

WATER SUPPLY ANNUAL REPORT 2019-20



Southern Alpine Resort Management Board

Water supply
2019-20 Annual Report

For year ending 30 June 2020

Lake Mountain Alpine Resort and Mount Baw Baw Alpine Resort

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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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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 and Human Services 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. The location and scope of activities

Lake Mountain Alpine Resort is located approximately 120km northeast of Melbourne, is the closest alpine resort to Melbourne and the premier family snow play destination in the State. Lake Mountain's summit elevation is 1,433m. Located adjacent to the Yarra Ranges National Park and with 37km of groomed trails, and access to over 2,400 hectares of skiable terrain in the National Park, the resort is also one of Victoria's premier cross-country alpine resorts. The resort covers an area of 465 hectares. The resort comprises of toboggan slopes, cross-country trails, the visitor centre and administration building which are all situated at an elevation of approximately 1,400m.

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 within the resort.

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.

2. Water supply system

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

The Act defines 2 types of water – 'drinking water' and 'regulated water'.

Declaration concerning regulated water:

- The Minister may, by notice publish in the Government Gazette, declare any water that is not drinking water to be regulated water for the purposes of this Act.
- The Minister may only make a declaration in relation to particular water if the Minister is satisfied that the water may be supplied to the public in circumstances in which it may be mistaken as being drinking water.
- In making a declaration, the Minister may identify the water that is the subject to the declaration by reference to its source, its method of supply, its composition or in any other way the Minister considers to be appropriate.

'Regulated Water' is defined in section 6 of the Act as, water that is not intended as drinking water, but which may be supplied to the public in circumstances in which it may be mistaken as drinking water. Where water supplier supplies water that is not intended for drinking, but which may be supplied to the public in circumstances such that it may be mistaken as drinking water, the Minister for Health may declare such water as regulated water.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

The water supplier is responsible, under the Act to:

- 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 and Human Services 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 for Risk Management.

Source Water, Gerratys

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 which is limited.

Storage and distribution

The main water supply system for Gerratys, the resort's village centre, consists of a small concrete weir directing water, via a series of 50mm poly pipes under a gravity/syphons process from the Taggerty River 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.

2.1 Snowy Hill

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

2.2 Arnold Gap

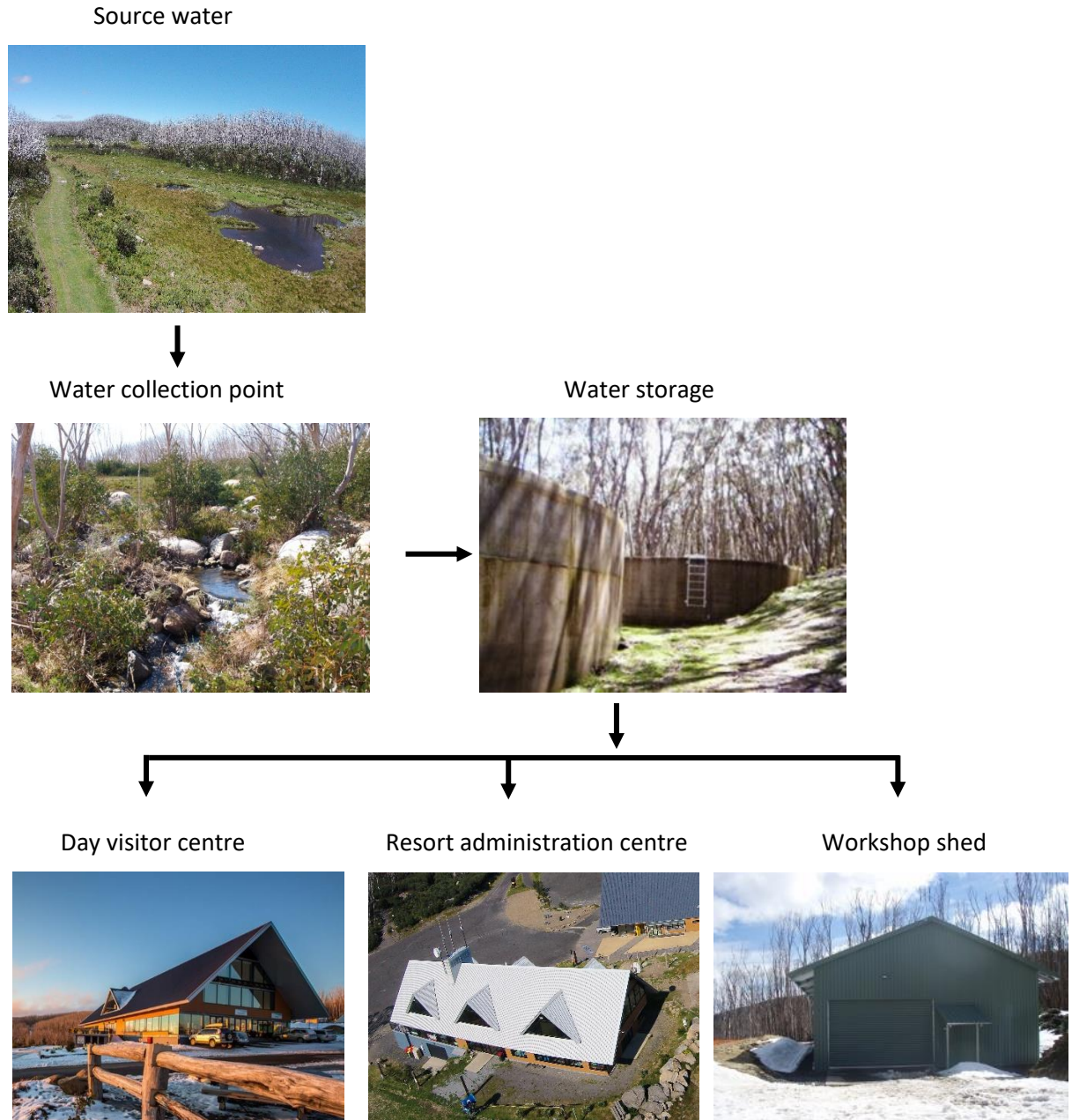
Water is sourced from a small tributary and stored in 1000 litre polythene tanks. The supply and delivery lines for systems work on gravity/syphons process via 50mm polythene lines which in turn supplies water to the amenities building located at Arnold Gap.

2.3 Cascades

Water is sourced from a small tributary and stored in 500 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 Cascades.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

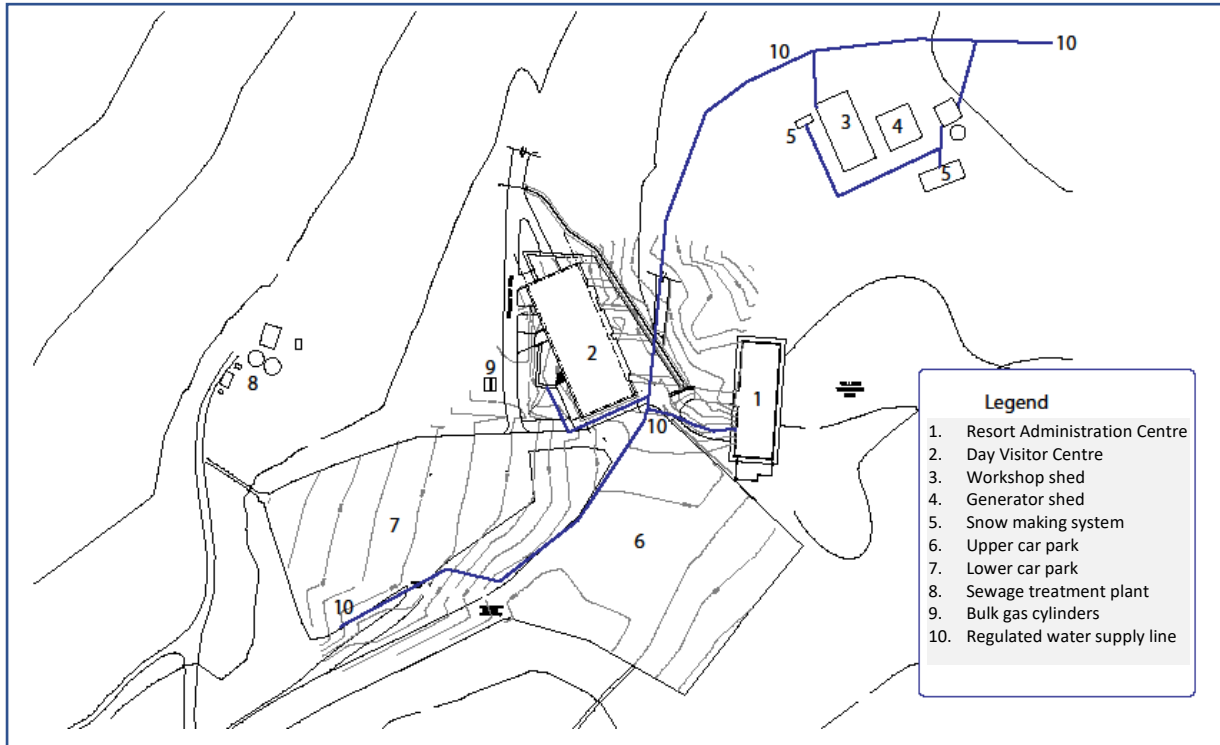
Resort Water Supply, Storage and Reticulation System, Gerratys



SECTION A - LAKE MOUNTAIN ALPINE RESORT

3. Schematic Drawing

Water Supply Lake Mountain Alpine Resort



4. Water (Regulated) Supply

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

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

SECTION A - LAKE MOUNTAIN ALPINE RESORT

5. Quality Management Systems

There is no treatment applied to the water supply at Lake Mountain. With this in mind, resort management is taking steps to minimize the possibility of potential health risks by raising public awareness through the signing of all the 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 a 20-micron and 5-micron cartridge unit. Testing occurs on a fortnightly basis.

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 minimize 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 quarterly basis.

6. 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.



- 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.

SECTION B - MOUNT BAW BAW ALPINE RESORT

1. The Location and Activities

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 2 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 700 cars (approx. 2,600 guests) and at least 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.

1.1 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 for the Secretary to DHHS an Annual Report on drinking water quality.
- 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.

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.

SECTION B - MOUNT BAW BAW ALPINE RESORT

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. Catchment trail usage is primarily 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.

Distribution System – Tanks

Raw water supply is contained within 2 x 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 (DACL) pipe to the village treatment, distribution, and reticulation network. Overflow from the supply tanks 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 quality in the supply tanks is undertaken to ensure that pathogens and organic chemicals within raw water storages are within the regulated guidelines. 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.

Distribution System - Pipelines

A pressurised main pipeline carries raw water from the 2 x storage tanks to a Hanovia PMD200F UV treatment plant and further chlorine dosing plant. Treated drinking water is then distributed throughout the village under gravity pressure, with head supplied by the natural height of the catchment and storage tanks in comparison to the village.

There are 4 scour valves within the reticulation system, and these are typically run at monthly intervals to ensure that there is no accumulation of sediments within the network. More or less sluicing is conducted dependent on water quality or availability. As the reticulation system is of a ring main configuration creating minimal dead ends, there is minimal stagnation in the lines (see figure 1 & 2).

SECTION B - MOUNT BAW BAW ALPINE RESORT



Figure 1: Aerial plan of the Baw Baw Village catchment locality and drinking water treatment and supply network

SECTION B - MOUNT BAW BAW ALPINE RESORT

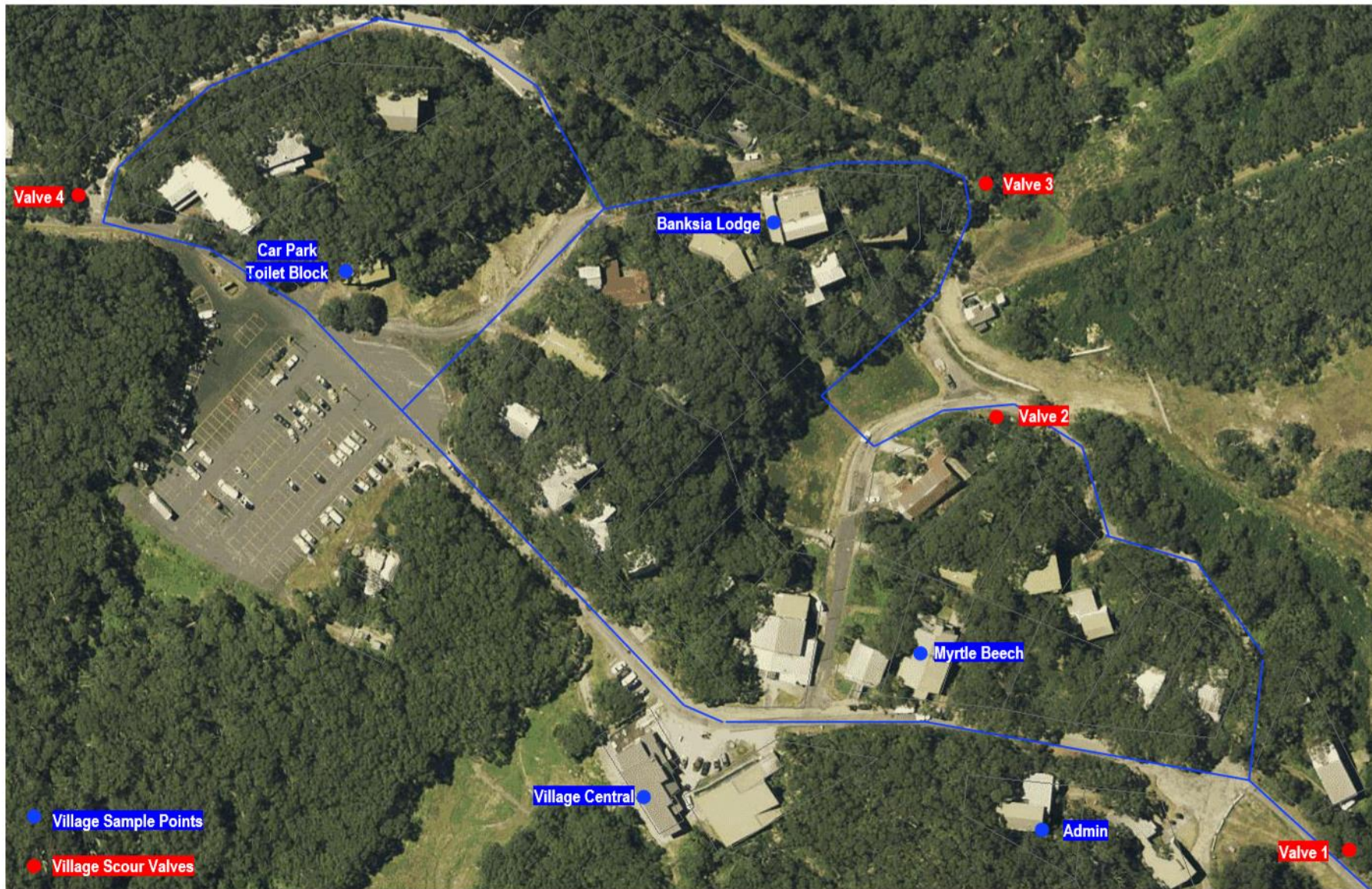


Figure 2: Baw Baw Village drinking water reticulation network, scour valves and sample locations

SECTION B - MOUNT BAW BAW ALPINE RESORT

2. Water Treatment and Quality Management Systems

2.1. Water Treatment

The Resort utilises a Hanovia PMD200F Ultra Violet (UV) Treatment Plant to sterilise water to a consumable quality. A sketch image and photograph of the UV treatment plant is shown below.

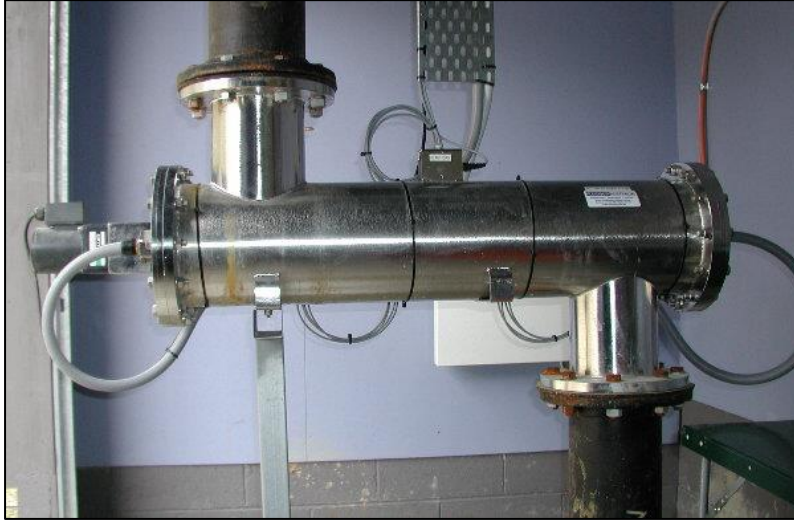


Figure 3: Hanovia PMD200F UV Treatment System in place

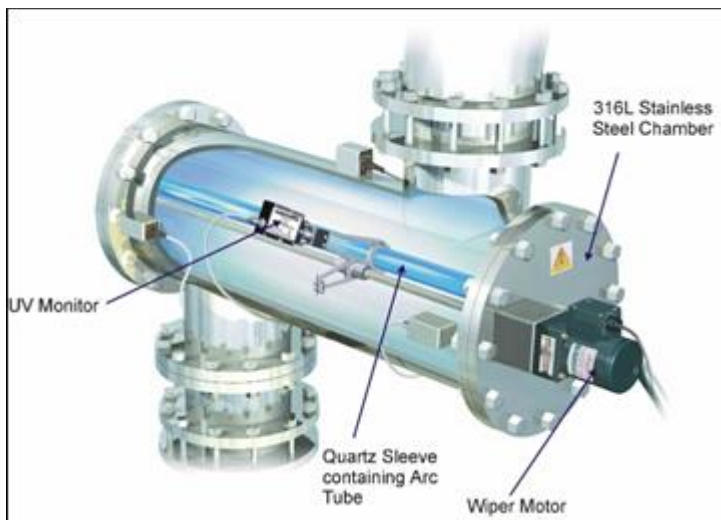


Figure 4: Hanovia PMD200F UV treatment unit

In addition to the abovementioned UV Treatment Plant (see figures 3 and 4), a residual trim unit provides automated chlorine dosing dependant on flow rates, post UV treatment. 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.

An uninterrupted power supply (UPS) is installed and connected to both the UV treatment plant and residual trim unit. The installation of this backup power supply has alleviated issues related to the potential supply of untreated water in the event of an interruption to mains power.

SECTION B - MOUNT BAW BAW ALPINE RESORT

Prior to installation of the chlorine residual trim unit, the resort conducted a manual chlorination program. This was implemented as a secondary barrier to mitigate potential microbial risk during the warmer months and through periods of low flow. Manual chlorine dosing consisted of simple pool floats with calcium hypochlorite tablets placed inside the raw water supply tanks. Through capacity assessments and a system review by the resort’s water engineering consultants, it was determined that calcium hypochlorite tablet dosing in the tanks could be eliminated and utilised only as an emergency back-up treatment in times of high demand. It was noted that UV destroys around 30% of chlorine. Further concern around ceasing manual treatment was the potential that algae and biofilm growth within the tanks may occur, however, there is no sun light for algae growth nor is there mixing within the tanks to distribute the chlorine for biofilm reduction. The manual dosing process had been consistent since March 2017 but since recent assessments, has now been discontinued.

Regular sluicing is undertaken at 4 scour valves within the reticulation system (figures 1 and 2). Catchment inspections are also a scheduled maintenance task under the RMP undertaken monthly to ensure that the catchment is clear of dead animals, faeces, and any other foreign matter, which may compromise or contaminate village water quality. Additional catchment inspections are also undertaken in the event of reported irregularities (i.e. dead animal smells, etc.).

Table 2.1.1: Drinking Water Treatment

Location	Treatment Process	Added Substances
Drinking Water Treatment Units (figure 1)	Ultra Violet (UV) Hanovia PMD200F	N/A
	Chlorination C-Tech Residual Trim Unit	Sodium Hypochlorite

2.2. Dam Valley Catchment Inspections

Table 2.2.1: Treatment and Management Processes – Inspections, Sluicing and Systems Management

Period	Location	Treatment/Inspection Process	Condition
July 2019	Dam Valley catchment	Inspected catchment for possible contaminants on 16/07/2019	All clear
August 2019	Dam Valley catchment	Inspected catchment for possible contaminants on 19/08/2019	All clear
September 2019	Dam Valley catchment	Inspected catchment for possible contaminants on 24/09/2019	All clear
September 2019	Scour valves 3 & 4	Major flush conducted at 2 scour points 12/09/2019	All clear
October 2019	Dam Valley catchment	Inspected catchment for possible contaminants on 15/10/2019	All clear
November 2019	Dam Valley catchment	Inspected catchment for possible contaminants on 3/11/2019	All clear

SECTION B - MOUNT BAW BAW ALPINE RESORT

Period	Location	Treatment/Inspection Process	Condition
November 2019	Scour valves 2, 3 & 4	Minor flush conducted at 3 scour points 6/11/2019	All clear
December 2019	Dam Valley catchment	Inspected catchment for possible contaminants on 16/12/2019	All clear
January 2020	Dam Valley catchment	Inspected catchment for possible contaminants on 7/01/2020	All clear
January 2020	All scour valves	Minor flush conducted at all scour points 15/01/2020	All clear
February 2020	Dam Valley catchment	Inspected catchment for possible contaminants on 4/02/2020	All clear
February 2020	Scour valve 3	Major flush conducted at one scour point 5/02/2020	All clear
March 2020	Dam Valley catchment	Inspected catchment for possible contaminants on 14/03/2020	All clear
April 2020	Dam Valley catchment	Inspected catchment for possible contaminants on 7/04/2020	All clear
April 2020	Scour valve 3	Major flush conducted at one scour point and 2 hydrants on 15/04/2020	All clear
May 2020	Dam Valley catchment	Inspected catchment for possible contaminants on 5/05/2020	All clear
May 2020	Scour valve 2 & 3	Major flush conducted at 2 scour points on 29/05/2020	All clear
June 2020	Dam Valley catchment	Inspected catchment for possible contaminants on 9/06/2020	Heavy snow cover, unable to identify any contamination.
June 2020	Scour valves 3 & 4	Minor flush conducted at 2 scour points on 1/06/2020	All clear

SECTION B - MOUNT BAW BAW ALPINE RESORT

3. Drinking Water Quality Standards

Drinking water quality is monitored to ensure it meets the regulatory standards under the Act).

To ensure we are supplying safe, high quality drinking water to consumers, weekly drinking water samples are collected and transported to a NATA accredited laboratory. Samples are taken at 5 points; post treatment at designated taps throughout the resort.

The following drinking water quality samples were taken from the village reticulation points shown in figure 2.

During the 2019-20 reporting period there were no breaches of section 22 of the Act.

3.1 Escherichia coli (E.coli)

Table 3.1 Summary of E.coli results

Locality	Frequency of sampling	No. of samples collected	No. of samples containing <i>E.coli</i>	No. of investigations conducted	No. of confirmed false positives	No. of investigations where standard not met
MBBAR	Weekly	52	0	0	N/A	N/A

ADWG: Based on health considerations, Escherichia coli should not be detected in any 100mL sample of drinking water.

All samples of drinking water collected were found to contain no Escherichia coli per 100 millilitres of drinking water.

3.2 Trihalomethanes

Table 3.2 Summary of Trihalomethanes results

Locality	Frequency of sampling	No of samples	Max (mg/L)	Average (mg/L)	No. of Non-Complying Samples
MBBAR	Monthly	12	0.083	0.026	0

ADWG: Based on health considerations, the concentration of trihalomethanes in drinking water should not exceed 0.25 mg/L.

MBBAR complied with the trihalomethane drinking water quality standards for the duration of the reporting period.

3.3 Turbidity

Table 3.3 Summary of Turbidity results

Locality	Frequency of sampling	No of samples	Maximum NTU	95 th percentile
MBBAR	Weekly	53	0.8	0.7

SECTION B - MOUNT BAW BAW ALPINE RESORT

ADWG: for aesthetic consideration, the 95th percentile of results for samples in a 12-month period must be ≤ 5.0 Nephelometric Turbidity Units (NTU).

MBBAR complied with the turbidity drinking water quality standards for the duration of the reporting period.

SECTION B - MOUNT BAW BAW ALPINE RESORT

4. Other Water Quality Standards

As previously discussed in section 2.1, MBBAR utilised 2 forms of disinfection, UV and chlorine, 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.

4.1 Chloroacetic Acid

Chloroacetic acid sampled post treatment within the reticulation network at the points shown in figure 2 to determine levels of chlorine treatment by-products.

Table 4.1 Summary of Chloroacetic Acid results

Locality	Frequency of sampling	No of samples	No of Non - Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
MBBAR	Monthly	12	0	<0.005	<0.005	0

ADWG: concentrations of chloroacetic acid in drinking water should not exceed 0.15 mg/L.

MBBAR complied with chloroacetic acid drinking water standards for the duration of the reporting period.

4.2 Dichloroacetic Acid

Dichloroacetic acid sampled post treatment within the reticulation network at the points shown in figure 2 to determine levels of chlorine treatment by-products.

Table 4.2 Summary of Dichloroacetic Acid results

Locality	Frequency of sampling	No of samples	No of Non - Complying samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
MBBAR	Monthly	12	0	0.019	0.007	0

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

MBBAR complied with dichloroacetic acid drinking water standards for the duration of the reporting period.

4.3 Trichloroacetic Acid

Trichloroacetic acid sampled post treatment within the reticulation network at points shown in figure 2 to determine levels of chlorine treatment by-products.

Table 4.3 Summary of Trichloroacetic Acid results

Locality	Frequency of sampling	No of samples	No of Non - Complying samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
MBABR	Monthly	12	0	0.054	0.012	0

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

SECTION B - MOUNT BAW BAW ALPINE RESORT

MBBAR complied with trichloroacetic acid drinking water standards for the duration of the reporting period.

4.4 Alpha Radiation

Alpha Radiation has been tested using raw water samples sourced from Dam Valley catchment (figure 1) to determine screening levels.

Table 4.4 Summary of Alpha Radiation results

Locality	Frequency of sampling	No of samples	No of Non – Complying samples	Max Bq/L	No. of Non-Complying Samples
MBABR	Annually	1	0	<0.05	0

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

Radiological quality of the MBBAR raw water supply was below recommended screening levels for alpha radiation so no further investigation was required.

4.5 Beta Radiation

Beta Radiation has been tested using water samples sourced from Dam Valley catchment (figure 1) to determine screening levels.

Table 4.5 Summary of Beta Radiation results

Locality	Frequency of sampling	No of samples	No of Non - Complying samples	Max Bq/L	No. of Non-Complying Samples
MBABR	Annually	1	0	0.23	0

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

Radiological quality of the MBBAR raw water supply was below recommended screening levels for beta radiation so no further investigation was required.

4.6 Copper

Copper tests were sampled from raw water supply tank samples (figure 1).

Table 4.6 Summary of Copper results

Locality	Frequency of sampling	No of samples	No. of non-complying samples	Maximum mg/L	Average mg/L	No. of Non-Complying Samples
MBBAR	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.

MBBAR complied with copper drinking water guidelines for the duration of the reporting period.

SECTION B - MOUNT BAW BAW ALPINE RESORT

4.7 Manganese

Manganese tests were sampled from raw water supply tank samples (*figure 1*).

Table 4.7 Summary of Manganese results

Locality	Frequency of sampling	No of samples	No. of non-complying samples	Maximum mg/L	Average mg/L	No. of Non-Complying Samples
MBBAR	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.

MBBAR complied with manganese drinking water standards and aesthetic recommendations for the duration of the reporting period.

SECTION B - MOUNT BAW BAW ALPINE RESORT

5. Aesthetic Water Quality

5.1 pH

pH tests were assessed within the reticulation network at 5 points shown in figure 2.

Table 5.1 Summary of pH results

Locality	Frequency of sampling	No of samples	Minimum pH	Maximum pH	Mean pH
MBBAR	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.

During the reporting period, the MBBAR drinking water supply pH levels recorded a mean reading within the guideline values.

Where values exceeded the ADWG, village sluicing was undertaken to flush reticulation lines. Future plans for additional treatment and reticulation network pipeline replacement are expected to reduce the variance in pH.

5.2 True Colour

True colour tests were assessed using samples taken within the reticulation network at the points shown in figure 2.

Table 5.2 Summary of True Colour results

Locality	Frequency of sampling	No. of samples	Minimum - HU	Maximum - HU	Mean - HU
MBBAR	Weekly	52	10	40	27.5

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.

The mean true colour readings for the reporting period were above the ADWG aesthetic guideline value of 15 Hazen Units (HU) (table 5.2.1). High colour HU and organic matter has the potential to reduce effectiveness of UV disinfection so secondary treatment using chlorine is vital. Due to the nature of the catchment and large amount of vegetation the water passes through, it is understood Dam Valley catchment contains a high volume of organic matter contributing to these high colour results. MBBAR has implemented mitigation measures to reduce the volumes of organic matter in the treatment and reticulation network by closing the supply tank inlet valve prior to major rain events, in addition to regular sluicing. Organic matter was also identified by the Resorts water engineer consultants as contributing to the low chlorine residual levels through the reticulation network and degradation of certain pipes. Mitigation measures by the Resort relies heavily on constant monitoring of water quality and manual operations, however efforts are limited by other factors such as catchment flow and system loading which are out of our control.

5.3 Iron

Iron tests were assessed using samples taken within the reticulation network at the 5 points shown in figure 2.

SECTION B - MOUNT BAW BAW ALPINE RESORT

Table 5.3 Summary of Iron results

Locality	Frequency of sampling	No. of samples	No. of non-complying samples	Maximum mg/L	Average mg/L	Complying (Yes/No)
MBBAR	Monthly	12	0	0.07	0.03	Yes

ADWG: with respect to aesthetic considerations, the concentration of iron in drinking water should not exceed 0.3 mg/L. There are no health-based guideline values for iron.

Levels of iron in the reticulation system have the potential to discolour water. Across the reporting period, MBBAR met the average guidelines for iron in regard to aesthetic considerations.

SECTION C – RISK MANAGEMENT PLAN

1. Review of the 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 and Human Services by an approved auditor.

The Risk Management plan is reviewed on an annual basis by responsible officer and Resort General Manager at the resorts. This review is coupled with a scheduled half yearly risk workshop that assists in assessing and minimising risk to visitors to the resort. The scheduled risk workshops incorporate the monitoring of water quality results, signage of water outlets within the resort, equipment inspection and maintenance schedules.

2. Findings of the most recent risk management plan audit

DHHS required the Board to undertake an audit of the safe drinking water risk management plan (which encompasses both Lake Mountain Alpine Resort and Mount Baw Baw Alpine Resort) and were found to be complaint with section 7(1) of the *Safe Drinking Water Act 2003*.

The opportunities for improvement 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 on 9 April 2018 and 27 June 2020 are summarised in Table 6.1 and 6.2 below. A copy of the audit certificate can be seen in Figure 5 below.

3. Complaints or issues

Southern Alpine Resort Management Board did not receive any water related complaints or issues during this reporting period at Mount Baw Baw Alpine Resort or Lake Mountain Alpine Resort.

4. Emergency / Incident Management

There were no incidents of known or suspected contamination reportable under section 22 of the *Safe Drinking Water Act 2003* during the reporting period. Further to this, there were no situations or events that occurred during the reporting period that were reportable under section 22 of the Act which impacted or had the potential to impact the water quality of the drinking water being supplied.

SECTION C – RISK MANAGEMENT PLAN

Table 6.1: 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	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 when course available (COVID 19 delay)
3.		Suggest as a high priority a UPS or back up power supply systems for your chlorine dosing system.	Medium	Environmental Officer/IT	January 2021
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 when course available (COVID 19 delay)
5.		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	July 2021
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

SECTION C – RISK MANAGEMENT PLAN

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 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.	High	Environment and Safety Officer	July 2021
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	July 2021
3.		While an increase to security cameras and signage is still under review, suggest this is considered a higher priority.	Medium	Operations Manager	July 2021
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	March 2021
	Lake Mountain		Low	Operations Manager	July 2021
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	July 2021

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

SECTION C – RISK MANAGEMENT PLAN

Table 6.2: Risk Management Plan Audit Outcome – 9 April 2018

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
1. We suggest an increased emphasis on training, especially as there have been staff changes. Possibly also consider using the consultant who assisted with your Safe Drinking Water Risk Management Plan assisting with this; including further standardising and developing site documentation. We suggest this, though we note that there is a training program upgrade as part of the merger integration of Baw Baw and Lake Mountain.	Mount Baw Baw	a) Key water operations staff to be identified. b) Staff training matrix to be completed by all key water operations staff to identify shortfalls in knowledge of potable water operations processes and procedures. c) Existing Standard Operating Procedures relating to potable water to be reviewed and updated as required.	High	Completed June 2018. Completed June 2018. Expected completion March 2021.
	Lake Mountain	d) Staff training to be offered as per point b) and c) above.		December 2019 (new environment and safety officer in place to drive review)
2. For your sampling taps, suggest considering a yearly audit, and replacement where required.	Mount Baw Baw	e) Existing operating procedures are currently in place as part of weekly potable water testing program. f) Standard Operating Procedure to be reviewed as per point c) above.	High	Relevant procedures are currently in place. Expected completion March 2021.
	Lake Mountain	g) As per point f) above.		December 2019 (new environment and safety officer in place to drive review)
3. Suggest considering further developing Standard Operating Procedure (SOP) for flushing of pipework systems. If there is a higher pH in the reticulating system, during very low use periods, to consider, for	Mount Baw Baw	h) Existing operating procedures are currently in place as part of fortnightly potable water operations program should catchment inflows permit. i) Standard operating procedure to be developed to cover sluicing of village supply main.	High	Ongoing. Expected completion March 2021.

SECTION C – RISK MANAGEMENT PLAN

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
example, a small bleed, when water permits.	Lake Mountain	j) Review Standard Operating Procedure.	High	December 2019 (new environment and safety officer in place to drive review)
4. Suggest further upgraded security measures near water systems. Possibly, also standardising between your 2 sites.	Mount Baw Baw	k) Village Supply Catchment is an open catchment with little ability to close due to operational constraints relating to trail usage. Monthly catchment inspections are in place to minimise the potential impact on potable water supply due to contamination. l) All hatches, doors and entrances at Village Supply Tanks, Ultra Violet Treatment Plant and Chlorine Dosing Plant are kept secured (locked) at all times when unattended.	Medium	Ongoing. Ongoing.
	Lake Mountain	m) Further review of signage and fencing to improve security will be undertaken and installed where identified.	High	Ongoing.

SECTION C – RISK MANAGEMENT PLAN

Auditor’s opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
<p>5. It was encouraging to note C-Tech are managing your chlorine dosing system. Suggest C-Tech graph both pH and free active chlorine residual. Other parameters could also be considered to optimize water chemistry. Suggest, a yearly chemistry performance review with suggestions for upgrades and tightening Key Performance Indicators.</p> <ul style="list-style-type: none"> • Suggest C-Tech also provide a training course during the yearly overhaul of your chlorine dosing system. • Suggest also considering a yearly chemical alarm test. 	Mount Baw Baw	<p>n) Key Consult C-Tech Technicians to ascertain potential for provision of required data on an annualised basis. Suggest this data is provided to coincide with annual reporting period.</p> <p>o) Consult C-Tech Technicians to ascertain potential for regular training to be conducted for key water operations staff related to operation and maintenance of the chlorine dosing plant.</p> <p>p) Alarm tests conducted as part of regular servicing by C-Tech technicians.</p>	Medium	<p>Consult with C-Tech and water consultants underway for new data dashboard.</p> <p>Ongoing</p> <p>Already implemented.</p>
<p>6. Suggest considering a UPS or back up power system dedicated just to your chlorine dosing system.</p>	Mount Baw Baw	<p>q) UPS is currently linked to Ultra Violet Treatment Plant and Chlorine Dosing Plant and has covered all power outages experienced to date. Investigate potential for requirement of larger UPS across next reporting period.</p>	Medium	<p>Expected completion March 2021.</p>
<p>7. Suggest considering your UV over hauler also giving a yearly training course. During this time contingency procedures could also be further discussed and developed.</p>	Mount Baw Baw	<p>r) Consult Hanovia Technicians to ascertain potential for regular training to be conducted for key water operations staff related to operation and maintenance of the Ultra Violet Treatment Plant.</p>	High	<p>Water Industry Operator Training expected to be completed when course available (COVID 19 delay).</p>

SECTION C – RISK MANAGEMENT PLAN

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
8. We note that you are considering long-term plans to include an additional catchment to increase water resources. Suggest considering sampling from this catchment as well. Currently, utilised for snowmaking.	Mount Baw Baw	<p>s) Consult ALS Laboratory Traralgon to perform additional testing at Snowmaking Supply Tanks on a quarterly basis commencing 1st January 2019.</p> <p>t) Investigate capital expenditure required and ability to install a new pipeline, pre- treatment from the existing 1.8 Megalitre Snowmaking Storage Supply Tanks into the Village Supply Main</p>	Medium	<p>Expected implementation of pre summer testing October 2020</p> <p>1 Investigation of current pipeline expected 2021</p>
9. Suggest considering using your current drone to assist with catchment inspections.	Lake Mountain	u) Undertake a trial using existing drone to identify if it can offer benefit to inspections.	Low	December 2019 (new environment and safety officer in place to drive review)

Reference: Page 15, 2020 Drinking Water Quality Risk Management Plan Regulatory Audit, RMP Systems Pty Ltd, 9 April 2018

SECTION C – RISK MANAGEMENT PLAN

Figure 5: 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

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SOUTHERN ALPINE
Resort Management Board