

There is an increasing trend within the construction sector for elements of buildings to be constructed offsite and delivered as pre-assembled units into a new or significantly refurbished building. Preassembled units can include bathrooms, kitchens and laundries. These are commonly referred to as ‘pods’ and are complex systems involving multiple fittings and hot/cold water and sewerage connections.⁸⁹

The modules are delivered to a building site as a complete package with fixtures and fittings including the toilet, bath, shower, basin and associated pipework pre-installed. These modules typically join multiple WaterMarked⁹⁰ plumbing appliances using general plumbing supplies and once installed on-site are connected by a licensed plumber to the building’s water and drainage systems.

A review of a sample of Compliance Certificates shows that pods are typically installed in apartment buildings, student accommodation or large multi-use developments.⁹¹ Bathroom pods are the most common pre-fabricated plumbing module a Compliance Certificate is issued for, followed by kitchen and laundry pods.

Recent examples

Hickory recently contracted 639 pods for the development of 50 Latrobe Street Student Accommodation.⁹² At 150m tall, it is one of the world’s tallest prefabricated Student Accommodation projects and is reducing construction time by up to 30 per cent by finishing the bathrooms to completion off-site, in parallel with on-site construction works.

Hacer Group, has engaged SYNC to deliver 588 bathroom pods for Melbourne’s newest purpose-built student accommodation, Iglu Franklin. Set across two towers of 9 and 23 storeys respectively, the buildings will include 594 beds as well as interconnected study and social areas, utilising SYNC bathroom pods has significantly reduced the production timeline for this project allowing for completion in mid-2018.

Current regulatory oversight of pods

In Victoria, if a pod is constructed in an off-site location, this work may be undertaken as plumbing work carried out by registered/licensed practitioners or alternatively, as the construction of a plumbing product.

If the pod is constructed as regulated plumbing work in Victoria, this work must comply with all requirements under the Act and current Regulations such that the work must be carried out by registered/licensed plumbers, WaterMarked products and materials must be used where required, relevant technical standards must be met, and a Compliance Certificate must be issued at the conclusion of the work should this be appropriate.

If a pod is constructed as a plumbing product, it must be certified as per the requirements of the WaterMark Certification Scheme. Pods constructed interstate or overseas must always be treated as a plumbing product when used in plumbing work undertaken in Victoria. The requirements of the Act only have effect within Victoria and therefore any plumbing work undertaken outside of this state is not plumbing work to which the Act applies.

⁸⁹ The issue of off-site assembly extends beyond the scope of bathroom, kitchen and laundry pods and may include pre-fabricated homes, mobile homes or cabins, site sheds and other buildings that include plumbing works as part of their assembly.

⁹⁰ The WaterMark Certification Scheme (Scheme) is a mandatory certification scheme for plumbing and drainage products to ensure they are fit for purpose and appropriately authorised for use in plumbing and drainage installations. <https://www.abcb.gov.au/Product-Certification/WaterMark-Certification-Scheme>

⁹¹ Compliance Certificates issued between 1 July 2014—30 June 2016, VBA provided data

⁹² <https://www.hickory.com.au/projects/filter-modular-bathrooms-456/>

In both cases, the installation of the pod on-site in Victoria must be done by a registered or licensed practitioner and a Compliance Certificate issued should this be appropriate.

If the same plumber is responsible for a pod's assembly and installation, only one Compliance Certificate is required to be issued after installation. If a pod is assembled by a plumber that will be different from the plumber who later installs the pod, then two Compliance Certificates are required to be issued. One for its assembly and one for its installation. From the department's review of Compliance Certificate data, it is not clear if the plumber installing the pod—when they have not been responsible for assembly of the pod—is requesting evidence that the product is WaterMarked or the relevant Compliance Certificate from the plumber who constructed the pod. The department considers that it would be good practice if this evidence was submitted as part of the Compliance Certificate the plumber issues following the installation of the pod to provide clarity on roles and responsibilities should the VBA audit work associated with these Compliance Certificates.

Industry concerns and current practice

As part of early consultation on the review of the current Regulations the department received a joint submission from the National Fire Industry Association, Plumbing and Pipe Trades Employees Union (PPTU), Air Conditioning and Mechanical Contractor' Association of Australia (AMCA) and Master Plumbers. It was submitted that prefabricated plumbing modules should be required to be issued with a Compliance Certificate from a licensed plumber before it leaves the manufacturer, or that a module be subject to the same rigour of oversight as expected when a bathroom is assembled on site.

These concerns were raised because it was unclear who was responsible for ensuring the pod was compliant when the plumber installing the pod who was not involved in its assembly. If the plumber is not involved in its assembly they would have no way of determining the compliance status of the component parts of the bathroom pod, all of which (bath, shower, sink, toilet) are themselves plumbing work.

The department notes that the regulatory approach regarding the assembly and subsequent installation of prefabricated plumbing modules has been clarified by the ABCB and the VBA in recent times:

- the Direction⁹³ issued by the Australian Building Codes Board (ABCB) in 2016 clarifies that bathroom pods will be accepted in all plumbing jurisdictions as either a product (which must be WaterMark certified) or a prefabricated plumbing installation which is regulated plumbing work
- the Victorian Building Authority (VBA) Fact Sheet⁹⁴ that clarifies that if the bathroom pod is constructed off-site in Victoria, the pod must either be WaterMarked or have a Compliance Certificate.

In Victoria, a plumber installing the pod can rely on either the WaterMark certification or the Compliance Certificate issued by the plumber who assembled the pod.

There have been concerns raised with defining a pod as a plumbing product for the purposes of the WaterMark regime. This is because the assembly of pods is not required to be completed by a licensed plumber to obtain WaterMark certification. To date, the department has not received any evidence that there has been a regulatory failure of the WaterMark scheme in relation to pods.

In the sample of Compliance Certificate data it is noted that when a plumber installs the pod, the Compliance Certificate will typically describe the work as “connections only” or “connection of pod

⁹³ <https://www.abcb.gov.au/Resources/Publications/Certification/Notice-of-Direction-2016-4-0>

⁹⁴ http://www.vba.vic.gov.au/_data/assets/pdf_file/0013/50422/Fact-Sheet-Regulatory-requirements-for-the-off-site-construction-of-plumbing-systems.pdf

only". Sometimes the plumber will explicitly state that the pod was "supplied and certified by others" or "done by others".⁹⁵

There are Victorian manufacturers who are obtaining Compliance Certificates for their pods. For example, one Compliance Certificate was issued for 63 bathroom pods and 50 kitchen pods. Another Compliance Certificate was issued for 53 bathroom pods and 16 laundry pods.

The department notes that there are currently no jurisdictions that vary from the WaterMark approach under the PCA regarding prefabricated plumbing modules.

Department analysis of the current regulatory framework

The department considers there does not appear to be strong evidence indicating that pre-fabricated plumbing modules are causing problems. It acknowledges that there is a need to look at how the current regulatory scheme should treat pre-fabricated building and plumbing products generally due to the increased use in the construction of buildings, but whether it is an issue that needs to be dealt with immediately is not clear.

Broadly, the department considers the ABCB administrative framework of the WaterMark scheme to be sufficiently robust enough to ensure appropriate and quality products are achieve WaterMark certification. The department will continue to monitor the existing framework and continue to work with the ABCB to ensure that the WaterMark framework is appropriate and effective, ensuring new issues identified are addressed through appropriate actions.

Next steps

Further consultation with industry and investigation is required to determine whether off-site plumbing work is an issue in Victoria. The department will continue to engage with industry to better understand the issue and to gather evidence to prove that the extent of the problem in Victoria requires additional regulatory intervention.

The department will continue to monitor the existing framework and continue to work with the ABCB to ensure that the WaterMark framework is appropriate and effective, ensuring new issues identified are addressed through appropriate actions.

If there is significant evidence of failure provided to the department, further work will be undertaken to determine whether the issue should be treated broadly as a building issue or whether there are specific types of prefabricated plumbing modules that require targeted regulatory oversight.

Questions for stakeholders

When Issuing a Compliance Certificate for the installation of a plumbing pod, do plumbers generally attach the evidence of certification of the construction of the pod to that Compliance Certificate?

What examples or case studies are you aware of where plumbing pods have failed and caused problems for building owners? How were these plumbing pods certified? Were there circumstances where the installing plumber was held responsible where this was considered inappropriate?

How common are plumbing pods that have been constructed internationally and subsequently being installed in Victoria or Australia?

Is the WaterMark certification scheme sufficient in ensuring certified plumbing products are appropriate for consumers and industry? What issues are not being sufficiently addressed by the WaterMark scheme?

⁹⁵ Compliance Certificates issued between 1 July 2014—30 June 2016, VBA provided data

Related proposal for change: point of sale regulation for WaterMark products

It is noted that Queensland has recently introduced new laws through the *Building and Construction Legislation (Non-conforming Building Products— Chain of Responsibility and Other Matters) Amendment Act 2017*. These changes have been incorporated into the *Queensland Building and Construction Commission Act 1991* (the Queensland Act) to ensure persons involved in the production, supply or installation of building products are held responsible for the safety of the products and their use. The key driver for this change is to respond to an emerging problem associated with the supply and marketing of inappropriate building products, recently demonstrated with the emerging issue of flammable, non-compliant cladding being installed on a building facade.

Whilst these changes have a broad application, under the primary duty of the new laws it will be an offence under the Queensland Act to supply plumbing products in Queensland that do not have WaterMark certification as these products do not meet the relevant regulatory provisions. These changes are applicable to the sale of bathroom pods in Queensland.

The consideration of the scope of these reforms would require legislative amendments to the Building Act and are hence out of scope.

The department notes that the ABCB is currently leading a project to explore the feasibility of point of sale regulation of the WaterMark Certification Scheme and that this is yet to be completed. It is possible that this project will strengthen oversight of WaterMark products in the market, including pre-fabricated plumbing modules. The department will continue to engage and contribute to the ABCB project on the WaterMark point of sale project as it progresses.

2.4 Area for future consideration: backflow prevention device register

Suitable backflow prevention devices must be installed at points in the plumbing system which carry a high risk of backflow cross connection (for more detail, see Part B—page 115). Backflow protection devices installed at the main water meter and beyond (including other water corporation assets) protect neighbourhoods and communities from backflow incidences. These backflow controls are specified and monitored by the relevant water authority through the Water (Estimation, Supply and Sewerage) Regulations 2014. Testable backflow prevention devices are required to be maintained and tested at least every 12 months by a suitably qualified person.⁹⁶

Water authorities meet ongoing compliance requirements by maintaining a register of all installed testable backflow prevention containment devices and annual test reports. Using this register, the authorities conduct audits of installations to ensure appropriate maintenance and testing work is undertaken on backflow prevention devices. Backflow controls on this register are regulated by the Water (Estimation, Supply and Sewerage) Regulations 2014 and are out of scope for the Plumbing Regulation remake process.

The department notes that currently there are no positive obligations on home owners to have backflow prevention devices maintained and tested every 12 months, and the department assumes that there is a low compliance rate for backflow prevention devices in residential homes. In addition, no register exists for devices installed in individual homes which makes monitoring and compliance difficult.

However, the heads of power provided in the *Building Act 1993* do not allow the Plumbing Regulations to impose ongoing obligations on the public after plumbing work has been carried out; nor do they enable the creation of a register.

The department's preliminary view is that to enable positive obligations on home owners with respect to the testing and maintenance of backflow prevention devices and to support the creation

⁹⁶ These requirements are set out in 4.4.6 of AS/NZS 3500.1, including for those installed in private residences. The Water (Estimation, Supply and Sewerage) Regulations 2014 also require that owners of properties serviced for water supply or sewerage services must have backflow prevention devices installed and tested at the request of a water corporation.

and maintenance of an appropriate register, in addition to the Building Act, various legislation may require amendment including the *Water Act 1989*, *Safe Drinking Water Act 2003*, or the *Local Government Act 1989*. As the scope of this review is limited to the remake of Plumbing Regulations, this issue is out of scope and therefore cannot be addressed as part of this review.

The department notes that in Queensland, local governments have the power to require building owners to have their backflow prevention device inspected yearly, tested, repaired or replaced by a suitably qualified person.⁹⁷

While the impact of backflow contamination within a residential home is limited to occupants and users of the water supply in that property, ensuring the ongoing effectiveness of backflow devices after installation is nevertheless important in protecting health outcomes. The department seeks submissions on this topic for consideration into the department's consideration of a forward work program.

Questions for stakeholders

What are the circumstances that would lead a residential consumer to request the services of a plumber to test a backflow control device?

What is the estimated proportion of backflow prevention device maintenance work that occurs in residential homes?

What is the estimated failure rate of backflow control devices? What are the consequences of these failures?

What is a reasonable period to require backflow control devices to be maintained and tested? Is requiring this yearly too often?

What is the estimated lifespan of backflow control devices?

What are the common types of failures for backflow prevention devices?

2.5 Area for future consideration: caravans and houseboats

The department believes risks identified for owners and occupiers of caravans and vessels should be sufficiently addressed through effective regulation. Nevertheless, the department understands that industry stakeholders perceive an issue with the fact that the manufacture of caravans and vessels involves work regulated through several different regulatory frameworks and hence the effective regulation of work in caravans or vessels is often not the principal focus. For example, the Plumbing Regulations are primarily concerned with regulating plumbing work carried out within, or associated with, buildings consistent with the objectives of the *Building Act 1993*.

The department will seek to work with caravan stakeholders going forward to identify opportunities where the plumbing regulatory framework may be improved. A key issue that was raised by stakeholders was the definition of 'caravan'. Because the Plumbing Regulations relate to plumbing work in caravans, the type of vehicles captured under this term is critical to the overall scope of the regulations. However, because the definition of 'caravan' in the Plumbing Regulations mirrors that prescribed through the *Gas Safety Act 1987*, amending the Plumbing Regulations without also amending the definitions under Gas Safety Act could create inconsistencies between the two

⁹⁷ A person who inspects or tests a backflow prevention device must give the local government written results of the inspection or test within 10 business days of inspecting or testing the device. This is facilitated through Queensland's Plumbing and Drainage Act 2002 and associated regulations.

frameworks. This in turn is likely to create confusion and potentially open regulatory gaps that could negatively impact both industry and consumers.

Because of both the complexity of plumbing installations in caravans and vessels and the various intersecting regulatory frameworks, the department seeks further submissions from the caravan and vessel industry to better understand the opportunities for regulatory or legislative amendments that may improve the operation and effectiveness of requirements relating to plumbing work on caravans and vessels.

Questions for stakeholders

The Plumbing Regulations contain definitions of caravans and vessels. Do you believe that the current definition of 'caravans' and 'vessels' are appropriate?

Caravans and vessels are currently referenced under three classes of plumbing work, gas-fitting, sanitary and water supply. Do you believe that these classes are appropriate?

Are licensed or registered plumbing practitioners usually engaged to carry out work in either caravans or vessels?

Where relevant, please provide reasons for your views and relevant examples.

2.6 Areas for further consideration: consistent regulatory framework to essential services measures (ESMs) work across Plumbing and Building Regulations

The department considers the safe and effective operation of fire protection systems to be paramount in meeting life and safety outcomes for building occupants and the broader community.

Under the current regulatory framework, the department acknowledges that there are different approaches taken by the Building Regulations and the Plumbing Regulations in relation to the maintenance of essential safety measures within a building. Under the proposed Plumbing Regulations, fire protection work must be carried out by a trade qualified plumber (i.e., successful completion of Certificate III in fire protection and an apprenticeship). Under the Building Regulations, work in relation to non-wet systems (such as smoke alarms or fire extinguishers) may be carried out by 'competent persons'.

This inconsistent approach across the Building Regulations and the Plumbing Regulations creates confusion for industry and does not provide a consistent framework for building owners to meet required compliance standards. The department considers that a holistic consideration of the existing requirements across the Building and Plumbing Regulations is required to establish the proper requirements for this type of work going forward. The department notes that changes to the Building Regulations were considered out of scope for the remake of the Plumbing Regulations and hence this was not considered or addressed as part of the process.

Prior to the department undertaking a more comprehensive review of the requirements for essential safety measure work across both Plumbing Regulations and Building Regulations, the department considered that the status quo arrangements for the Plumbing Regulations, should continue, with an amendment to explicitly include routine servicing work in the definition of fire protection work to be in line with AS 1851. As noted above, this is primarily because the department considers that training obtained through the Certificate III in fire protection and apprenticeship equips practitioners with the required level of knowledge and skill required to perform all fire protection maintenance work safely and competently.

In addition, the department considers that any proposal that provides further changes to the existing class of fire protection as part of the existing plumbing class could create an additional layer of unnecessary confusion for consumers and industry regarding who may carry out work related to ESMs.

The department acknowledges that other jurisdictions have nominated to introduce categories of licence for routine servicing work to include competencies from the Certificate II or III in fire protection inspection and testing. The department will monitor and seek to obtain further data and evidence from other jurisdictions, particularly South Australia's approach in light of the approach taken to sprinkler systems which is more complex and higher risk relative to work on other fire protection equipment. This will assist to quantify the risks associated with an alternative approach that allows practitioners with alternative training to undertake routine servicing work. In addition, the VBA's increased proactive auditing of fire protection systems will likely capture data on unregistered / unlicensed individuals undertaking this work to inform an assessment of the rate of non-compliant or defective work and potential impacts on the life and safety of building occupants.

While the department expects that increased proactive auditing by the VBA of fire protection systems will over the long-run assist in ensuring that only registered / licensed practitioners undertake this work, the department acknowledges that further work and analysis is required to gain a robust understanding of whether demand for routine servicing over the life of the Regulations will be sufficiently met by the supply of registered and licensed practitioners. Given the complexities of this task, the department proposes to partner with key industry stakeholders to better understand the labour supply dynamics for fire protection work to identify whether key risks exist in the system.

The department seeks submissions from industry stakeholders to inform a potential forward work program to identify an appropriate regulatory framework to establish clear and appropriate requirements for work associated with ESMs across the Building and Plumbing Regulations.

APPENDICES

Appendix A: Current regulatory approach

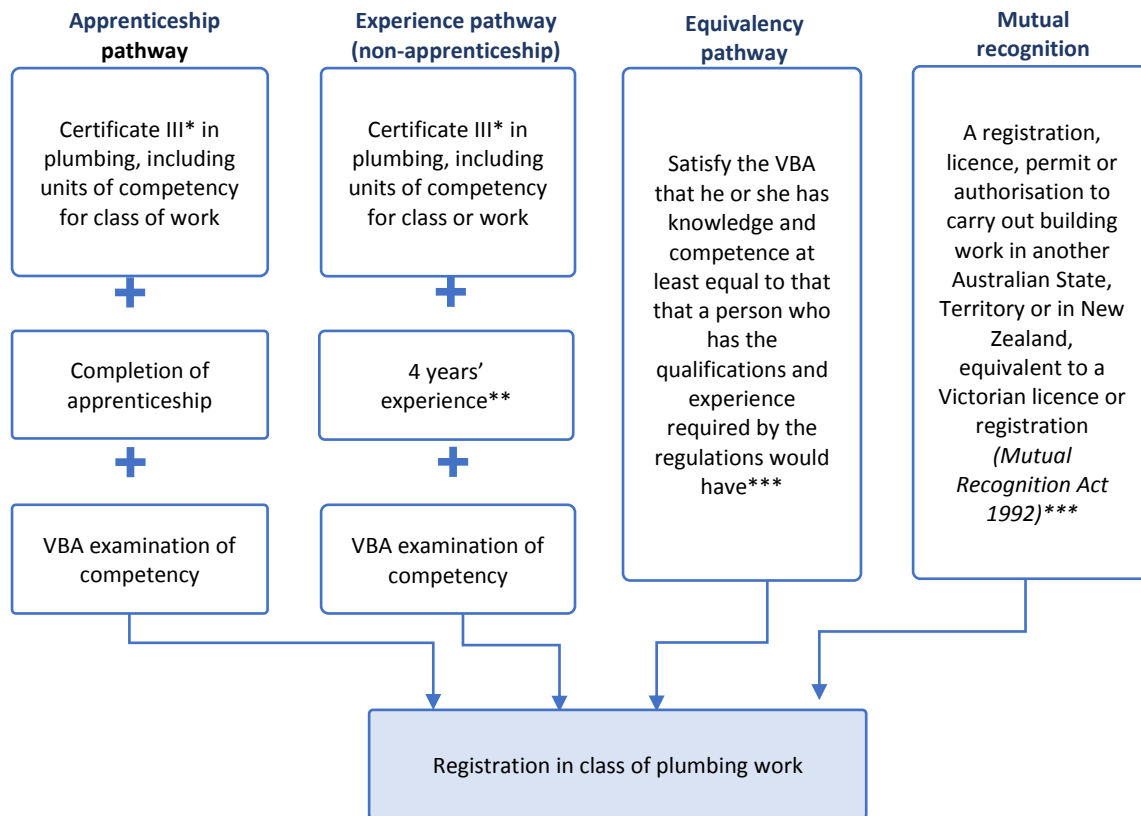
In addition to incorporating the Plumbing Code of Australia (PCA) as part of the Plumbing Regulations, the current Regulations set out a number of work requirements (in Schedule 2 to the Regulations):

Table 36: Additional work standards in the current Regulations

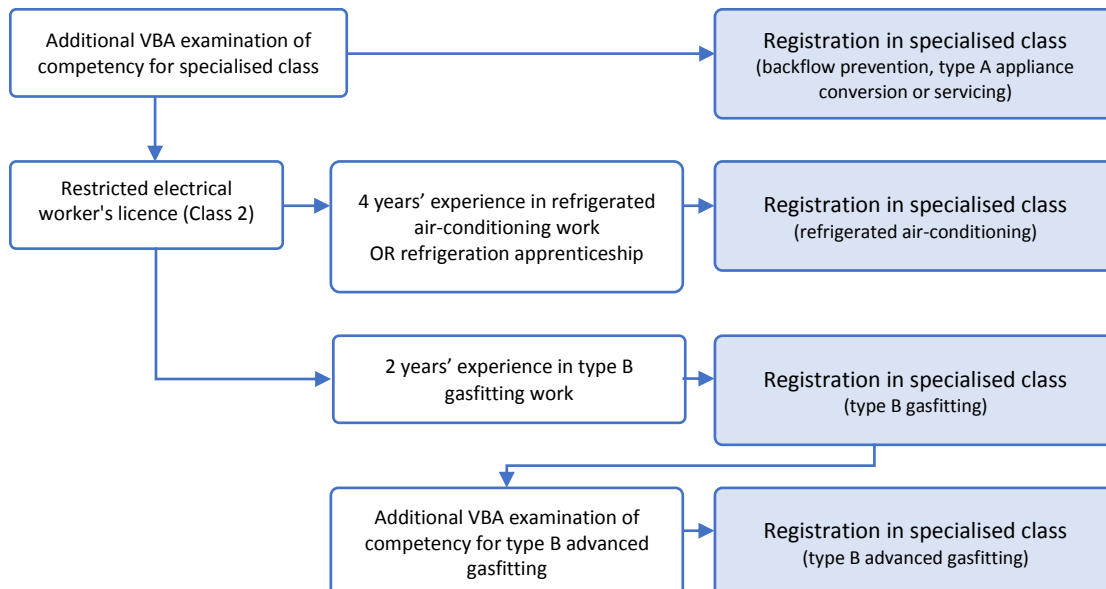
Type of plumbing work	Work requirement
All classes and specialised classes	Any registered plumber, licensed plumber or other person authorised to carry out plumbing work under the Act must carry out plumbing work in a good and workmanlike manner
Fire protection work	Parts of the following standards: AS/NZS 1530 AS 4118 AS 2941 AS 1851 AS 1682
Mechanical services	Parts of the following standards: AS/NZS 2918 AS 2896 AS 2473 AS 2568 AS 2902 AS/NZS 4859 HB 276—2004 A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling and Air Conditioning Plant and Equipment
Refrigerated air conditioning work	Parts of the following standards: AS/NZS 1677 HB 276—2004 A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling and Air Conditioning Plant and Equipment Australia and New Zealand refrigerant handling code of practice 2007
Roofing (stormwater)	Parts of the following standards: SAA HB 39—1997 AS 1562 AS/NZS 4200 SAA/SNZ HB 114:1998
Water supply	Requirement to install a water meter in the water supply system supplying water to a cooling tower Requirement for an automatic or manual interchange device that allows alternate use of water from the rainwater tank or the reticulated water supply for sanitary flushing Requirements for rainwater tanks installed in a new Class 1 building Requirements relating to solar water heaters

Under the Act and current Regulations, there are a number of pathways to becoming registered:

Figure 6: Registration pathways



To be registered in a class of specialised plumbing work, the practitioner must be registered in the relevant (parent) class of plumbing work, and also have the following:



* A Certificate II is sufficient for drainage work or irrigation (non-agricultural) work.

** 2 years is sufficient for drainage work or irrigation (non-agricultural) work. Where a practitioner is already registered or licensed in another class of plumbing work, 1 year's experience is sufficient for registration in another class.

*** The equivalence and mutual recognition pathways may also be used for registration in the specialised classes.

To become licensed in a class or specialised class, an applicant must be *eligible* for registration⁹⁸ in the corresponding class or specialised class, and undertake a VBA examination of competencies relevant for holding a licence in that class or specialised class.⁹⁹ Licensing also requires being covered by the required type and level of insurance.

⁹⁸ For a type B gasfitting licence, an applicant for a licence must actually be registered in that specialised class.

⁹⁹ The equivalence and mutual recognition pathways may also be used for licensing.

Appendix B: Risks associated with each type of plumbing work

This section provides a high-level description of problems in relation to specific classes of plumbing work.

Drainage

Drainage plumbing removes sanitary waste or stormwater from a site.

Risks

Poor quality plumbing work may result in significant health problems. Onsite sanitary or stormwater drainage issues may be caused by poor workmanship, inappropriate product use, non-compliant or defective plumbing products.

Drainage problems result in contamination of drinking water, bacterial or viral infections from the growth of pathogens, property damage due to sewage surcharge or blockage and risks to third parties if members of the public are exposed to sewage or wasted water.

The quality and effectiveness of drainage systems can reduce risks to occupant health and safety, the environment, water quality and property damage. In particular, the following are risks of poor plumbing work:

Cross-contamination

Incorrect connection of drainage systems particularly in relation to sewage systems that can lead to contamination of drinkable water or discharge into the environment.

Bacterial infection

Poor drainage systems can result in stagnant water which is unable to drain; this can contribute to bacterial infections resulting in serious health problems and even death.

Surcharge

Surcharge (or yard) gullies are an important part of a drainage system and most homes have a gully—usually a small round grate set in a cement slab just outside the building. If the gully is at the wrong height, raw sewerage can flow back into the occupant's bathroom or laundry, presenting a serious public health and safety risk, and leading to property damage.

Fire protection

Fire protection systems are designed, installed, tested and maintained to ensure water—which may come from water tanks, mains water connections, dams or reservoirs—can be reliably used to control fire until emergency services personnel arrive. The existence and correct design and installation of fire protection systems are critical for protecting people, buildings and assets in a fire.

While this type of work is regulated plumbing work under the Regulations, there is also an intersection with the Building Interim Regulations 2017. When the construction of a building is complete, the building owner is responsible for its upkeep and maintenance, particularly its safety features or essential safety measures (which are defined under the Building Interim Regulations 2017 to include, amongst other things, fire control centres, fire curtains and doors, fire extinguishers and fire detection and alarm systems).

The maintenance of essential safety measures will ensure that important safety systems within the building remain at the required operational level throughout the life of the building. The type of

maintenance needed depends on the complexity of the safety measure, equipment or feature and the maintenance program required or expected at the time of installation.

Risks

As per regulation 16 of the Regulations, the role of plumbers registered within the fire protection scope of work is to construct, install, replace, alter, maintain, test and commission any part of a water service used for firefighting. The life safety aspect attached to this scope of work is paramount, as fire protection system reliability provides direct and increased life safety outcomes related to fires within the built environment.

Gasfitting

Gas appliances can vary in size, operating pressure and complexity, ranging from small domestic gas space heaters to large industrial steam boilers or industrial furnaces.

Risks

Carbon monoxide leaks from faulty or poorly installed or maintained gas appliances can be lethal. It is dangerous being odourless. Carbon monoxide is poisonous and requires urgent medical attention.

Gasfitting may result in serious health and safety impacts and therefore requires critical knowledge and skills to ensure safe installation of gas appliances.

Natural gas is a major source of energy used for both heating and cooking in homes and commercial premises. There is an extensive use of propane used for cooking and heating in areas without access to natural gas.

Due to the heat, flammability and toxicity associated with gas use or leaks it is a high risk and requires skilled and regulated workforce.

Incorrectly installed gas appliances present the following potential risks:

Poisoning/Asphyxiation

Carbon monoxide is produced from the combustion of carbon-based substances. Faulty or improperly ventilated gas heaters can result in carbon monoxide in the home. It is poisonous and odourless and causes asphyxiation.

Appliances using natural gas require adequate ventilation air for correct combustion and a suitable flue to remove the products of combustion. A gas leak, inadequate ventilation or an ineffective flue can result in serious health problems and even death.

House fires and explosions

Leaking pipes, poor maintenance work on appliances, sub-standard materials or products or incorrect installation can lead to fires and explosions. This is a public and private health and safety risk and can result in property damage.

Personal injury

Leaking gas or incomplete combustion arising from poorly maintained or incorrectly installed appliances can result in serious burns and significant property damage.

Irrigation (non-agricultural)

Non-agricultural irrigation work is a specialised field which involves installing irrigation systems that provide an artificial supply of water to parks, private and public gardens and sporting grounds such as ovals and bowling greens.

Risks

Non-agricultural irrigation work was, until the commencement of the current Regulations, regulated as part of the water supply class of plumbing work.

A number of problems were identified by the Plumbing Industry Commission during the development of the 2008 RIS to the Regulations which led to the creation of a new class of plumbing work to capture non-agricultural irrigation work. These problems are discussed below.

As plumbers are a key supplier of non-agricultural irrigation services, the users of those services (such as local government who have responsibility for ovals, parks and gardens) requested government to improve regulation of this work, including further standards and training development.

Problems identified include:

Contaminated water

- Unsafe water sources being used for irrigation purposes presents a major health and safety risk, particularly if the irrigation system is used on fruits and vegetables which can become contaminated by the water used.

Backflow

- If an irrigation system is connected to the drinking water supply and therefore is not sufficient backflow protection different classes of water can cross connect and chemicals and other impurities used in gardens can enter the drinking water supply.

Water wastage

- If people designing and installing irrigation systems do not have the appropriate level of understanding of soil and plant relationships, significant wastage of water can occur. The design and installation of an irrigation system must be appropriate for the particular make up of plants and the level of water that they require.

Mechanical services

Mechanical services plumbing work involves mechanically heating, cooling and ventilating residential and commercial buildings. It also includes plumbing work for medical gas equipment.

Risks

A high quality of experience and workmanship is required for the installation of a pipeline for the purposes of supply or removal of medical gases.

Often confused with electrical work. Mechanical services requires oxy-acetylene and manual metal arc welding as part of providing ducting.

Legionella

Legionella is a bacterium which is common in many environments and is not necessarily dangerous to humans. However, in certain conditions these bacteria flourish and present a serious health risk to the community. Faulty installation or incorrect maintenance on cooling towers may result in Legionella contaminated aerosols and can cause an outbreak of Legionnaires disease.

Resource wastage

If heating and cooling systems are incorrectly designed or installed, this may cause them to run inefficiently and not perform optimally. This leads to increased running costs, sub optimal outcomes and unnecessary energy consumption.

Infestation of rodents/pests

Plumbers are qualified to install ducted heating systems. However, if this is done incorrectly fitting or joint failure can result and lead to an infestation of rodents and pests in the ducts.

Roofing (stormwater)

Roof plumbing work involves a roof drainage system that collects and disposes of stormwater. Many factors affect how quickly water drains off a roof, if water drains completely and if the roof is watertight. A roof drainage system usually comprises gutters, eaves and downpipes.

Risks

Industry data on metal roofing shows that approximately 36 per cent of new dwellings install a metal roof. With 50,000 dwellings constructed on average per year approximately 18,000 metal roofs are installed per year.

The concern associated with allowing tradesmen not qualified in plumbing to install and maintain metal roofs is that there will be an increase in property damage caused by an increase in the number of faults with metal roofs and less control of the risks associated with the increasing use of rain water harvesting (water contamination).

The risks of unqualified people undertaking roof guttering and downpipe connection includes:

Property & other asset damage

If the design or installation of the roof is not adequate, leaking or flooding can result, causing damage to structures and fixtures, other property, soil erosion and subsidence. Potential consequences of poor roofing work include roof damage, water leakage and property damage. The costs of rectifying damaged ceilings or structural decay in a building caused by water ingress, or replacing appliances that may have been damaged, can be costly. Water ingress issues usually start out as a hidden problem, which are discovered after extensive damage has occurred.

Failing gutters to drain runoff if capacity and design of guttering does not support water runoff.

Water contamination

It is now common for people to use stormwater collected from their roof for drinking, irrigation or for sanitary flushing. It is important that the appropriate water quality is maintained for water catchment from roofs. For example, poor installation or the use of inappropriate materials (e.g., lead flashings) can result in a contaminated water supply which presents a serious health and safety risk.

Risks associated with non-conforming / non-compliant flashings include lead contamination of water run-off.

Third Party Property Damage

If a roof is not installed securely there is potential for it to detached and cause damage to the property of the occupant and/or third parties. Risks associated with connect guttering and downpipes include roof collapse and other property damage from water ingress.

Sanitary

All residential buildings, and nearly all commercial and industrial buildings, need sanitation. A building's sanitation typically involves connections to waste disposal or below ground drainage systems but the work itself is conducted above ground.

Risks

Plumbers carrying out sanitary work need critical knowledge and skills to protect the health and safety of building occupants and the community.

Sanitary work is regularly undertaken by plumbers in domestic, commercial and industrial buildings. Problems with sanitary work result from plumbers' failure to comply with the Regulations and Standards, poor workmanship, inappropriate product use and defective plumbing products.

Problems identified as part of early consultation on the regulations included:

Leaking pipes

Defective plumbing products and incorrect installation can lead to pipes leaking and releasing raw sewerage into the community.

Blocked pipes/toilets

Poorly designed and installed sanitary fixtures can cause issues such as blocked toilets, which if left unrepaired can result in exposure to raw sewerage, possibly leading to the spread of disease.

Foul smells

Poorly designed or maintained sanitary systems can cause a loss of water seals in traps. If this occurs, foul smells from the sanitary system can enter the house / building. This causes inconvenience to occupants and may also present a public health and safety risk.

Water supply

Water supply is the supply of hot and cold water to domestic, commercial and industrial buildings.

Risks

A plumber's work affects the supply of water to and from a building. Plumbers need critical knowledge and skills to protect the integrity of the water supply and the health and safety of the building occupants.

Problems identified as part of early consultation on the regulations included:

Water supply contamination

If inappropriate products or materials are used or if they are connected to water sources that are inappropriate (i.e., recycled water) the supply of water can become contaminated leading to serious health and safety risks.

Scalding and burns

If hot water systems are installed incorrectly and proper consideration is not given to tempering requirements, people using the hot water supply can suffer scalds and burns.

Water wastage

Burst water pipes can waste a significant amount of water. In addition, poor pipe work design can cause water wastage, for example, if the hot water system supplying a building is placed too far away from where the water is required, the hot water must travel an unnecessary distance, causing a loss of water whilst waiting for the hot water to arrive.

Refrigerated air-conditioning

Refrigerated air-conditioning work is conducted in domestic, commercial and industrial environments, to provide desired heating and cooling requirements.

Risks

The problem statement in the RIS will seek to disaggregate the extent to which the following risks and harms apply across differing sectors, including those within the domestic and commercial settings.

Damage to the environment

Some types of air-conditioning units contain ozone depleting gases, if released into the environment they can be damaging. These gases need to be captured and stored and/or re-used. Plumbers who install or perform maintenance on these systems can unintentionally release these gases into the environment.

Health and safety risks

Ozone depleting gases found in the majority of air-conditioners are toxic and if accidentally released present serious occupational health and safety risks and public health and safety risks. Plumbing working with ozone depleting gases requires a national qualification to ensure skill levels are adequate.

Backflow prevention

Backflow protection work protects a property's drinking water supply from contamination that may be caused by backflow.

Risks

Plumbers undertaking backflow prevention work apply critical knowledge and skills to protect the health and safety of the community.

What is backflow?

Water flow into a property is normally maintained at a consistent pressure so water can flow consistently from the tap, shower, or other fixture.

This normal water pressure is reduced when a water main bursts or there is high demand on the water system (for example, when several fire hydrants are opened). Less pressure in the pipe may allow contaminated water from a property to be drawn back into the main water supply system. This is called backflow.

Backflow can be caused by the following events:

- Reduced pressure in the water main
- A cross connection between the drinking water supply and a contaminated source, and
- A nearby property using the water supply.

Problems identified include where water is used in high risk areas such as petrol stations and hospitals, whereby the backflow of contaminants into public water supply may occur. This presents a serious public health and safety risk.

Appendix C: Cost assumptions

Assessment parameters

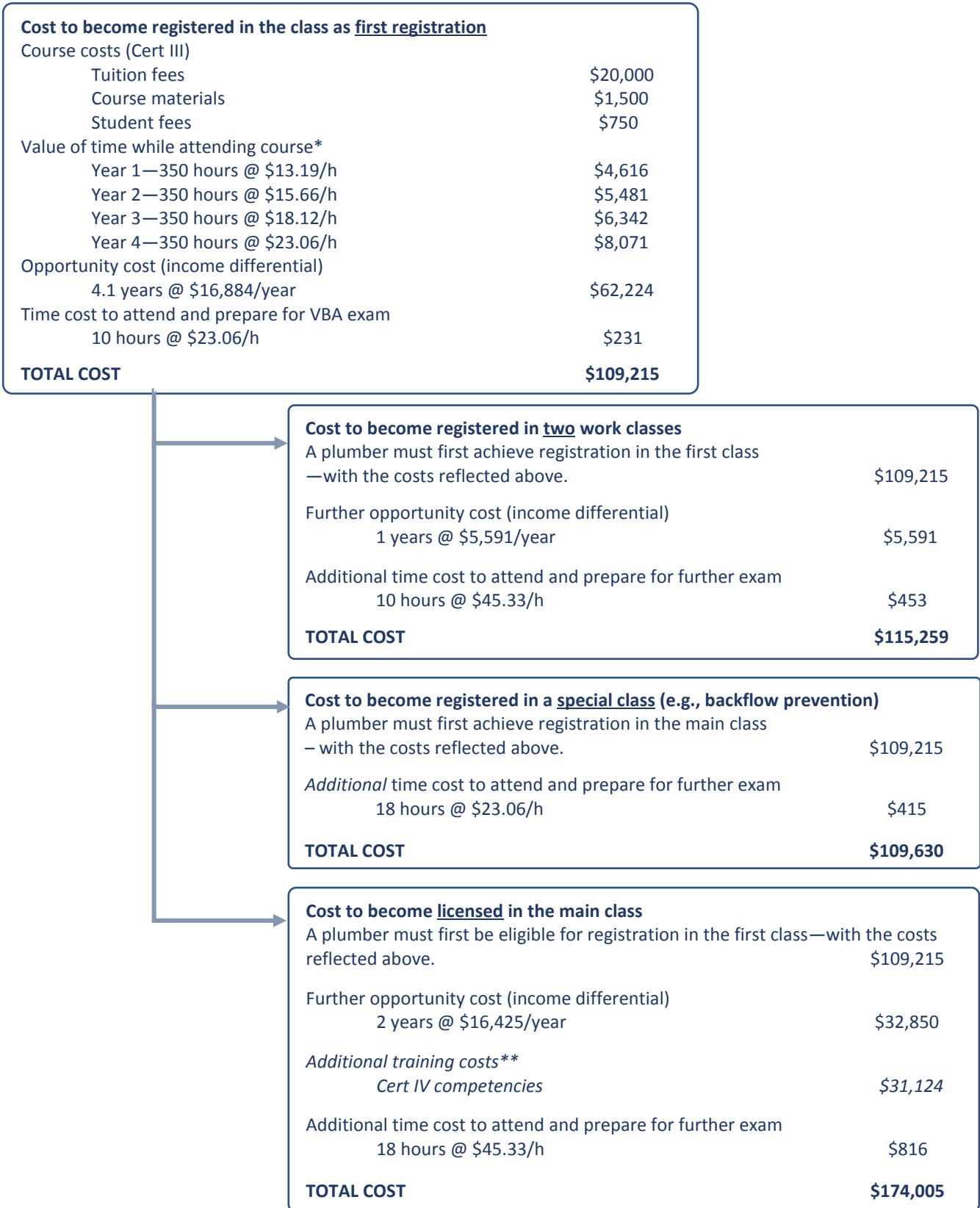
1. Costs are assessed over a ten-year period, reflecting the period to which the proposed Regulations will apply, before automatically sunseting in 2028.
2. Unless otherwise stated, all figures are expressed in 2018 dollars. Future costs and benefits are discounted by 4 per cent per annum to determine its value in 2018 dollars.

Costs of becoming registered or licensed

3. Course costs for Cert II: \$5,000 tuition fee, \$500 course materials, \$250 student fees. Course costs for Cert III: \$20,000 tuition fee, \$1,500 course materials, \$750 student fees. Cert IV: \$7,000 tuition fee, \$500 course materials. Time to attend course: 360 hours for Cert II, 1400 hours for Cert III, 750 hours for Cert IV. All estimates taken as an average of a sample of TAFE courses available as at March 2018. The tuition costs reflects the full fee amount for each course. In practice, students may be eligible for a government-subsidised course, meaning the majority of these costs are costs to government, but have been included as a total cost to the community as a whole of providing the training services. Further, remaining course costs will often be paid for by the employer.
4. Value of apprentices' time while attending classes is taken as \$12.05 per hour for first year, \$14.30 for second year, \$16.55 for third year, \$21.06 for fourth year, based on scheduled apprentice rates of pay in the Plumbing and Fire Sprinklers Award 2010 (MA000036). 9.5% superannuation is added to these amounts. This is a proxy for forgone earnings while attending classes, although in practice apprentices will often be paid for their time while attending classes. Therefore, this is a cost to the employer.
5. Value of time for non-apprentices to attend training is \$21.20 per hour. This is the rate of pay for a plumber's labourer under the Award, and taken as a reasonable proxy for the earning potential of a person for the non-apprentice pathway for registration. 9.5% superannuation is added to this amount.
6. Elapsed time to reach experience requirement: For apprentices, 2 years for Cert II and 4.1 years for Cert III, based on VBA data. For non-apprentices, the prescribed experience of 2 years or 4 years is used as the minimum time needed to be eligible for registration.
7. The opportunity cost of the minimum experience requirement is the difference between what a person earns while gaining the required experience required for registration or licence, and what they could otherwise earn if they were allowed to work as a plumber immediately. This was estimated as \$15,419 per annum for apprentices and \$5,106 per annum for non-apprentices, based on the reported differences in earnings under the Award between apprentices and labourers and the starting wagger rate for first year registered plumbers. 9.5% superannuation is added to these amounts to reflect total earning potential.
8. The income differential between a registered plumber and a licensed plumber was taken as \$15,000 per annum, plus 9.5% superannuation. This is based on industry consultation on costs.
9. The cost to sit the VBA exams was estimated by assuming on average 10 hours' time to prepare for, travel to, and sit the registration exam, and 18 hours to prepare for, travel to, and sit exams for specialised classes or the licensing exam. The value of time was taken as the final hourly rate of a 4th year apprentice of \$21.06 (plus 9.5% superannuation) for a person's first registration exam, and \$41.40 per hour (plus 9.5% superannuation) for people sitting exams for additional work classes or for licensing (reflecting that these people are most likely to already be working as a registered plumber in another class).
10. Additional costs were included for refrigerated air-conditioning and type B gasfitting classes, which are required to hold a restricted electrical licence. The cost involves a course fee (\$945), a licence fee (\$588) and value of time to undertake the relevant course (56 hours at \$21.06 per hour, plus superannuation).
11. There are no formal additional training or qualification requirements prescribed for obtaining a licence, however it is generally understood in the industry that undertaking a Cert IV in plumbing and services is highly recommended as a means to prepare for the VBA exam, although this would not be necessary for applicants with sufficient work experience in the relevant area. For the purpose of this CBA, VBA has estimated from its dealings with applicants that around 75 per cent of licence applicants will have undertaken a Cert IV in preparation to becoming licensed.

The following figure shows examples of how the costs were calculate for an individual plumber to become registered or licensed in each work class. The example provided relates to the water supply class, using the apprenticeship pathway. **The costs shown are only those that are attributable to the qualifications and experience requirements contained in the Plumbing Regulations.** Fees for application and sitting exams are not shown (these are discussed separately in the RIS).

EXAMPLE: WATER SUPPLY CLASS



* This is an example timing of hours and duration. Apprenticeships may be completed over different timeframes.

** Undertaking a Cert IV is not specific required under the Regulations, but many plumbers undertake this in order to pass the exam of competencies.

12. While in the absence of any regulations there would be no mandatory requirements to obtain qualifications and experience before becoming registered, it is reasonable to assume that most plumbers would voluntarily undertake relevant training and experience in order to obtain work as a plumber. This may be motivated by the need to comply with the Plumbing Code of Australia, which would require a degree of technical knowledge, and a commercial imperative to providing plumbing services to a sufficiently high standard to avoid customer claims (e.g., common law or consumer law claims for defects, or reputational damage). The existence of the current registration requirements over a long period of time would have contributed to setting a certain level of customer expectation in terms of the competency and standards of plumbing work. Hence, many plumbers would continue to voluntarily undertake training and practical experience before becoming a registered or licensed plumber. The degree of voluntary action may change over time. Some preliminary discussions with industry stakeholders suggests that most plumbers would continue to meet the current requirements, as this has become an established practice within the industry. This RIS has adopted a more conservative approach: assuming that 80 per cent of the costs of obtaining the required qualifications and experience incurred from complying with the current Regulations would continue if these requirements were removed, however this percentage would be expected to display some decline over the next ten years; in this case falling to 50 per cent by 2028 (modelled as a straight-line decrease).

Number of practitioners becoming registered and licensed

13. Based on historical numbers of plumbers, the costs benefit analysis assumes there are 1197 new plumber registrations in 2018 (i.e., not previously registered in any class). This figure is assumed to be distributed across work classes in proportion to current plumber numbers in each class. There is a further 1000 plumbers assumed to apply for registration in classes subsequent to their first registration (i.e., in a second or third class).
14. There are assumed 600 new licence applications in 2018, assumed to be distributed across work classes in proportion to current licence numbers in each class. Based on VBA data, it is estimated that 95% of licence applicants are already registered in the relevant class, with 5% of applicants not being registered in the corresponding class.
15. The number of plumbers is assumed to grow over time. It is assumed that the number of refrigerated air-conditioning plumbers will grow by 1.4% per year over the next ten years, while other plumbing classes will grow by 2.15% per year. Source: Commonwealth Department of Employment 2017 Employment Projections <http://lmip.gov.au/default.aspx?LMIP/GainInsights/EmploymentProjections>.

Cost of Schedule 2 work standards

16. The general requirement that “any registered plumber, licensed plumber or other person authorised to carry out plumbing work under the Act must carry out plumbing work in a good and workmanlike manner” has not been separately costed. This is because:
- Section 221ZZZG of the Act already provides that one of the grounds for disciplinary action against a plumber (which may lead to suspension or cancellation of registration or licence) is where the plumber has carried out, or was a party to, the carrying out of plumbing work otherwise than in a good and workmanlike manner.
 - Section 221GA of the Act provides that a licensed plumber must not permit a person to carry out on his or her behalf, or direct a person to carry out, any plumbing work or specialised plumbing work that is defective in workmanship or that involves the use of materials that the licensed plumber knows, or reasonably ought to know, are defective.
17. Therefore, the requirement in the current Regulations to carry out work in a good and workmanlike manner merely restates what is already expected by the Act, adding no real additional obligations on a plumber.
18. The additional work requirements for certain types of plumbing work set out in Schedule 2 of the current Regulations does impose additional costs of compliance. The costs of compliance can be considered as:
- Additional time per job needed in order to complete the work as per the work standard
 - Additional cost of material needed to meet the standard, over and above what materials would otherwise be used in the absence of the work standard.

19. This RIS estimated these costs for each type of plumbing work in the table below, drawing on information obtained through consultation with industry.

Table 37: Costs of additional work standards

Class of plumbing work	Additional time (hours)	Additional material costs
Fire protection work	4	\$750
Mechanical services work (excluding refrigerated air conditioning)	2	\$250
Refrigerated air-conditioning work	2	\$150
Roofing (stormwater) work	1	\$200
Water supply work—rainwater tanks	1	\$50
Water supply work—solar water heaters	1	\$100
Water supply work—cooling tower	1	\$200
Water supply work—interchange device	1	\$75

** the hourly value has been taken as \$41.10 (ABS Cat 6306.0—Employee Earnings and Hours, Australia, May 2016, ANSCO 334, Plumbers, Average hourly total cash earnings) Increased by a factor of 1.5 to allow for indirect labour and corporate costs (staff oncosts and overheads).*

20. Not all of the cost of following the work standards should be included in the cost of the Regulations. Feedback from industry suggests that even in the absence of specifying the work requirements in the Plumbing Regulations, most plumbers would continue to meet the requirements. This is due to the fact that plumbers have been trained to undertake work in a way that does meet these standards (which have been in place for some time), and would be unlikely to change established work practices. Preliminary consultation with industry stakeholders indicated that around 85-90 per cent of work would continue to meet the standards. This is likely to be true in the short term, however in the medium term it might be expected that established work practices may drift away from the strict requirements of the standards.
21. Therefore, the base case assumes that, in the absence of the work standards being required in the Plumbing Regulations, 85 per cent of the costs of meeting the standards would continue to be incurred in the short term, with this gradually falling to 50 per cent by 2028 (decreasing on a straight-line basis).

Appendix D: Key assumptions for hot water heater standard cost-benefit analysis

The costs and benefits of the three options from a state-wide perspective and an individual household perspective were modelled by the department. The full report that details the cost-benefit analysis associated with the hot water heater standard can be provided by the department upon request through the Engage Victoria website, '*Domestic Hot Water Research and Cost Benefit Analysis for Plumbing Regulations 2018 Regulatory Impact Statement*'.

In addition to assumptions regarding decisions of consumers purchasing a new replacement hot water heater under the proposed standard (as outlined in section B.8), key assumptions underpinning the cost-benefit analysis for hot water heater standard include the following:

- All costs are retail costs (real costs) as paid by the consumer. These costs are decreased by the Federal Government Renewable Energy Target (RET) incentives for solar and heat pump water heaters, called Small-scale Technology Certificates (STCs) where they are applicable.
- The government administration costs included in the analysis are one off costs of consumer/industry education, and compliance checking costs.
- Business costs for complying with the regulation are included, and where relevant, includes testing, administration and compliance checking.
- Energy prices (retail) from Australian Energy Market Operator forecast for the period (which include RET costs for electricity) and include GST. Off-peak prices are based on retailer prices (ratio of standard offer peak/anytime to controlled load). LPG prices are based on current market prices.
- Greenhouse gas emission reduction benefits are based on energy savings and emission factor projections of the Commonwealth and the National Greenhouse Accounts and a Victorian value of carbon abatement of \$20 per tonne CO₂-e.
- A discount rate of 4 per cent.
- A 10-year timeframe for analysis, for the period from 2019 to 2028 inclusive.
- Maintenance costs are not included as they are approximately similar for all water heater technologies.
- The cost reductions to the consumer from incentives available through the Victorian Energy Upgrades program are not included as VEU would not normally be available for activities that are already mandated.

Appendix E: Typical plumbing jobs by value of plumbing work

This section sets out examples of typical plumbing jobs, by plumbing class, for ranges of plumbing work below \$500, \$500 to \$750, \$750 to \$1000, \$1000 to \$1500, and above \$1500, to inform consideration of the threshold for Compliance Certificates.

It is noted that a Compliance Certificate is often issued for multiple items of work (for example all work completed in a new dwelling), with the result that even very low value work can be included on a Compliance Certificate where the total value of all work exceeds \$750. The various types of work are not necessarily divided neatly into different price ranges. For example, while a tap replacement could cost \$500 with cheaper materials, it could also easily cost upwards of \$1000 with more expensive tapware. For this reason, much of the content in the attached tables is repeated for several different price thresholds.

Below \$500

Class of work	Area of work	Example task	Risk
Backflow prevention work	Backflow prevention	Service or testing of backflow prevention devices.	Failure to identify a faulty device and potential non-reporting.
Drainage work	Drainage (below ground sewer)	Sewer cut in for an additional fixture.	Inappropriate jointing methods causing blockages.
	Drainage (below ground stormwater)	Additional connections to below ground drainage systems.	Potential flooding to garages and habitable structures.
	Septic tank installation	Installation or alteration of effluent distribution systems.	Potential health and safety risks as a result of inappropriate surface or subsurface treatment systems.
Fire protection work	Fire protection	Testing of fire protection equipment & valve arrangements.	Potential for critical valves to be left in the wrong operating position.
	Residential and domestic fire sprinkler systems	Replacement of fire sprinkler heads.	Inadequate sprinkler coverage in a fire event.
Gasfitting work	Type A appliance (natural gas) installation	Failure to secure an appliance to prevent tilting.	Potential for scalding.
	Type A appliance (LPG) installation	Failure to appropriately test a fitting line.	Potential explosive conditions through defective piping joints.
	Type A appliance conversion work	Conversion of an appliance from LPG to natural gas.	Gas flare ups due to incorrect burner pressures.
	Type A appliance servicing work	CO spillage testing.	Failure to identify CO spillage from an un-serviced gas heater
	Type B gasfitting work	Servicing of high gas consumption industrial gas appliances.	Potential for high level appliance failure and explosive combustion.
	Type B gasfitting advanced work	Connection of high risk gas fired appliance such as boilers or steam generators.	Potential for major failure of an appliance causing risk of injury to not only installer but also the public.
Irrigation (non-agricultural) work	Irrigation	Minor maintenance, repairs & cut in's.	Cross connection risk.
Mechanical services work	Mechanical services	Servicing appliance and minor pipe repairs.	High damage risks due to most mechanical service work being restricted to commercial sites.
Refrigerated air-conditioning work	Refrigerated air-conditioning	Servicing appliance.	Potential for ozone depleting gas leaks.
Roofing (stormwater) work	Roof plumbing	Minor leak repair.	Property damage and potential health risks associated with the growth of mould spores.
Sanitary work	Sanitary plumbing	Installation of standard domestic plumbing fixtures.	Inappropriate fixture trapping or venting cause the release of sewer gases.
Water supply work	Cold water plumbing	Minor tap repairs and servicing.	Damage to plumbing fixture cabinetry.
	Grey or recycled water	Minor repairs and servicing.	Potential for cross connections between drinking water & recycled or reclaimed water supplies.
	Hot water plumbing	Minor repairs and servicing.	Failure to temper hot water delivery temperatures to 50 degrees.
	Rainwater tank installation	Installation of rainwater tanks onto a stable support base or structure	Inadequate supporting base to rainwater tanks allowing tank to move and possibly fall.
	Solar installation	Tempering of solar hot water supply	Incorrect tempering valve installations on uncontrolled heat sources.

\$500 to \$750

Class of work	Area of work	Example task	Risk
Backflow prevention work	Backflow prevention	Service or testing of backflow prevention devices.	Failure to identify a faulty device and potential non-reporting.
Drainage work	Drainage (below ground sewer)	Sewer cut in for an additional fixture.	Inappropriate jointing methods causing blockages.
	Drainage (below ground stormwater)	Additional connections to below ground drainage systems.	Potential flooding to garages and habitable structures.
	Septic tank installation	Installation or alteration of effluent distribution systems.	Potential health and safety risks as a result of inappropriate surface or subsurface treatment systems.
Fire protection work	Fire protection	Testing of fire protection equipment & valve arrangements.	Potential for critical valves to be left in the wrong operating position.
	Residential and domestic fire sprinkler systems	Replacement of fire sprinkler heads.	Inadequate sprinkler coverage in a fire event.
Gasfitting work	Type A appliance (natural gas) installation	Secure an appliance to prevent tilting.	Potential for scalding.
	Type A appliance (LPG) installation	Test a fitting line.	Potential explosive conditions through defective piping joints.
	Type A appliance conversion work	Conversion of an appliance from LPG to natural gas.	Gas flare ups due to incorrect burner pressures.
	Type A appliance servicing work	CO spillage testing.	Failure to identify CO spillage from an un-serviced gas heater
	Type B gasfitting work	Servicing of high gas consumption industrial gas appliances.	Potential for high level appliance failure and explosive combustion.
	Type B gasfitting advanced work	Connection of high risk gas fired appliance such as boilers or steam generators.	Potential for major failure of an appliance causing risk of injury to not only installer but also the public.
Irrigation (non-agricultural) work	Irrigation	Minor maintenance, repairs & cut in's.	Cross connection risk.
Mechanical services work	Mechanical services	Servicing appliance and minor pipe repairs.	High damage risks due to most mechanical service work being restricted to commercial sites.
Refrigerated air-conditioning work	Refrigerated air-conditioning	Servicing appliance.	Potential for ozone depleting gas leaks.
Roofing (stormwater) work	Roof plumbing	Minor leak repair.	Property damage and potential health risks associated with the growth of mould spores.
Sanitary work	Sanitary plumbing	Installation of standard domestic plumbing fixtures.	Inappropriate fixture trapping or venting cause the release of sewer gases.
Water supply work	Cold water plumbing	Minor tap repairs and servicing.	Damage to plumbing fixture cabinetry.
	Grey or recycled water	Minor repairs and servicing.	Potential for cross connections between drinking water & recycled or reclaimed water supplies.
	Hot water plumbing	Minor repairs and servicing.	Failure to temper hot water delivery temperatures to 50 degrees.
	Rainwater tank installation	Installation of rainwater tanks onto a stable support base or structure	Inadequate supporting base to rainwater tanks allowing tank to move and possibly fall.
	Solar installation	Tempering of solar hot water supply	Incorrect tempering valve installations on uncontrolled heat sources.

\$750 to \$1000

Class of work	Area of work	Example task	Risk
Backflow prevention work	Backflow prevention	Service or testing of backflow prevention devices.	Failure to identify a faulty device and potential non-reporting.
Drainage work	Drainage (below ground sewer)	Sewer cut in for an additional fixture.	Inappropriate jointing methods causing blockages.
	Drainage (below ground stormwater)	Additional connections to below ground drainage systems.	Potential flooding to garages and habitable structures.
	Septic tank installation	Installation or alteration of effluent distribution systems.	Potential health and safety risks as a result of inappropriate surface or subsurface treatment systems.
Fire protection work	Fire protection	Testing of fire protection equipment & valve arrangements.	Potential for critical valves to be left in the wrong operating position.
	Residential and domestic fire sprinkler systems	Replacement of fire sprinkler heads.	Inadequate sprinkler coverage in a fire event.
Gasfitting work	Type A appliance (natural gas) installation	Failure to secure an appliance to prevent tilting.	Potential for scalding.
	Type A appliance (LPG) installation	Failure to appropriately test a fitting line.	Potential explosive conditions through defective piping joints.
	Type A appliance conversion work	Conversion of an appliance from LPG to natural gas.	Gas flare ups due to incorrect burner pressures.
	Type A appliance servicing work	CO spillage testing.	Failure to identify CO spillage from an un-serviced gas heater
	Type B gasfitting work	Servicing of high gas consumption industrial gas appliances.	Potential for high level appliance failure and explosive combustion.
	Type B gasfitting advanced work	Connection of high risk gas fired appliance such as boilers or steam generators.	Potential for major failure of an appliance causing risk of injury to not only installer but also the public.
Irrigation (non-agricultural) work	Irrigation	Minor maintenance, repairs & cut in's.	Cross connection risk.
Mechanical services work	Mechanical services	Servicing appliance and minor pipe repairs.	High damage risks due to most mechanical service work being restricted to commercial sites.
Refrigerated air-conditioning work	Refrigerated air-conditioning	Servicing appliance.	Potential for ozone depleting gas leaks.
Roofing (stormwater) work	Roof plumbing	Minor leak repair.	Property damage and potential health risks associated with the growth of mould spores.
Sanitary work	Sanitary plumbing	Installation of standard domestic plumbing fixtures.	Inappropriate fixture trapping or venting cause the release of sewer gases.
Water supply work	Cold water plumbing	Minor tap repairs and servicing.	Damage to plumbing fixture cabinetry.
	Grey or recycled water	Minor repairs and servicing.	Potential for cross connections between drinking water & recycled or reclaimed water supplies.
	Hot water plumbing	Minor repairs and servicing.	Failure to temper hot water delivery temperatures to 50 degrees.
	Rainwater tank installation	Installation of rainwater tanks onto a stable support base or structure	Inadequate supporting base to rainwater tanks allowing tank to move and possibly fall.
	Solar installation	Tempering of solar hot water supply	Incorrect tempering valve installations on uncontrolled heat sources.

\$1000 to \$1500

Class of work	Area of work	Example task	Risk
Backflow prevention work	Backflow prevention	Repair, alteration, maintenance, testing or commissioning of backflow prevention devices.	Installations must be compliant to protect drinking water supplies from contamination both within properties and as containment at property boundaries to protect reticulated water supplies
Drainage work	Drainage (below ground sewer)	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a below ground sanitary drainage system.	Poorly designed or installed below ground sanitary drainage systems create health risks and are expensive to rectify,
	Drainage (below ground stormwater)	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a below ground stormwater drainage system.	Poorly designed site stormwater drainage systems have the potential to cause building subsidence and property damage.
	Septic tank installation	The installation & treatment of human waste through primary and secondary wastewater treatment systems such as septic tanks and effluent dispersal fields.	Inadequate septic tank or wastewater treatments systems are a public health risk both to private properties and to the environment.
Fire protection work	Fire protection	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of a fire hydrant or hose reel.	Poorly designed or installed fire protection systems are a very significant risk to life and the spread of fire from property to property.
	Residential and domestic fire sprinkler systems	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of a residential & domestic fire sprinkler systems in buildings up to 4 storeys in height.	Poorly designed or installed residential or domestic fire sprinkler systems may not allow safe egress from a building during a fire event.
Gasfitting work	Type A appliance (natural gas) installation	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any pipe appliance, flue, fitting, apparatus, control or other item that is involved with the supply or use of gas and that is fitted downstream of the outlet of the consumer billing meter.	Large and complex natural gas installations are high risk for both residential or commercial industrial installations, due to their gas volumes and installations requirements.
	Type A appliance (LPG) installation	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any pipe appliance, flue, fitting, apparatus, control or other item that is involved with the supply or use of gas and that is fitted downstream of the outlet of the consumer's gas storage container.	Large and complex LPG gas installations are also high-risk activities for both residential or commercial industrial installations, due to their gas volumes and installations requirements particularly where the fuel gas is heavier than air.
	Type A appliance conversion work	The altering of a type A appliance to operate on a different gas from the gas that the	Incorrect burner pressures and or aeration adjustments to converted appliances can contribute to CO spillage.

		appliance was originally manufactured to use or was previously converted to use.	
	Type A appliance servicing work	The internal cleaning, maintenance and adjusting of type A appliances including the adjustment, repair or replacement of components.	Improper servicing of gas appliance in multi-level properties introduces a significant risk to all building tenants.
	Type B gasfitting work	Construction, installation, servicing and maintenance of a type A appliance between the gas isolating valve adjacent to the appliance and any flue connection.	Improper servicing of type A gas appliances is also a significant risk to all building tenants' due to the complexity of the appliance and its componentry.
	Type B gasfitting advanced work	Construction, installation servicing and maintenance of a type B appliance, including the gas supply componentry of the appliance between the gas isolating valve adjacent to the appliance and any flue connection.	Improper servicing of type B gas appliances is also a significant risk to all building tenants' due to the complexity of the appliance and its componentry.
Irrigation (non-agricultural) work	Irrigation	Install sprinkler irrigation system.	Large complex irrigation systems are a common cross connection cause due to the complexity of the piping systems, poor piping system identification and inadequate system commissioning processes.
Mechanical services work	Mechanical services	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of a mechanical heating, cooling or ventilation system in a building associated with the heating, cooling or ventilation of that building.	Poorly designed and installed mechanical services systems often the subject of serious consumer complaint issues requiring significant rectification work at considerable cost to industry and the consumer. Systems fail to meet their design or performance objectives
Refrigerated air-conditioning work	Refrigerated air-conditioning	Install or replace evaporative cooler or refrigerated air-conditioner.	Poorly designed and installed refrigerated air-conditioning systems are also common consumer complaint issues requiring significant rectification work at considerable cost to industry and the consumer.
Roofing (stormwater) work	Roof plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any roof covering or roof flashing and any part of a roof drainage system involved in the collection or disposal of stormwater.	Large complex roof structures require a high level of design skill to ensure that all of the roofing components are sized for the expected average rainfall intensities in 1:100-year storm events.
Sanitary work	Sanitary plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of an above ground sanitary plumbing system to connect sanitary fixtures and appliances to a disposal system or below-ground sanitary drainage system.	There are common design faults in multi-storey designs that impact to connections at the lower floors of buildings.
Water supply work	Cold water plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or	Inappropriate water supply system designs are a common fault in multi-unit developments where inaccurate probable simultaneous designs are formulated

	commissioning of any part of a hot water service that is connected to a drinking water supply from the point of connection to the water supply to the points of discharge of the service.	
Grey or recycled water	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a non-drinking water service from the point of connection to the water supply to the points of discharge of the service.	Inappropriate water supply system designs can lead to cross connections.
Hot water plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a hot water service that is connected to a drinking water supply from the point of connection to the water supply to the points of discharge of the service.	Inappropriate water supply system designs are a common fault in multi-unit developments where inaccurate probable simultaneous designs are formulated and there is also a potential for legionella growth in poorly designed circulated warm water systems.
Rainwater tank installation	The installation of rainwater storage tanks.	There are significant property damage risks from Improperly sized rainwater tank overflow measures and are life safety risks from inadequate support measures for slimline type rainwater storage tanks. There is also potential water supply cross connection issues with any alternative water supply at properties that also have a reticulated drinking water supply.
Solar installation	Installation of solar hot water collectors, flow and return piping systems and the installation of solar hot water pre-heating storage tanks.	Potential non-compliance with orientation and inclination issues with large volume builders and potential safety risks with appropriate uncontrolled heated water tempering.

Above \$1500

Class of work	Area of work	Example task	Risk
Backflow prevention work	Backflow prevention	Repair, alteration, maintenance, testing or commissioning of backflow prevention devices.	Installations must be compliant to protect drinking water supplies from contamination both within properties and as containment at property boundaries to protect reticulated water supplies
Drainage work	Drainage (below ground sewer)	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a below ground sanitary drainage system.	Poorly designed or installed below ground sanitary drainage systems create health risks and are expensive to rectify,
	Drainage (below ground stormwater)	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a below ground stormwater drainage system.	Poorly designed site stormwater drainage systems have the potential to cause building subsidence and property damage.
	Septic tank installation	The installation & treatment of human waste through primary and secondary wastewater treatment systems such as septic tanks and effluent dispersal fields.	Inadequate septic tank or wastewater treatments systems are a public health risk both to private properties and to the environment.
Fire protection work	Fire protection	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of a fire hydrant or hose reel.	Poorly designed or installed fire protection systems are a very significant risk to life and the spread of fire from property to property.
	Residential and domestic fire sprinkler systems	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of a residential & domestic fire sprinkler systems in buildings up to 4 storeys in height.	Poorly designed or installed residential or domestic fire sprinkler systems may not allow safe egress from a building during a fire event.
Gasfitting work	Type A appliance (natural gas) installation	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any pipe appliance, flue, fitting, apparatus, control or other item that is involved with the supply or use of gas and that is fitted downstream of the outlet of the consumer billing meter.	Large and complex natural gas installations are high risk for both residential or commercial industrial installations, due to their gas volumes and installations requirements.
	Type A appliance (LPG) installation	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any pipe appliance, flue, fitting, apparatus, control or other item that is involved with the supply or use of gas and that is fitted downstream of the outlet of the consumer's gas storage container.	Large and complex LPG gas installations are also high-risk activities for both residential or commercial industrial installations, due to their gas volumes and installations requirements particularly where the fuel gas is heavier than air.
	Type A appliance conversion work	The altering of a type A appliance to operate on a different gas from the gas that the appliance	Incorrect burner pressures and or aeration adjustments to converted appliances can contribute to CO spillage.

		was originally manufactured to use or was previously converted to use.	
	Type A appliance servicing work	The internal cleaning, maintenance and adjusting of type A appliances including the adjustment, repair or replacement of components.	Improper servicing of gas appliance in multi-level properties introduces a significant risk to all building tenants.
	Type B gasfitting work	Construction, installation, servicing and maintenance of a type B appliance between the gas isolating valve adjacent to the appliance and any flue connection.	Improper servicing of type B gas appliances is also a significant risk to all building tenant's due to the complexity of the appliance and its componentry.
	Type B gasfitting advanced work	Construction, installation servicing and maintenance of a type B appliance, including the gas supply componentry of the appliance between the gas isolating valve adjacent to the appliance and any flue connection.	Improper servicing of type B gas appliances is also a significant risk to all building tenants' due to the complexity of the appliance and its componentry.
Irrigation (non-agricultural) work	Irrigation	Install sprinkler irrigation system.	Large complex irrigation systems are a common cross connection cause due to the complexity of the piping systems, poor piping system identification and inadequate system commissioning processes.
Mechanical services work	Mechanical services	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of a mechanical heating, cooling or ventilation system in a building associated with the heating, cooling or ventilation of that building.	Poorly designed and installed mechanical services systems often the subject of serious consumer complaint issues requiring significant rectification work at considerable cost to industry and the consumer. Systems fail to meet their design or performance objectives
Refrigerated air-conditioning work	Refrigerated air-conditioning	Install or replace evaporative cooler or refrigerated air-conditioner.	Poorly designed and installed refrigerated air-conditioning systems are also common consumer complaint issues requiring significant rectification work at considerable cost to industry and the consumer.
Roofing (stormwater) work	Roof plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any roof covering or roof flashing and any part of a roof drainage system involved in the collection or disposal of stormwater.	Large complex roof structure require a high level of design skill to ensure that all of the roofing components are sized for the expected average rainfall intensities in 1:100-year storm events.
Sanitary work	Sanitary plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of an above ground sanitary plumbing system to connect sanitary fixtures and appliances to a disposal system or below-ground sanitary drainage system.	There are common design faults in multi-storey designs that impact to connections at the lower floors of buildings.
Water supply work	Cold water plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a hot water service that is connected to a drinking water supply from	Inappropriate water supply system designs are a common fault in multi-unit developments where inaccurate probable simultaneous designs are formulated

	the point of connection to the water supply to the points of discharge of the service.	
Grey or recycled water	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a non-drinking water service from the point of connection to the water supply to the points of discharge of the service.	Inappropriate water supply system designs can lead to cross connections.
Hot water plumbing	Construction, installation, replacement, repair, alteration, maintenance, testing or commissioning of any part of a hot water service that is connected to a drinking water supply from the point of connection to the water supply to the points of discharge of the service.	Inappropriate water supply system designs are a common fault in multi-unit developments where inaccurate probable simultaneous designs are formulated and there is also a potential for legionella growth in poorly designed circulated warm water systems.
Rainwater tank installation	The installation of rainwater storage tanks.	There are significant property damage risks from Improperly sized rainwater tank overflow measures and are life safety risks from inadequate support measures for slimline type rainwater storage tanks. There is also potential water supply cross connection issues with any alternative water supply at properties that also have a reticulated drinking water supply.
Solar installation	Installation of solar hot water collectors, flow and return piping systems and the installation of solar hot water pre-heating storage tanks.	Potential non-compliance with orientation and inclination issues with large volume builders and potential safety risks with appropriate uncontrolled heated water tempering.

