

TECHNICAL MEMORANDUM

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Subject: ICC Water Supply Risk Review	

1 INTRODUCTION

The objective of this review is to review the current water supply risk identification and identify any risks that are not currently addressed.

The investigation reviewed at a high level, the following documentation:

1. Water scheme drawings and plans.
2. Water Safety Plan (WSP).
3. Source Water Risk Management Plan (SWRMP).
4. Defining Asset Criticality for Water Services Report, ProjectMax June 2017.
5. Asset Management Plan.
6. 2024-2034 LTP.

It is fair to say that a detailed review of each document was not carried out but rather a review of the content with spot checks on the major risk areas.

2 THE GOOD NEWS

The quality of the information in the documentation, particularly the Water Safety Plan and the Source Water Risk Management Plan is excellent. There are a couple of minor improvements that could be made, but this will enhance the documents rather than correct them.

In these documents, the risks to water supply are clearly identified with appropriate actions to manage those risks. Probably the two most notable risks are:

1. The reliance on a single water supply.
2. Backflow prevention and leakage.

In both cases, there are active projects to manage both risks. The reliance on a single water source means that if that source is contaminated or becomes unavailable (e.g. cyanobacteria, low river flow, etc.) then Invercargill would be out of water in 1-2 days. This is clearly unacceptable. ICC is investigating the potential for a new water source and treatment plant to mitigate this risk.

Contamination of the water after it has left the treatment plant contributes to about half of the water borne disease outbreaks in the developed world. Backflow prevention is one of the most important things to prevent this sort of contamination. Backflow can be caused by a negative pressure in a network. Every time a pump starts or stops there is a pressure wave created in the fluid. This pressure wave causes higher positive pressures at its peak and negative pressures at the trough. This can cause water and material from outside of a leak or a connection to flow back into the main, potentially contaminating the water.

It is pleasing to note that ICC has programmes for backflow installation, identification of high-risk users and leakage identification and reduction.



Another great resource is the support for the operators from Adrian Cocker who provides that Principal role and is available if things go wrong. This level of support is extremely rare in New Zealand.

2.1 Improvements to the Water Safety Plan and Source Water Risk Management Plan.

These improvements will enhance the current document.

1. In the WSP, it would be good to have a response plan to a major water contamination incident that included both a "Boil Water Notice" and a "Do Not Drink" notice. The "Boil Water Notice" would be used in response to a microbial water contamination event and the "Do Not Drink" notice in response to a chemical contamination event. It should be noted that these are both unlikely events for Invercargill but can happen even in the best network supplies. The response plan should include names and phone numbers of people actually carrying out the various tasks in response to the incident.
2. I think more details about how the public is informed should be included. The responses typically say, "Inform public of possible constraints on reticulated water supply by use of radio, social media and newspaper." It should be detailed who contacts the news media and who puts the warnings up on social media. How is the incident communicated from the operations/compliance team to the Communications Team who is contacting media and updating social media. Also, in the case of a major contamination event, is this sufficient. In Queenstown last year, there were complaints that the message was slow to get out. Should door knocking and/or leaflet drops be considered.
3. Inter-agency communication. When a new consent is applied for, or a contamination event is notified, who should be notified, by whom and when? This information is probably well communicated now, but the WSP and the SWRMP do not identify how this happens. There should be phone numbers and positions of people in both organisations with back-ups listed to ensure the correct people are informed in a timely manner.
4. The critical control points (CCPs) are only listed in the WSP. They are accessible to the operators on the computer. It is suggested that the CCPs are either programmed into the SCADA or available in hardcopy in the control room at Branxholme.

All of these suggestions are for improving the usefulness of the document. In a major incident, it is good practice if people are told what to do clearly without having to think about how to achieve that objective.

3 THE BAD NEWS

While the asset risks are clearly identified, there are major risks to ICC that are not identified. These mainly revolve around the people.

The risks identified are summarised as follows:

- Loss of institutional knowledge when people leave.
- Lack of experience in the operations team 3-5 years.
- Recruitment of qualified staff.
- Retention of qualified staff,
- Lack of on-going training. While this is an industry wide issue, it does affect ICC directly.
- Succession planning, particularly around the operations team.
- Number of staff
- A horizontal structure where, for example information technology, finance, human resources, etc. cover all aspects of what ICC does, means that potentially people inexperienced with water supply don't

understand the risks associated with water supply. It should be noted that ICC has a specific 3-Waters project Manager and a specific 3-Waters Asset Manager.

- Personal legal liability of people employed by a water supplier, directly or indirectly.
- Maintenance Contract Renewal – this could occur when there are a number of councils wishing to renew contracts which will pose a risk to ICC.
- Transparency of risk through to the governance levels.

Several of these risks are in common with the wider water services industry. For example, skilled operators are rare and there are not enough in New Zealand. This links into the number of people, their knowledge and experience, recruitment, retention and succession planning.

3.1 People Risks

Many of the risks identified here are common across the whole industry. They are identified here because they are risks for ICC made worse by the fact that it is an industry risk. This means that the options for solving this will not be done at a national level and solutions must be found locally.

ICC has three water treatment operators, one principal process specialist, one water manager. All of these staff are in their 50's or 60's and will probably retire within the next 10 years. Within the industry in New Zealand there is a severe lack of trained operators and process specialists, along with managers with a good understanding of the risks associated with water supply. When these people retire, ICC need to have people internally who want to progress to these roles. When these people leave, they will take with them all of the institutional knowledge they have gained.

Specifically, around operations, ICC could consider re-implementing the Cadet programme that was so successful a few years ago along with an operator apprenticeship. One small council in Australia, for example has an apprenticeship where the apprentices are not allowed to be on-call for two years at least. Perhaps ICC could adapt their systems to develop a training programme for operators.

Recruitment and retention (Industry wide issue). This is a huge issue. Starting salaries for operators in Brisbane are AUD120k with all of the other benefits that working in Australia provides. Salaries at dairy and other industries in and around southland for operators are approximately \$300 per month more after tax. Typically, some form of medical insurance is also included. While money is not the only driver for most people, it is an important part of any job. ICC needs to be able to offer quality staff with experience and qualifications a package that is attractive.

On-going training (Industry wide issue) for operators is an industry wide problem. However, it is understood that attending industry conferences is allowed for by ICC for two staff. However, with three operators only, this puts pressure on the staff not on the training. Other development options could include swapping an operator with Dunedin CC (or another council) for a month, seeing what water suppliers do in Auckland, and Australia in terms of training. The other issue with this sort of training is having the ability to cover staff on-call for an extended period given that there are only three operators in the team. This also affects the ability of ICC to backfill roles and provide cover while staff are on leave, sick or away training.

Training of new people is also a major industry issue. An apprentice electrician for example takes between 3 and 4 years before they can wire a plug without it being signed off by a registered electrician. In the water industry, there is no such requirement. The industry training can be completed in 6 months and is limited. Indeed, it is possible to put someone on call who has no knowledge or experience of water treatment plants.

The number of staff required to provide safe drinking water is also a concern. While the number of operators (3) is sufficient during normal operations, the number required to support an incident or plant upset may mean the team is stretched. Each operator is on-call 1 week in 3. If an operator is sick, on leave or away on training, this can leave the remaining operators stretched, particularly if a water treatment or quality incident takes place.

On another note, it is **difficult to resource from overseas** as water supply is not listed as one of the fast-track visas by Immigration NZ. Bringing someone into NZ can take several months before they are available.

There were a number of comments about the time lag between a project being finished and accurate data being uploaded to GIS. This can be a problem for the maintenance crews if a valve or pipe is not correctly shown. This again goes back to staffing levels and the backlog of work updating the council GIS system.

3.2 Structural Risks

There are a number of ways of structuring a water business and both have pros and cons. Having a horizontal structure means that support services are not necessarily focused on safe drinking water. For example, I recently asked the head of IT at one rural council what his biggest risk to water supply was in his council. He said it was cyber security, yet many of the water supplies relied on wooden reservoirs. If he had been IT support within the water team, his focus would have been somewhat different about what was important and where his concerns sat in the overall risk matrix.

It must be noted that ICC has specialist 3-waters project managers and asset managers, albeit not in the 3-waters team. It is my opinion that having these roles working as close as possible to the 3-waters team increases communication efficiency and gives better outcomes. The disadvantage with this is that it may not be possible to have someone full time dedicated to, say water delivery only.

3.3 Responsibility and Transparency Risks

One of the most unfair aspects of the current legislation is the fact that all the individuals employed by water supplier are personally liable for their actions and the elected members are not. Under the Water Services Act 2021, each individual person working for a water supplier is liable for fines up to \$600,000 and 5 years in prison (for recklessness). Lower fines are possible for negligence and multiple other offences. Recklessness is a high bar. For example, in Walkerton in Canada in 2000, an outbreak of E. coli caused 2,500 people to get sick and 7 deaths. The operators there were found guilty of recklessness because they falsified chlorine results after they knew the chlorine system had failed.

However, decisions made at the governance level may affect the ability of ICC as a water supplier to provide safe drinking water. For example, the priority of safe drinking water has been second to a new stadium in one council in the South Island. ICC elected members need to understand that the decisions they make, can increase the risk to the water supply to an intolerable level.

I have investigated several incidents over the last few years. One of the main problems is the lack of transparency at the governance level. The main issue is that public health is not a standalone risk category reported to Council. It is normally included in service delivery where it can be hidden by other risks. The problem with public health risks is that many of them have catastrophic consequences and alarmingly high likelihood meaning that the risks are high to extreme. For example, a cross connection from a storm water or sewer line into the network causing contamination, is an extreme risk to ICC and around backflow there are several high risks identified.

One water services manager went to his council and asked for all the money needed to provide a low-risk safe drinking water. When the council saw the number, they told him to reduce his expectations. He refused and asked them to make the reductions and accept the increase in risk as they were immune from prosecution, and he was not.

4 SUMMARY

ICC's asset risks are well defined with appropriate mitigations either in place or being implemented over time. However, the risks that are not well addressed are the risks associated with people.

These risks are equally important as the asset risks and need to be addressed in a meaningful way. ICC should be aware that many of the risks identified are common across the industry and cannot be resolved by local recruitment. Foreign recruitment is also difficult due to the length of time to get visas.

ICC should focus on the number of staff required, how to recruit, train and retain those staff members and plan for the future with an active succession plan.