

WATER SUPPLY ANNUAL REPORT 2021-22



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Acknowledgement of Country

We acknowledge and respect the Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

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FOREWORD

Message from the CEO, Southern Alpine Resort Management Board

We are pleased to present Southern Alpine Resort Management Board's 2021-22 Annual Report.

Over the last twelve months, we've worked hard to improve the safety and reliability of drinking water supplied at Mt Baw Baw Alpine Resort. Funding in 2021 allowed the Resort to design and commission a purpose-built containerised modern potable Water Treatment Plant (WTP) to meet current and future demands. Interim solutions allowed for the reliable provision of safe drinking water through the 2021's White season and 2021-22 Green season. The WTP was designed and constructed off-mountain to streamline the build process and minimise any major delays or service disruptions. The new WTP has a multibarrier treatment approach including filtration and disinfection processes.

- AFM and GAC filtration is used to remove coarse solids and achieve organics removal.
- UV is used for disinfection and final bacteria control.
- Sodium Hypochlorite dosing to maintain level of chlorine for drinking water.
- Caustic dosing to maintain the level of pH for drinking water.

The WTP is equipped with duty/standby units to ensure redundancy of each aspect in the system, SCADA to allow for remote adjustments and monitoring, and alarms which automatically switch over and shutdown plant operations in the event critical limits are triggered. Contractors, FILTEC International, provide ongoing support to Resort operators and assist with monitoring and regular servicing of the plant to maintain optimal performance.

The Resort is confident that the new WTP will allow for consistent provision of high-quality drinking water exceeding Australian Drinking Water Guidelines. Confidence can be had in the performance of the plant and operations staff response capabilities in managing the quality and safety of drinking water treatment processes through improved training and procedure documentation.

Southern ARMB is committed to ongoing compliance with all public health and safety matters relevant to Mt Baw Baw Alpine Resort which includes ongoing development and improvements as stated in the policy (appendix 3).

Lake Mountain continues to supply regulated water only. An Integrated Water Management (IWM) plan will be developed in the near future. Support will be sought from key stakeholders to implement the recommendations of the plan in the following reporting period. Lake Mountain continues to manage risks in relation to water this is not intended for drinking for the safety of all staff and visitors.

From 1 October 2022 the SARMB will cease and all the Victorian Alpine Resorts amalgamated into a single statutory body known as Alpine Resorts Victoria (ARV). It is expected that a single Water Supply Annual Report will be produced for the 2022-23 year.



Gail Conman
CEO SARMB

INTRODUCTION

1. Legislative framework

The Southern Alpine Resort Management Board ('the Board') was established on 1 January 2017 as a result of an amendment to the *Alpine Resorts (Management) Act 1997*. It is the successor to the Lake Mountain Alpine Resort Management Board and the Mount Baw Baw Alpine Resort Management Board.

2. Board governance

The Board is established by the *Alpine Resorts (Management) Act 1997 s34 (2)*. The Board is deemed to be the committee of management of all the Crown land within the Lake Mountain Alpine Resort and Mount Baw Baw Alpine Resort that is permanently reserved under the *Crown Land Reserves Act 1978*.

3. Vision for the resorts

Recognised as providing memorable, accessible, all seasons alpine adventures.

4. Mission for management of the resorts

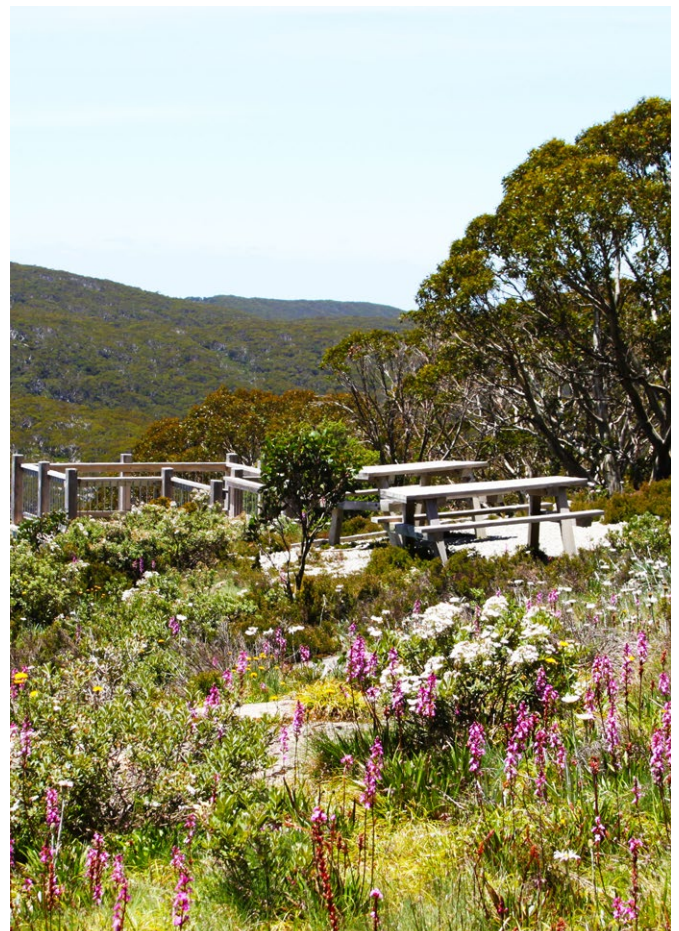
Building a dynamic, passionate, customer focused culture and pursuing relationships to adapt to climate change and deliver exciting all-seasons adventures.

5. Water supply for the resorts

The Board is committed to the delivery of quality reliable water service for its visitors and meeting all of its regularity obligations to the resorts. The aim is to provide safe and aesthetically pleasing drinking water for Mount Baw Baw Alpine Resort and provide a regulated water supply for Lake Mountain Alpine Resort that its water is not intended for drinking water and cannot be mistaken for drinking water.

6. Reporting requirements

This report has been prepared for the Secretary, to the Department of Health as outlined in Section 26 of the *Safe Water Drinking Act 2003* and Section 16 of the *Safe Drinking Water Regulations 2015*. The report is provided each year on the issues relating to the quality of drinking water and regulated water supplied by that water supplier.



SECTION A - LAKE MOUNTAIN ALPINE RESORT

1. Water supply system

This policy outlines the commitment of the Board to manage an ecologically sustainable framework and responsibility for the protection, enhancement and restoration of the natural and cultural heritage.

1.1 Overview

Lake Mountain Alpine Resort is located approximately 120km northeast of Melbourne, the closest alpine resort to Melbourne, and the premier family snow play destination in the State. Located adjacent to the Yarra Ranges National Park, the resort covers an area of 465 hectares with the summit elevation at 1,433m. The Resort comprises of toboggan slopes, cross-country ski trails, the visitor centre and administration building, all situated at an elevation of approximately 1,400m. Lake Mountain Alpine Resort is one of Victoria's premier cross-country alpine resorts, offering 37km of groomed trails providing access to over 2,400 hectares of skiable terrain in the National Park. During the green season Lake Mountain is an event venue, hosts guided walking tours, mountain biking, road cycling and provides several nature-based adventure activities.

Lake Mountain is located at the edge of the Yarra Valley, one of Victoria's key gourmet produce and wine regions. The resort is close to and has a strong relationship with the town of Marysville, 22 kilometres away. Once a prospering tourism and conference hub, with a strong day visitation market, Marysville and the surrounding region continue to rebuild the tourism offer after the devastating 'Black Saturday' bushfires of early February 2009 and have seen growing overnight stay visits.

1.2 Water supply

Lake Mountain Alpine Resort is a Regulated Water System as defined under the *Safe Drinking Water Act 2003* ('the Act'). The storage and supply of water to the Resort is untreated as declared and gazetted by the Minister for Health on the 23rd of October 2005. 'Regulated Water' is defined in Section 6 of the Act as, water that is not intended for drinking but could be reasonably mistaken as drinking water.

Lake Mountain Alpine Resort is the sole water (regulated) supplier to the following facilities:

- Day Visitor Centre which includes;
 - o Public space
 - o Public amenities
 - o Food outlet
 - o Ski patrol/ first aid
 - o Resort ticketing outlet
 - o Retail outlet
- Resort Administration Centre which includes;
 - o Snow sports centre
 - o Rental department
 - o Public space
 - o Administrative offices
- Workshop shed
- Snowy Hill amenities building
- Snow making system

As a regulated water supplier the Board must:

- Prepare a risk management plan for the regulated water.
- Ensure that the risk management plan contains the matters detailed in Regulation 6 of the *Safe Drinking Water Regulations* (except those that specifically relate to drinking water only).
- Have the Risk Management Plan audited, when required, by the Secretary to the Department of Health by an approved auditor.
- Take all reasonable steps to ensure that the intended recipients of the water are made aware of the nature of the water and of the health risks that may arise from the use of the water.
- Include a summary of their management activities for regulated water in their annual report.

Actions taken as the responsible water supplier during this reporting period are referred to in the section 4 (Risk Management).

SECTION A - LAKE MOUNTAIN ALPINE RESORT

1.3 Water source, storage, and distribution

Gerraty's

Gerraty's is the resort's village centre. Water is sourced from the Upper Taggerty River. This small stream is fed by the bog and heath catchment area of Echo Flat. This plateau is within the Yarra Ranges National Park and considered a pristine environment, the only possible human contact is from some of the cross-country ski trail network that borders the catchment area, or from people camping where there are no toilets, which is limited.

The main water supply system for Gerraty's consists of a small concrete weir directing water from the Taggerty River via a series of 50mm poly pipes, under a gravity/syphons process, to 3 enclosed concrete tanks. The combined storage capacity of these tanks is 800kl. The storage tanks supply water to resort's facilities via a 100mm ductile iron pipe.

Snowy Hill

Water is sourced from the storage and distribution system at Gerraty's. The delivery line works on gravity/syphons process via 50mm polythene line that supplies the Snowy Hill amenities.

Arnold Gap

Water is sourced from a small tributary and stored in 1000 litre polythene tanks. The supply and delivery lines for systems work on gravity/syphons process via 50mm polythene lines which in turn supplies water to the amenities building located at Arnold Gap.

Cascades

Water is sourced from a small tributary and stored in a 2270 litre polythene tank. The supply and delivery lines for systems work on gravity/syphons process via 50mm polythene lines which in turn supplies water to the amenities building located at Cascades. In addition, a water tank was installed in 2020, which is roof fed and services the staff toilet at the ticket box.



SECTION A - LAKE MOUNTAIN ALPINE RESORT

Source water, Echo Flat



Water collection point



Water storage



Day visitor centre



Resort administration centre



Workshop shed



Figure A1: Lake Mountain Alpine Resort, Gerraty's water supply, storage and reticulation system

SECTION A - LAKE MOUNTAIN ALPINE RESORT

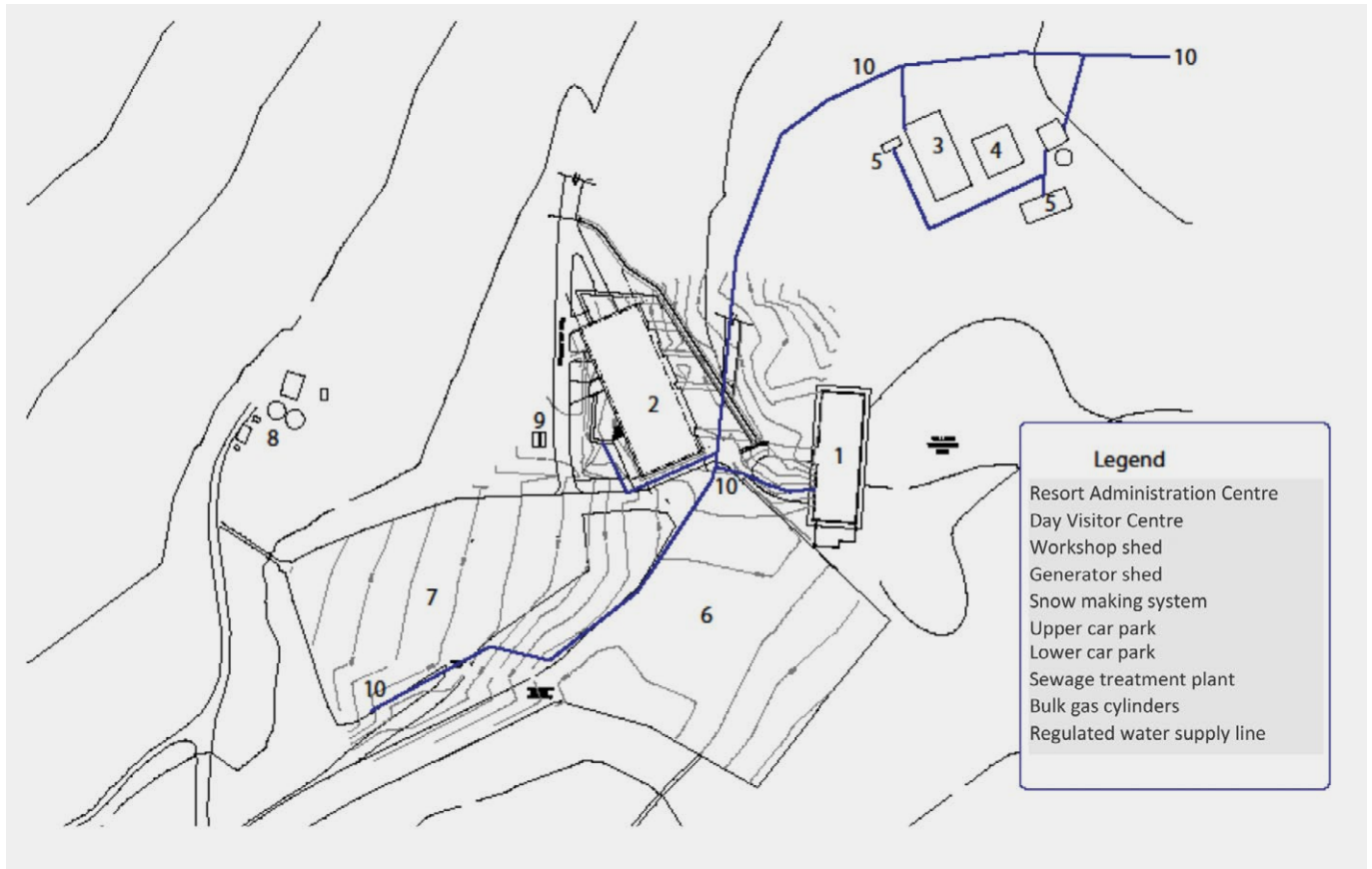


Figure A2: Lake Mountain Alpine Resort water supply schematic drawing

2. Quality Management Systems

There is no treatment applied to the water supply at Lake Mountain. Resort management is taking steps to minimise the possibility of potential health risks by raising public awareness through the placement of "Do Not Drink" signage above all resort water outlets, advising resort visitors that the water is not treated, nor is it suitable for consumption. Water that feeds into the food preparation outlets is filtered with both multiple 20-micron and 5-micron cartridge units. Testing occurs offsite by ALS Water on a fortnightly basis to analyse turbidity, E.coli, Coliforms and Plate Counts.

As part of the management of the water supply system water quality monitoring is undertaken. Catchment and associated water delivery and storage infrastructure inspections are conducted to minimise any potential for supply failure and contaminants which may affect water quality and impact the water supply system. The management of the storage and water diversion infrastructure includes the purging of the reticulation system coupled with the cleaning of the storage tanks, which is undertaken on a twice yearly basis.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

3. Regulated Water Risk Management Activities

The management activities that have been implemented in relation to regulated water supply, in particular those that pertain to Section 25 of the Safe Drinking Water Act 2003, warning to be given if regulated water supplied are described as follows:

- A blanket signage program for all water outlets on the resort has been completed and maintenance schedule that is monitored through the resort Water Supply Risk Management Plan. All water outlets have been signed warning visitors to Lake Mountain that water is untreated and of the health risks that may arise from its use.



Figure A3: Signage displayed at all water outlets

- User groups of the mountain through public forums and stakeholder meetings are advised of the issues pertaining to the non-treatment of the resorts water supply and of the health risks that may arise from its use.
- All managers and staff working within the commercial operations on the resort are briefed on issues pertaining to the non-treatment of the resorts water supply and the health risks that may arise from its use.

- As a part of the resort staff induction information sessions, the non-treatment and health risks that may arise from the use of water on the resort are covered both verbally and as inclusion in the resort employee handbook, which all employees receive prior to commencement of employment.
- To minimise risk to employees the resort management have installed water coolers and supply potable water for consumption.

4. Future of Water Supply

An Integrated Water Management Plan will be developed to guide the future of water supply management at Lake Mountain Alpine Resort. This plan will evaluate all aspects of the water cycle and enable innovative management solutions for the Resort as it develops.



SECTION B - MT BAW BAW ALPINE RESORT

1. Drinking water supply system

1.1 Overview

The Resort is located on the south-west face of the Baw Baw Plateau, two and a half hours' drive east of the Melbourne CBD. Mt Baw Baw has a summit elevation of 1,565 metres and gently sloping terrain with gradients of 15% to 25%. It consists of and is surrounded by a rich variety of diverse alpine and sub-alpine native vegetation. The resort is surrounded by Crown land with the Baw Baw National Park on the northern and eastern boundaries and Tanjil State Forest towards the western and southern sides. Whilst the resort covers 355 hectares, just 37 hectares have been developed. Developed land includes groomed ski runs, 7 ski lifts, a seasonal terrain park, toboggan runs and 10 kilometres of groomed cross-country ski trails. The village has 43 surveyed sites, 34 of which are developed, and land occupied by site holders is under leasehold or licence.

The resort at peak operation during the white season offers 7 surface lifts, with a mix of terrain of for beginners, intermediate skiers and more advanced skiing, 2 toboggan parks, 2 magic carpets, a beginners area, a small terrain park and is home to 3 alpine dingoes.

During the green season, the resort is home to mountain biking trails, offers guided walking tours, road cycling (including part of the Seven Peaks) and is an access point for hikes into the surrounding Baw Baw National Park.

Parking is available for up to 750 cars (approx. 3,500 guests) , including up to 20 buses at any time. With occupancy highest during the white season, the resort offers almost 578 accommodation beds, with a variety of styles covering most budgets.

1.2 Characterisation of the system

Mt Baw Baw Alpine Resort is classified a Drinking Water Supplier as defined under the *Safe Drinking Water Act 2003*.

As a water supplier, the Board must:

- Prepare, implement, review and revise a risk management plan in relation to its supply of drinking water and regulated water.
- Prepare a report for the Secretary, in respect of each financial year, on the issues relative to the quality of drinking water.
- Monitor drinking water supply from catchment to tap (water sampling points).
- Ensure all drinking water supplied meets water quality standards.
- Notify the Secretary if non-complying water is supplied or is likely to be supplied.

SECTION B - MT BAW BAW ALPINE RESORT

1.3 Source of water

Dam Valley Catchment

The water used throughout the Resort is supplied by the 'Dam Valley' catchment, a protected valley slightly elevated above the village. Runoff in the catchment is collected by a minor tributary of the headwaters of the Tanjil River – Eastern Branch. The runoff, a mixture of rainfall and snowmelt, flows through sphagnum moss which provides a minor form of natural filtration for suspended particulate matter. A weir constructed in the stream below Dam Valley captures and directs water to a draw off pipe supplying 2 x 200,000 litre concrete storage tanks to service the village.

The catchment is heavily vegetated by shrubs and trees, with the exclusion of a single access trail through the north-western side of the catchment, the environment is considered to be in pristine condition. There is limited recreational access to the catchment area, primarily used by cross country skiers in winter and bushwalkers and mountain bikers in summer. Clear signage is located at both ends of the trail advising users of the importance of catchment preservation, to remain on track and prevent contamination.

Raw water sampling is conducted in the catchment area monthly to monitor the raw water quality including monitoring for parameters such as turbidity and organic chemicals. The catchment is inspected monthly. Visual inspections are conducted to assess the condition of management features (e.g. signage, access track, drainage boards and the weir). Catchment condition is assessed to identify any potential contaminants, signs of pollutants and any other reportable items (e.g. significant snow cover). These assessments allow for constant understanding of catchment health and assist to identify the source of potential raw water contamination.

Raw water storage

Raw water supply is contained within two 200,000 litre concrete storage tanks at the south western end of the catchment. Water is fed by gravity from the weir and connected by a 150mm ductile iron, concrete lined (DICL) pipe to the village treatment, distribution, and reticulation network. Overflow from the supply tanks, as untreated water, is discharged back into the headwaters of the Tanjil River – Eastern Branch before any treatment occurs. This overflow runs most of the time, indicating that the flow through the weir currently exceeds the village demand.

Regular weekly monitoring of raw water in the supply tanks is undertaken to understand any potential contamination which may be hindering quality. Results obtained from raw water quality sampling are utilised to assist with identification of potential issues prior to final treatment of water and supply to the village reticulation network.

Snow making water storage (back up supply)

Raw water for snow making is contained within two 200,000 litre concrete open storage tanks and one 1ML corrugated iron open storage tank located on Big Hill. Water is pumped from the ski bowl weir and Maltese Cross weir fed by Tanjil River – Eastern Branch. Filling of the tanks is a manual process of activating pump systems and is undertaken regularly during the white season for snow making production. During the green season, this supply is kept full as back up supply to the village pre-treatment.

Water quality monitoring is undertaken in the snow making storage tanks periodically throughout the green season, to provide an understanding of quality in the event it was required for supply to the village. Monitoring includes the analysis of critical parameters that is likely to have potential effect on the quality of drinking water.

SECTION B - MT BAW BAW ALPINE RESORT

1.4 Service area

Distribution System

The service area encompasses the entirety of the Baw Baw Village which can be seen in *figure B1.4.2*. Water is treated at the WTP (*figure B1.4.1*) into clear water storage tanks and distributed throughout the village under a pressurised system. The majority of the village reticulation is made from 100mm galvanised or DICL pipework. There are 4 scour valves within the reticulation system, and these are typically run on an ad-hoc basis to clear out accumulation of sediments within the network. More or less sluicing is conducted dependent on water quality or availability.



Figure B1.4.1: Aerial plan of the Baw Baw Village catchment locality and drinking water treatment and supply network

SECTION B - MT BAW BAW ALPINE RESORT



Figure B1.4.2: Baw Baw Village drinking water reticulation network, scour valves and sample locations



SECTION B - MT BAW BAW ALPINE RESORT

2. Water Treatment and Quality Management Systems

2.1. Treatment processes

r.16(e)(i)

The Resort utilises a multibarrier approach to drinking water treatment which includes two methods of filtration, UV disinfection, hypo disinfection and pH correction, all within a containerised secure water treatment plant (WTP) installed in May 2022.

Prior to this the Resort utilised a multibarrier approach to drinking water treatment which included pre oxidation with chlorine dioxide and disinfection by UV and sodium hypochlorite.

Pre-May 2022

Chlorine Dioxide

Chlorine Dioxide (installed May 2021) is used as pre oxidising agent to enhance effectiveness of disinfection treatment systems and improve aesthetic properties. Chlorine Dioxide is generated onsite and dosed into two 23,000L holding tanks to reduce the volume of organic matter, before being treated as required via UV and Sodium Hypochlorite. As a byproduct of Chlorine Dioxide, Chlorite is monitored frequently to ensure compliance with health and aesthetic guidelines.

UV Treatment

The UV treatment plant consists of one Hanovia PMD200F Ultra Violet (UV) treatment system which acts as the resort's primary treatment barrier. The UV unit is an unvalidated system with dose calculated using flow rate, UVT (assumed static rate) and UV intensity. There are nil by-products to be monitored as a result of UV treatment.

Sodium Hypochlorite

A residual trim unit provides automated sodium hypochlorite dosing post UV treatment. Dose rates are set to a manual dose rate or flow pace dependent on current system demand. The residual trim unit acts as a secondary disinfection barrier in the resort's multiple barrier approach to water treatment. This unit provides the ability to control the level of dosing remotely and maintain a disinfection residual within the reticulation system. As a byproduct of sodium hypochlorite, trihalomethanes (THMs) are monitored frequently to ensure compliance with health and aesthetic guidelines.



SECTION B - MT BAW BAW ALPINE RESORT

Figure B1.4.2: Baw Baw Village drinking water reticulation network, scour valves and sample locations

Location	Treatment Process	Added Substances	Byproducts monitored
Drinking Water Treatment	Pre-oxidation	Chlorine Dioxide	Chlorite
	Ultra Violet (UV) Hanovia PMD200F	N/A	N/A
	Chlorination C-Tech Residual Trim Unit	Sodium Hypochlorite	THMs

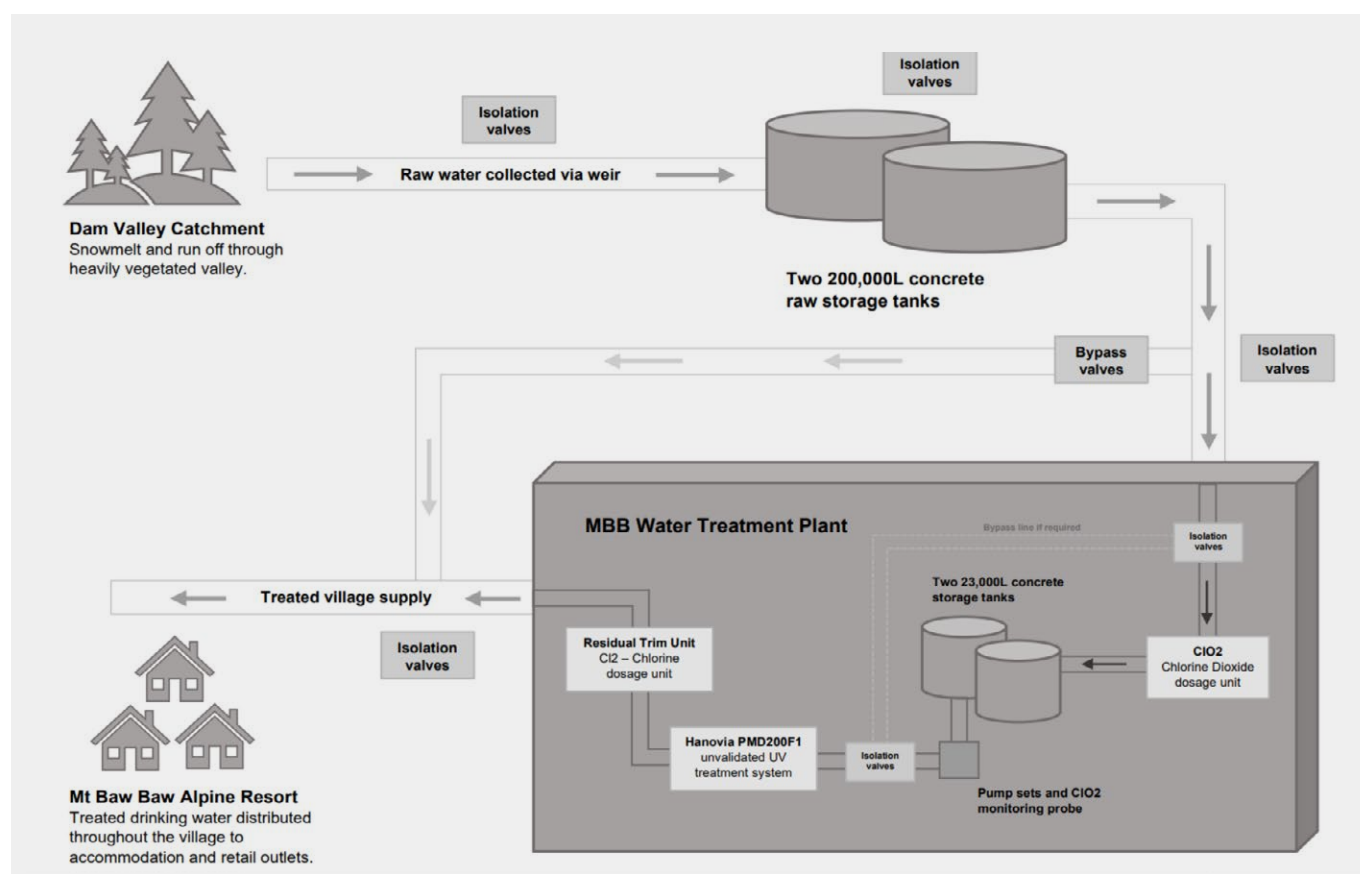


Figure B2.1.1: Mt Baw Baw schematic diagram of village treatment systems (pre May 2022).

SECTION B - MT BAW BAW ALPINE RESORT

Post May 2022

The potable water treatment plant process is as follows:

- AFM media filtration – to remove the majority of coarse solids.
- GAC filtration (lead/lag configuration) to achieve organic removal.
- UV disinfection to disinfect water and final bacteria control.
- Sodium Hypochlorite dosing to maintain level of chlorine in treated water for further bacteria control.
- Caustic (Sodium Hydroxide) to maintain level of pH in treated drinking water.
- Recirculation system allows free chlorine concentration to be topped up continuously as required.
- Distribution pump to deliver water to the site.

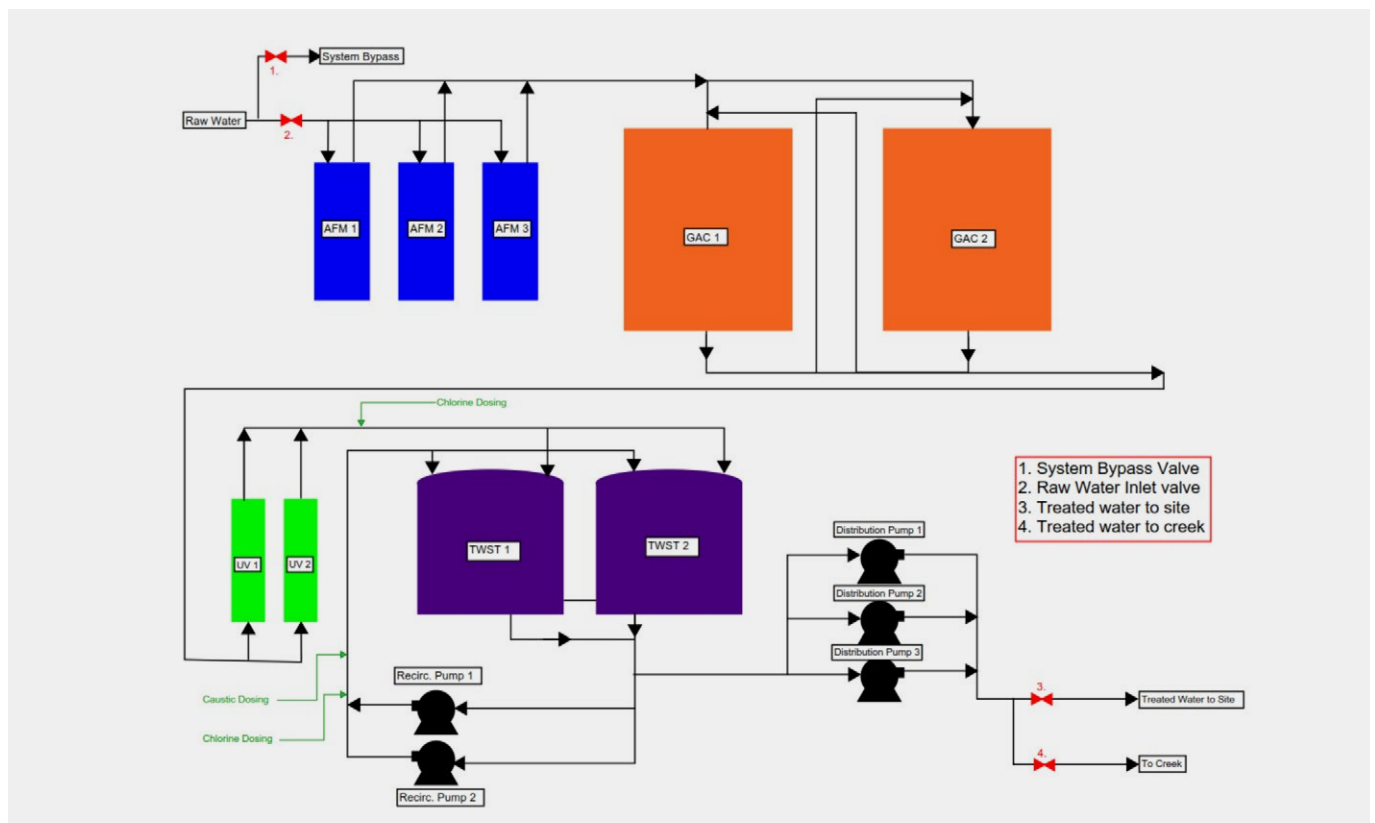


Figure B2.1.2: Mt Baw Baw water treatment plant schematic (post May 2022).

SECTION B - MT BAW BAW ALPINE RESORT

Activated Filter Material (AFM)

AFM uses amorphous alumino-silicate (glass) to remove 90% of 1-micron and larger particles and acts as a prefilter to reduce fouling and backwash frequency of the GAC filters. Three units provide for redundancy in the event of unexpected faults or planned servicing. Backwashing occurs on an automated time or differential pressure basis to reduce clogging and head loss, improving filtration performance.

Granular Activated Carbon (GAC)

GAC is used to absorb dissolved organic matter, pesticides, algal toxins and compounds which historically have resulted in taste and aesthetic problems in the village supply. GAC filtration when used prior to disinfection reduces the formation of disinfection by-products in later disinfection processes. Two GAC filtration units in a lead/lag configuration provide for redundancy in the event of unexpected faults or planned servicing (media replacement). Backwashing occurs on an automated time or differential pressure basis to reduce clogging and head loss, improving filtration performance.

Ultraviolet disinfection

Primary disinfection

The treatment plant consists of two TrojanUVMax SV50 Ultra Violet (UV) units in a duty/standby configuration. These are validated for 3.0-log *Cryptosporidium* & *Giardia* inactivation credit, based on MS2 & T1 testing as per USEPA UVDGM 2006.

Sodium Hypochlorite disinfection

Secondary disinfection

Sodium Hypochlorite (hypo) is the secondary form of disinfection within the WTP. The residual trim hypo dosing unit provides automated dosing post UV treatment to meet specified set points. Dose rates are controlled through the Human-Machine Interface (HMI) both onsite and remotely and can be adjusted as required. Two pumps are used to supply the course dose of hypo to the system pre clear water storage and a third is used to provide a top up dose on the recirculation line. Analysers provide continuous readings of the Free Available Chlorine (FAC) within clear water storage tanks to allow set points to be withheld at all times.

Caustic Soda

Caustic soda (caustic), or sodium hydroxide (NaOH) is used to increase the pH of the drinking water post hypo dosing which decreases pH levels. Acidic water has a higher likelihood of corrosion to pipework and equipment making pH adjustment an important process in water treatment.

SECTION B - MT BAW BAW ALPINE RESORT

Table B2.1.2: Drinking Water Treatment processes, added substances and byproducts monitored r.16(e)(ii)

Location	Treatment Process	Added Substances	Byproducts monitored
Potable Water Treatment Plant	AFM Media Filtration	N/A	N/A
	GAC Filtration	N/A	N/A
	UV Disinfection	N/A	N/A
	Disinfection	Sodium Hypochlorite	THMs
	pH Correction	Caustic Soda	N/A

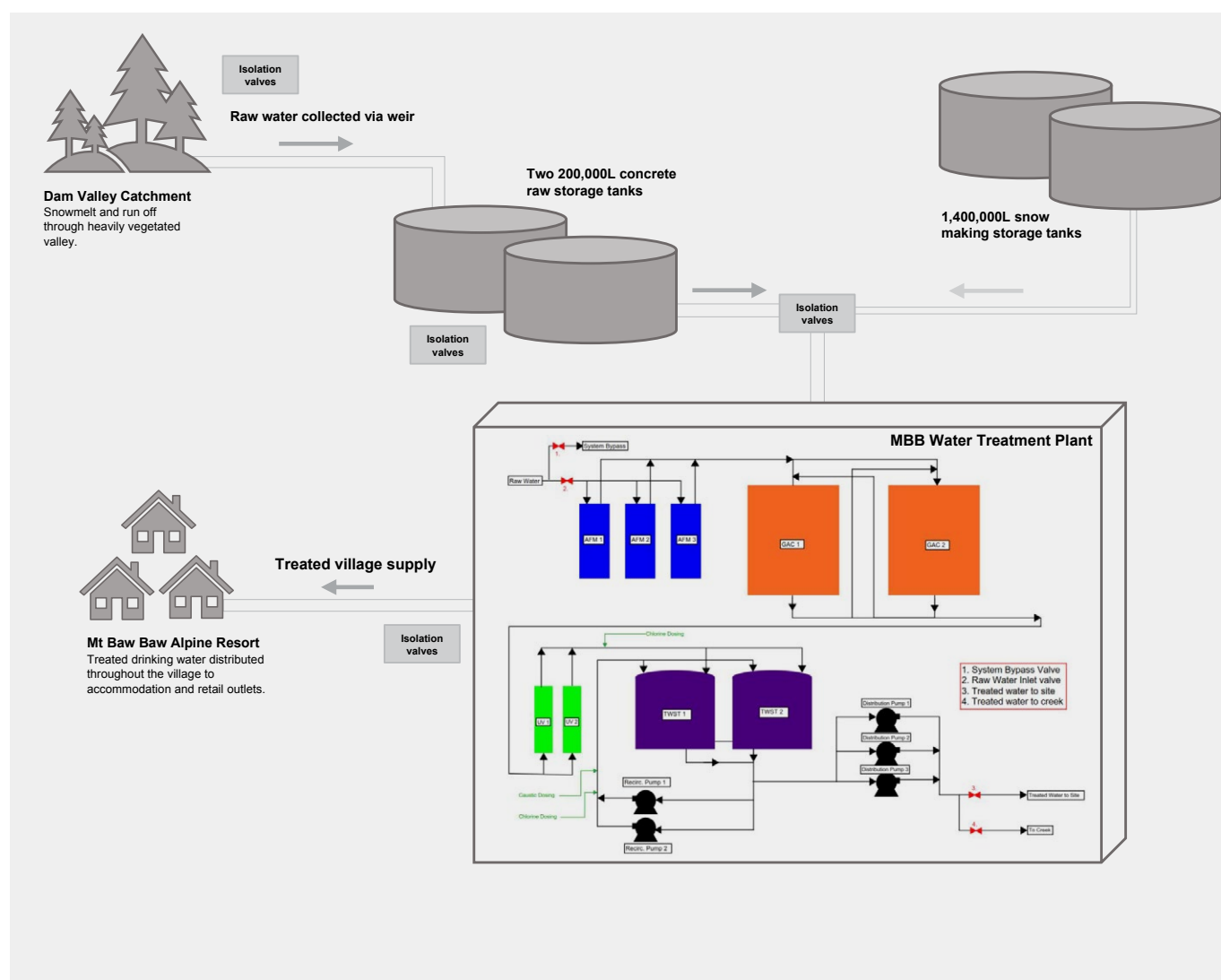


Figure B2.1.3: Mt Baw Baw schematic diagram of village treatment systems (post May 2022).

SECTION B - MT BAW BAW ALPINE RESORT

3. Drinking Water Quality Standards

r.16(f)
r.16(g)
r.16(h)

3.1 Performance monitoring

During the 2021-22 reporting period, the resort conducted microbiological and chemical performance monitoring in accordance with the SDWR.

To ensure the resort supplies safe, high quality drinking water to consumers, weekly treated water samples are collected from dedicated sampling points within consumer facilities (*figure B1.4.2*). All samples are collected following standard procedures by staff who have undergone competency training and transported to a NATA accredited laboratory for testing. As required under regulation 8 of the SDWR, samples are taken from rotating sample locations to ensure no two consecutive samples are taken from the same locality.

3.2 Compliance performance summary

During the 2021-22 reporting period, the resort reported nil events of known or suspected contamination to drinking water, where water quality standards have not been met.

3.3 Schedule 2 Drinking water quality standards

r.16(f)
r.16(g)

Escherichia coli (E.coli)

Table B3.3.1 Summary of E.coli results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of samples containing E.coli	No. of investigations conducted (s.22)	No. of investigations where standard not met
21-22	Weekly +	75	0	0	0
20-21	Weekly	51	1	1	1
19-20	Weekly	52	0	0	0

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015: All samples of drinking water collected are found to contain no Escherichia coli per 100 millilitres of drinking water, with the exception of any false positive sample. Samples to be taken weekly.

All drinking water samples have demonstrated compliance with the SDWR criteria. During the 2021-22 reporting period, MBB expanded the sampling schedule to twice weekly for a period of time to verify performance of changing treatment systems and confirm compliance of drinking water quality. This can be seen across a number of parameters within section 3.0 Drinking Water Quality Standards.

SECTION B - MT BAW BAW ALPINE RESORT

Total Trihalomethanes

Table B3.3.2 Summary of Trihalomethanes results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples	Max (mg/L)	Average (mg/L)	No. of Non-Complying Samples
21-22	Monthly	12	0.24	0.07	0
20-21	Monthly	12	0.1	0.05	0
19-20	Monthly	12	0.083	0.026	0

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015: less than or equal to 0.25 milligrams per litre of drinking water. One sample to be taken per month.

All drinking water samples have demonstrated compliance with the SDWR criteria.

Increase in trends across previous reporting periods were seen with regard to the average recorded value. This trend is representative of increased dosing volumes in the 2021-22 reporting period, all values remain below SDWR limits. During the transition to new treatment systems, chlorine set points were increased to achieve required residuals within the reticulation network, increased THMs were anticipated at this time with the absence of filtration.

Turbidity

Table B3.3.3 Summary of Turbidity results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	Maximum NTU	95th percentile
21-22	Weekly	73	3.4	0.78
20-21	Weekly	51	0.5	0.4
19-20	Weekly	53	0.8	0.7

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015: The 95th percentile of results for samples in any 12-month period must be less than or equal to 5.0 Nephelometric Turbidity Units. One sample to be taken per week

All drinking water samples have demonstrated compliance with the SDWR. Two outliers were recorded during the 2021-22 reporting period, with one in early January (3.4NTU) and the second in late January (1.5NTU). There was no explanation or likely event relating to this unusually high reading, following samples from the site and surrounding sample points recorded averages of <0.4NTU. The 95th percentile of results during the latest reporting period still remained less than 0.8NTU, with the average excluding two mentioned outliers being 0.28NTU.

SECTION B - MT BAW BAW ALPINE RESORT

3.4 Other Water Quality Standards

As previously discussed in section B2, MBB utilises a multi-barrier approach to mitigate microbial risks in the drinking water supply. Water testing is conducted on a regular basis for the presence and levels of chlorine disinfection by-products, chloroacetic acid, dichloroacetic acid and trichloroacetic acid. Chlorite, as the by-product of chlorine dioxide (used up until mid-May 2022) has been incorporated in this Annual Report.

Chloroacetic Acid

Chloroacetic acid sampled post treatment within the reticulation network at the points shown in figure B1.4.2 to determine levels of chlorine treatment by-products.

Table B3.4.1 Summary of Chloroacetic Acid results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples	Max (mg/L)	Average (mg/L)	No. of Non-Complying Samples
21-22	Monthly	12	0.24	0.07	0
20-21	Monthly	12	0.1	0.05	0
19-20	Monthly	12	0.083	0.026	0

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015: less than or equal to 0.25 milligrams per litre of drinking water. One sample to be taken per month.

All drinking water samples have demonstrated compliance with the SDWR criteria.

Increase in trends across previous reporting periods were seen with regard to the average recorded value. This trend is representative of increased dosing volumes in the 2021-22 reporting period, all values remain below SDWR limits. During the transition to new treatment systems, chlorine set points were increased to achieve required residuals within the reticulation network, increased THMs were anticipated at this time with the absence of filtration.

Dichloroacetic Acid

Dichloroacetic acid sampled post treatment within the reticulation network at the points shown in figure B1.4.2 to determine levels of chlorine treatment by-products.

Table B3.4.2 Summary of Dichloroacetic Acid results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of Non-Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
21-22	Monthly	12	0	0.079	0.028	0
20-21	Monthly	12	0	0.043	0.016	0
19-20	Monthly	12	0	0.019	0.007	0

ADWG: concentrations of dichloroacetic acid in drinking water should not exceed 0.10 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria.

An increase in maximum and average Dichloroacetic Acid readings have been recorded as a result of increased hypo usage in the 2021-22 reporting period. Refer to section 3.3 Total Trihalomethanes.

SECTION B - MT BAW BAW ALPINE RESORT

Trichloroacetic Acid

Trichloroacetic acid sampled post treatment within the reticulation network at points shown in *figure B1.4.2* to determine levels of chlorine treatment by-products.

Table B3.4.3 Summary of Trichloroacetic Acid results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of Non-Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
21-22	Monthly	12	0	0.012	0.029	0
20-21	Monthly	12	0	0.044	0.015	0
19-20	Monthly	12	0	0.054	0.012	0

ADWG: concentrations of trichloroacetic acid in drinking water should not exceed 0.10 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria.

An increase in maximum and average Trihaloroacetic Acid readings have been recorded as a result of increased hypo usage in the 2021-22 reporting period. Refer to section 3.3 Total Trihalomethanes.

Chlorite

Chlorite sampled post treatment within the reticulation network at points shown in *figure B1.4.2* to determine levels of chlorine treatment by-products.

Table B3.4.3 Summary of Chlorite results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of Non-Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
21-22	Weekly	52	0	0.52	0.07	0

ADWG: concentrations of Chlorite in drinking water should not exceed 0.80 mg/L. Action to reduce chlorite is encouraged, but must not compromise disinfection, as non-disinfected water poses significantly greater risk than chlorite.

All drinking water samples have demonstrated compliance with the ADWG criteria. Chlorite was included in sampling from mid-June 2021 to mid-March 2022, during the period that Chlorine Dioxide was used for drinking water treatment. During the introduction of this chemical, by-products were monitored closely from four sites per week, across two weekly sampling events. Sampling frequency was then reduced as results were consistently <0.05mg/L. Chlorite was removed from the sampling regime in late March 2022, once dosing was discontinued and the risk of by-products eliminated.

SECTION B - MT BAW BAW ALPINE RESORT

Alpha Radiation

Alpha Radiation has been tested using raw water samples sourced from Dam Valley catchment (*figure B1.4.1*) to determine screening levels.

Table B3.4.4 Summary of Alpha Radiation results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples	No. of Non – Complying samples	Max Bq/L	No. of Non-Complying Samples
21-22	Annually	1	0	<0.05	0
20-21	Annually	1	0	<0.05	0
19-20	Annually	1	0	<0.05	0

ADWG: recommended screening levels for alpha radiation are 0.5 Bq/L

All drinking water samples have demonstrated compliance with the ADWG criteria. No significant trends from the previous two reporting periods are evident.

Beta Radiation

Beta Radiation has been tested using raw water samples sourced from Dam Valley catchment (*figure B1.4.1*) to determine screening levels.

Table 3.4.5 Summary of Beta Radiation results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples	No. of Non – Complying samples	Max Bq/L	No. of Non-Complying Samples
21-22	Annually	1	0	<0.1	0
20-21	Annually	1	0	<0.1	0
19-29	Annually	1	0	0.23	0

ADWG: recommended screening levels for beta radiation are 0.5 Bq/L

All drinking water samples have demonstrated compliance with the ADWG criteria. No significant trends from the previous two reporting periods are evident.

Copper

Copper tests were sampled from raw water supply tank samples (*figure B1.4.1*).

Table 3.4.6 Summary of Copper results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of Non – Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
20-22	Monthly	12	0	0.003	0.001	0
20-21	Monthly	12	0	<0.001	<0.001	0
19-20	Monthly	12	0	0.001	0.001	0

ADWG: for health considerations, concentrations of copper should not exceed the guideline value of 2 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria. No significant trends from the previous two reporting periods are evident.

SECTION B - MT BAW BAW ALPINE RESORT

Manganese

Manganese tests were sampled from raw water supply tank samples (*figure B1.4.1*).

Table 3.4.7 Summary of Manganese results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of Non - Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
21-22	Monthly	12	0	0.004	0.001	0
20-21	Monthly	12	0	0.008	0.002	0
19-20	Monthly	12	0	0.002	0.001	0

ADWG: manganese may cause health considerations if exceeding 0.5 mg/L however, for aesthetic considerations drinking water should not exceed 0.1 mg/L at point of consumption.

All drinking water samples have demonstrated compliance with the ADWG criteria. No significant trends from the previous two reporting periods are evident.

3.5 Aesthetic Water Quality

pH

pH tests were assessed within the reticulation network at 5 points shown in *figure B1.4.2*.

Table 3.5.1 Summary of pH results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples	Minimum pH	Maximum pH	Mean pH
21-22	Weekly	52	4.5	9.4	6.3
20-21	Weekly	51	5.8	10.1	6.9
19-20	Weekly	52	5.6	9.8	6.7

ADWG: with respect to aesthetic considerations and to reduce corrosion of pipes and fittings, drinking water pH levels should be between 6.5 and 8.5. There are no health-based guideline values for pH.

Average pH from drinking water samples have demonstrated compliance with the ADWG criteria. During the reporting period, minimum and maximum values exceeded the desired range, with fluctuation across sample sites. An overall decrease in pH can be seen as a whole from previous reporting periods. pH correction is now in place (post May 2022) however fluctuation across sample sites is anticipated as a result of building specific pipework.

SECTION B - MT BAW BAW ALPINE RESORT

True Colour

True colour tests were assessed using samples taken within the reticulation network at the points shown in *figure B1.4.2*.

Table 3.5.2 Summary of True Colour results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	Minimum - HU	Maximum - HU	Mean - HU
21-22	Monthly	12	0	0.004	0.001
20-21	Monthly	12	0	0.008	0.002
19-20	Monthly	12	0	0.002	0.001

ADWG: with respect to aesthetic considerations, true colour for drinking water should not exceed 15HU. There are no health-based guideline values for true colour.

With the introduction of dioxide (pre may 2022) and filtration (post may 2022) a reduction in the minimum, maximum and mean true colour can be seen across the latest reporting period. Historically, the Resort has recorded high colour HU due to the volume of organic matter in the raw water. Though it is understood the Resorts catchment is of high quality, a significant volume of organic particulate contributes to aesthetic quality issues the Resort faces.

Chlorine dioxide was introduced as an interim solution to reducing organic load which had potential to reduce effectiveness of UV disinfection, and effectiveness of residual disinfection in the network. Significant improvement of aesthetic properties was seen within the reticulation network, and the reduction of monthly mean true colour readings. Further improvements were made once filtration was introduced in May 2022. Correlating with the reduction in true colour readings, a reduction in organic matter entering the reticulation network has had a positive effect on maintaining chlorine residuals for network disinfection. Chlorine residual increases trends became more consistent pre may 2022 with the reduce organic load present to consume residual chlorine. Upon installation of the new WTP post may 2022 these have improved further, to hold a minimum of 0.2mg/L across the Resort network. Both the interim solution and now permanent new WTP has been a positive step forward in provision of safe drinking water, maintaining consistent chlorine residuals.

SECTION C – EMERGENCY AND INCIDENT MANAGEMENT

1. Risk Management Plan

In accordance with the Act, the Board as the responsible water supplier has:

- Prepared a risk management plan for the regulated water.
- That the risk management plan contains the matters detailed in Regulation 6 of the *Safe Drinking Water Regulations* (except those that specifically relate to drinking water only).
- Undertaken a risk management plan audit as required, by the Secretary to the Department of Health by an approved auditor.

1.1 Review of the Risk Management Plan

The risk management plan has been divided into an individual plan for each of the Resort. The division ensures both Resorts have a comprehensive risk management plan that details the system specifics and remains operationally accessible. Both Resorts operate independently, though governed by the one Board, risk management practices and its implementation are required to be site specific to ensure all aspects of the plan can remain under consistent review.

During the reporting period, significant development of new procedures and systems to guide response to water quality concerns, exceedances and communications occurred. Minor updates to the risk matrix in addition to new operations procedures and interim monitoring schedules were implemented while the Resort operated off the interim treatment plant (chlorine dioxide). Following the install and commissioning of the new WTP at MBB, the risk management plan has been updated in full to reflect system upgrades and changes to risk management from catchment to tap. The MBB RMP is to be reviewed by consultants in late 2022, ahead of being thoroughly reviewed by an accredited auditor during the 2023 audit.

1.2 Findings of the most recent risk management plan audit

r.16(d)

Risk management plans are required to be audited by independent auditors at periods declared by the Department of Health. A summary of the audit findings and any issues raised by the auditor are required to be provided in this Report. SARMB was found to be compliant in June 2020 with section 7(1) of the *Safe Drinking Water Act 2003*.

The opportunities for improvement raised by the auditor support the ongoing implementation of good risk management and have been prioritised to reinforce a culture of effective risk management in the organisation's responsibilities for the Victorian water industry.

The findings and recommendations of the previous audits that occurred in June/July 2020 has been summarised in appendix 1 and 2 below. A copy of the audit certificate can be seen in appendix 2. Opportunities for improvement from audit undertaken on 9 April 2018 were marked as finalised in the 2020-21 Annual Report and thus removed from the 2021-22 Report. The next RMP audit will be undertaken between 1 January 2023 to 30 April 2023 for the period of 1 January 2021 to 31 December 2022.

SECTION C – EMERGENCY AND INCIDENT MANAGEMENT

2. Customer feedback

Complaints

Southern Alpine Resort Management Board received one alleged complaint regarding non-complying drinking water at Mt Baw Baw Alpine Resort detailed below. There were no other water related complaints or issues during this reporting period at Mount Baw Baw Alpine Resort or Lake Mountain Alpine Resort.

Mt Baw Baw Alpine Resort – Alleged supply of non-complying water March 2022.

MBB was notified by the Department of Health on Tuesday March 8, regarding an alleged illness complaint related to drinking water from the Mt Baw Baw Supply provided to the EPA on Tuesday March 1.

Upon investigation of system performance, water quality results and network inspection the Resort concluded that the drinking water supply is adequately treated and there are no ongoing issues with the treatment. The Resort also confirmed there have been no recorded complains in the Resorts register.

3. Known or suspected contamination

r.16(a)(i)
r.16(a)(ii)
r.16(b)

3.1 Section 18 incident summary

Table 3.1.1 Summary table of section 18 incidents.

Date of incident	Location of incident	Nature of incident	Actions taken in response to incident
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Nil.

3.2 Section 22 incident summary

Table 3.2.1 Summary table of section 22 incidents.

Date of incident	Location of incident	Nature of incident	Actions taken in response to incident
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Nil.

3.3 Other incidents/events

Nil.



APPENDIX 1 - RISK MANAGEMENT PLAN AUDIT OUTCOME — 27 JUNE 2020

Auditor's opportunity for improvement	Alpine Resort	Findings and recommendations to be undertaken as per the report dated 27 June 2020	Management response		
			Priority rating	By who	Expected completion date
Follow up on previous opportunities for improvements for Mt Baw Baw					
1.	Mount Baw Baw	Suggest continuing to develop Standard Operating Procedures (SOP) for example: a) Promote the option of flushing drinking water taps in ski lodges before use or if taken offline. Maintenance and servicing of backflow prevention valves could also be considered as a support service. b) If there is a higher pH in the reticulating system, to consider a small bleed during very low use periods, when water permits.	High	Environmental Officer	Procedures reviewed and developed. Completed March 2021.
2.		Suggest further developing chlorine dosing and training with CTech to optimise chlorine dosing, for example, during the summer when water use is minimal. Possibly also consider a post chlorination tank.	High	Environmental Officer	Water Industry Operator Training underway, expected completion early 2023. Consideration of post treatment tank has been incorporated in capital investments and installed in 2021.
3.		Suggest as a high priority a UPS or back up power supply systems for your chlorine dosing system.	Medium	Environmental Officer/IT	No action as village back-up generators have been updated to eliminate the need for a UPS.
4.		Consider extending UV training and review upgrades, for example, further developing alarms, and matching UV to system turbidity.	High	Environmental Officer	Water Industry Operator Training underway, expected completion early 2023.

APPENDIX 1 - RISK MANAGEMENT PLAN AUDIT OUTCOME — 27 JUNE 2020

Auditor's opportunity for improvement	Alpine Resort	Findings and recommendations to be undertaken as per the report dated 27 June 2020	Priority rating	Management response	
				By who	Expected completion date
Follow up on previous opportunities for improvements for Mt Baw Baw					
5.	Mount Baw Baw	Suggest continuing to review plans for a further catchment, possibly a borehole as an option. The water flow may be low during the summer periods.	Low	Environmental Officer	No action required. Current storage does not require additional volume, water storage is meeting the Resorts current needs with the inclusion of back up from the Resorts snow making supply as required. Nil formal analysis has been undertaken, however water usage and storage volumes year-round are monitored.
6.		We note that a drone has been considered and is not seen as practical at this stage given the smaller size of the catchments.	Low	No action required	No action required
Follow up on previous opportunities for improvements for Lake Mountain					
1.	Lake Mountain	Of very high priority is the training program, as part of the merger between Mt Baw Baw and Lake Mountain, especially if Lake Mountain is to be upgraded to be also of a potable water supply.	Medium	Environment and Safety Officer	September 2022
2.		While increasing the range of water chemistry and microbiology tests is still under review, this could be part of the plan and research into any future plant upgrades.	Medium	Environment and safety Officer/ Operations Manager	September 2022
3.		While an increase to security cameras and signage is still under review, suggest this is considered a higher priority.	Medium	Operations Manager	September 2022

APPENDIX 1 - RISK MANAGEMENT PLAN AUDIT OUTCOME — 27 JUNE 2020

Auditor's opportunity for improvement	Alpine Resort	Findings and recommendations to be undertaken as per the report dated 27 June 2020	Management response		
			Priority rating	By who	Expected completion date
Opportunities for improvements for both sites					
1.	Mount Baw Baw	While installing a new SCADA system for both sites is still under review, suggest this considered as a high priority.	Medium	Environmental Officer	Complete. Implementation of a SCADA system has been incorporated in capital investments.
	Lake Mountain		Low	Operations Manager	December 2022
2.	Mount Baw Baw	It is also very encouraging to note that upgrading the Lake Mountain supply to also be of a potable water supply is under review. Suggest considering the consultant who assisted with your previous Risk Management Plan also to assist.	N/A	No action required	No action required
	Lake Mountain		Low	Operations Manager	December 2022

Reference: Page 17, 2020 Drinking Water Quality Risk Management Plan Regulatory Audit, RMP Systems Pty Ltd, 27 June 2020

APPENDIX 2 - COPY OF THE RISK MANAGEMENT PLAN AUDIT CERTIFICATE



Regulation 10

Schedule 1 - Risk Management Plan Audit Certificate

Safe Drinking Water Regulations 2015

Certificate Number: 175

Audit Period: 10th April 2018 to 18th March 2020

To: Gail Conman
CEO
Southern Alpine Resort Management Board
PO Box 117
Alpine Resort
Rawson 117, VIC 3825

Australian Business Number (ABN): 80 841 224 798

I, Thomas Teunissen, after conducting a risk management plan audit of the water supplied by Southern Alpine Resort Management Board, am of the opinion that:

Southern Alpine Resort Management Board has complied with the obligations imposed by Section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

Date: 27th June 2020

Signature of approved auditor:

Thomas Teunissen

APPENDIX 3 — MT BAW BAW ALPINE RESORT — DRINKING WATER POLICY

The Resort's *Drinking water policy*:

Mt Baw Baw Alpine Resort (the Resort) has a responsibility for providing drinking water to visitors, residents, and employees in Baw Baw Village.

The Resort is committed, as a drinking water supplier under the Safe Drinking Water Act (SDWA) 2003, to delivering safe, high quality drinking water that consistently meets the Australian Drinking Water Guidelines (ADWG), consumer and other regulatory requirements to all stakeholders.

To achieve this, the Resort will:

- Manage water quality at all points along the system from source to consumer;
- Ensure systems are in place to identify, assess and manage risks associated with the supply;
- Comply with relevant legislation, regulations, and expectations of our stakeholders;
- Regularly monitor and report on water quality, to ensure compliance exceeds the requirements of the ADWG;
- Ensure all potential threats to water quality are identified and responded to quickly, and are effectively managed and communicated to customers and regulators;
- Keep all stakeholders informed of the quality of their water supply and provide relevant and timely information promoting confidence in the water supply and its management.
- Adopt a continual improvement strategy for the Resorts water supply infrastructure and operations including training and development.

All managers, employees and contractors involved in the supply of drinking water to Baw Baw Village are responsible for understanding, implementing, maintaining and continuously improving the drinking water quality management system.

Andrew Tingate

General Manager, Mount Baw Baw Alpine Resort

January 2022



