ALLIANCE

FARMERS' PRODUCE

SINCE 1948

ALLIANCE GROUP LIMITED

MATAURA PROCESSING PLANT

Resource Consent Applications and
Assessment of Environmental Effects

31 May 2019

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

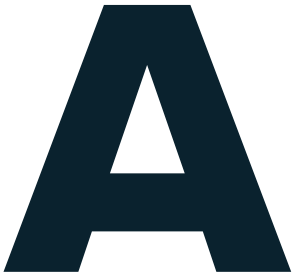
LIST OF APPENDICES

LIST OF ACRONYMS / GLOSSARY OF TERMS

AEE	Assessment of Environmental Effects
AES	Aquatic Environmental Sciences Ltd
Alliance	Alliance Group Ltd
Amm-N	ammoniacal nitrogen
ANZECC	Australian and New Zealand Environment and Conservation Council
BOD	biological oxygen demand
BPO	best practicable option
CAPEX	capital expenditure
CFU	colony-forming unit
COD	chemical oxygen demand
DAF	dissolved air floatation
DIN	dissolved inorganic nitrogen
DO	dissolved oxygen
DoC	Department of Conservation
DRP	dissolved reactive phosphorus
EMP	Environmental Monitoring Plan
EPT	Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly)
ES	Environment Southland
FIB	faecal indicator bacteria
FMU	freshwater management unit
Freshwater NPS	National Policy Statement for Freshwater Management 2014
FRE3 flows	the average annual frequency at which flows exceed three times the median
FTEs	full time equivalent staff

FWS	Freshwater Solutions Ltd
GDC	Gore District Council
kW	kilowatt
MALF	Mean annual low flow
MCI	Macroinvertebrate Community Index
MfE	Ministry for the Environment
MIE	Mataura Industrial Estate
MoU	Memorandum of Understanding
NPS	National Policy Statement
Operative Plan	Operative Regional Water Plan
OPEX	operating expense
PDP	Pattle Delamore Partners
Proposed Plan	Proposed Southland Water and Land Plan
QMCI	Quantitative Macroinvertebrate Community Index
QMRA	Quantitative Microbial Risk Assessment
RMA	Resource Management Act 1991
RPS	Southland Regional Policy Statement
TAMI	Te Ao Marama Inc
Te Tangi a Tauira	Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008: *Te Tangi a Tauira - The Cry of The People*
the Act	Resource Management Act 1991
the Plant	Alliance Mataura Plant
TKN	Total Kjeldahl nitrogen
TN	total nitrogen
TP	total phosphorus
TSS	total suspended solids
TWCG	Tangata Whenua Consultation Group

UV	ultra violet
WCO	Water Conservation (Mataura River) Order 1997



PART A

Resource Consent Applications

FORM 9

APPLICATION FOR RESOURCE CONSENT OR FAST-TRACK RESOURCE CONSENT

Sections 87AAC, 88, and 145, Resource Management Act 1991

To Environment Southland

1. Alliance Group Limited (Alliance) apply for the following resource consents:

Water Permit - To take water from the hydro race which is fed by the Mataura River for cooling water purposes.

Water Permit - To take water from the hydro race which is fed by the Mataura River for meat processing and truck wash activities.

Discharge Permit - To discharge condenser cooling water from the meat works to the Mataura River.

Discharge Permit - To discharge treated meat works wastewater to the Mataura River

2. The activity to which the application relates (the proposed activity) is as follows:

Alliance owns and operates the Mataura Meat Processing Plant (the Plant) on the true right bank of the Mataura River in the Mataura township.

The Plant currently operates under 10 resource consents issued by Southland Regional Council (Environment Southland). Three of these consents expire on 6 December 2019. They authorise:

1. *The take and use of water for cooling and processing purposes;*
2. *The discharge of cooling water; and*
3. *The discharge of wastewater.*

This Assessment of Environmental Effects is in support of applications to 're-consent' these activities such that the Plant can continue to operate and contribute in a major way to the social and economic wellbeing of the surrounding community. Of note, the proposed conditions require a substantial staged upgrade of the Plant's wastewater treatment plant to improve the quality of the Plant's discharge to the Mataura River, and a reduction in water use. These will be significant capital investments and will add significant annual costs to the wastewater plant's operation.

A 35 year term is sought for all resource consents.

3. The site at which the proposed activity is to occur is as follows:

The Mataura Plant and infrastructure are located on the true right bank of the Mataura River, within the Mataura township.

Map reference: *NZMS 260 F46: 911 384*

Legal description: *Lots 1-2 DP12431 Lot 1 DP 12500 Blk XIII Mataura TN*

4. The full name and address of each owner or occupier (other than the applicant) of the site to which the application relates are as follows:

The Alliance Group Limited is the owner and occupier of the land associated with the Mataura Plant.

The bed of the Mataura River is Crown Land.

5. The value of the investment of the existing consent holder is considerable. The latest estimate (December 2018) for the Mataura plant's insured value is $225 million and much of this value is sunk – i.e. it could not be recovered if the plant was forced to downsize, close or be relocated.

6. There are no other activities that are part of the proposal to which this application relates.

7. No additional resource consents are needed for the proposal to which this application relates.

8. I attach an assessment of the proposed activity's effect on the environment that—

(a) includes the information required by clause 6 of Schedule 4 of the Resource Management Act 1991; and

(b) addresses the matters specified in clause 7 of Schedule 4 of the Resource Management Act 1991; and

(c) includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

9. I attach an assessment of the proposed activity against the matters set out in Part 2 of the Resource Management Act 1991.

10. **I attach an assessment of the proposed activity against any relevant provisions of a document referred to in section 104(1)(b) of the Resource Management Act 1991, including the information required by clause 2(2) of Schedule 4 of that Act.**

Signature:

Doyle Richardson

Group Environmental Manager

Date: 31 May 2019

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Contact person: Doyle Richardson

B

PART B

Assessment of Environmental Effects

1. INTRODUCTION

1.1 OVERVIEW OF THE ACTIVITY

Alliance Group Limited (Alliance) owns and operates the Mataura Meat Processing Plant (the Plant) on the true right bank of the Mataura River in the Mataura township.

Alliance is a farmer owned cooperative and the Plant is a vital component of Southland's agricultural sector – processing stock from the region. It is also a vital component of the local and regional economy, employing approximately 500 people in the peak of the season and contributing approximately $160 million per year to the economy (mostly in livestock payments) and approximately $22 million per year for wages and salaries for the 2017/2018 season.

Figure 1: The Alliance Mataura Plant (foreground).

The Plant currently operates under 10 resource consents issued by Southland Regional Council (Environment Southland). Three of these consents expire on 6 December 2019. They authorise:

- The take and use of water for cooling and processing purposes;
- The discharge of cooling water; and
- The discharge of wastewater.

This Assessment of Environmental Effects (AEE) is in support of applications to 're-consent' these activities such that the Plant can continue to operate and contribute in a major way to the social and economic wellbeing of the surrounding community. Of note, the

proposed conditions require a substantial staged upgrade of the Plant's wastewater treatment plant to improve the quality of the Plant's discharge to the Mataura River, and a reduction in water use. These will be significant capital investments and will add significant annual costs to the wastewater plant's operation.

Alliance is seeking a 35-year consent term for all replacement consents being sought. Suitably recognising the value of Alliance's significant existing investment in the Plant, and the future investment which it has committed to via the proposed wastewater treatment plant upgrade, is vital in this context. And it is important to acknowledge that the additional capital investment involved in the wastewater treatment plant upgrades is contingent on securing a long consent term in order to enable those upgrades to be progressively implemented and the financial investment to be justified and secured over an appropriate timeframe. A long consent term also suitably reflects the significant social and economic benefits this Plant provides in the local area and gives greater certainty those benefits will endure.

The discharge to air permit for the site also expires shortly - in December 2020. Applications to replace that resource consent will be made separately, probably in the first half of 2020.

The Plant is specifically provided for in the Gore District Plan and industrial activities are permitted on the site. No consents are needed or being sought from the District Council.

1.2 REPORT STRUCTURE

This AEE addresses all of the matters Alliance is required to address in these consent applications by Schedule 4 of the Resource Management Act (RMA or the Act). It is set out in 14 sections as follows:

Section 1 Is this introduction.

Section 2 Provides background information on Alliance and its environmental management systems.

Section 3 Describes the existing environment for the proposed activities

Section 4 Provides a description of the activities for which consent is sought.

Section 5 Sets out the activity status of the resource consents sought and the scope of the relevant matters when considering the applications.

Section 6 Assesses the social and economic effects of granting the consents sought and enabling the Plant to continue to operate.

Section 7 Assesses the actual and potential effects of the abstraction of water on the environment.

Section 8 Assesses the actual and potential effects of the discharge of wastewater and cooling water on the environment.

Section 9 Provides a summary of the measures proposed by Alliance to avoid, remedy or mitigate any actual or potential effects on the environment, and proposed monitoring.

Section 10 Provides an overview of how alternative means of undertaking the proposed discharge activities have been considered and why the proposed discharge activities are considered to be the best practicable option.

Section 11 Describes the consultation undertaken in respect of these resource consent applications.

Section 12 Is an assessment of the key directives in the relevant planning documents, and how the proposed activities sit in relation to them.

Section 13 Sets out the RMA statutory framework which applies to resource consent applications and assesses the proposal against those provisions.

Section 14 Is a concluding comment.

Various technical assessments have been commissioned by Alliance to support this AEE. They are appended to this AEE and are referenced throughout this document as necessary.

2. ALLIANCE GROUP LIMITED

2.1 OVERVIEW

Alliance is a large meat processing and exporting company operating five meat processing and export plants throughout the South Island and two plants in the North Island. These plants are located at:

- Stoke, Nelson
- Smithfield, Timaru
- Pukeuri, North Otago
- Mataura, Southland
- Lorneville, Southland
- Levin, Horowhenua
- Dannevirke, Hawkes Bay

The company was established in 1948 and is now a wholly farmer-owned cooperative company. On an annual basis, Alliance processes approximately 6 million lambs, 1 million sheep, over 200,000 cattle, 115,000 deer and 270,000 calves.

This equates to approximately 30% of New Zealand's sheep meat production, 10% of beef and 30% of venison.

The company exports products to over 65 different countries. Approximately 80% of its activities are related to sheep and lamb processing, the remainder being beef, and deer processing. Processing is vertically integrated with about 80% of the meat production being further processed by boning, cutting and consumer packaging. A proportion of the production is exported in a chilled state to Europe and North America. Co-products such as wool, skins and other carcass material are also processed for export by the company, usually at the same location as the meat processing facility.

As a wholly farmer-owned co-operative company, all profits are returned to the company's farmer shareholders with a portion retained for growth. The company employs approximately 4,650 people (permanent and seasonal staff) and services about 4,340 farmer shareholders who supply livestock, with 36% of these based in Southland.

Alliance's annual turnover for the 2017/2018 season was $1.8 billion and operating profit was $8 million.

2.2 ALLIANCE'S ENVIRONMENTAL POLICY AND ENVIRONMENTAL MANAGEMENT SYSTEMS

Alliance is committed to the sustainable management of the natural and physical resources that it depends on. Alliance therefore adheres to the following environmental policy:

> *Alliance Group Ltd is committed to the sustainable management of the natural and physical resources which it depends on. In meeting this commitment, Alliance Group will align itself with applicable New Zealand and international standards and will take all practicable steps to:*
>
> - *meet or exceed internal and key stakeholder expectations and relevant regulatory requirements;*
> - *continually improve environmental performance by identifying and measuring impacts, developing clear objectives and meaningful targets, and measuring progress with effective monitoring;*
> - *optimise the use of all resources including energy, water, packaging and chemicals, to minimise the wastes produced and the overall impact of our operations;*
> - *annually review the adequacy of the environmental management programme and progress towards achieving environmental objectives and targets;*
> - *communicate regularly on environmental matters with stakeholders including shareholders, employees, customers, suppliers, communities and regulatory bodies;*
> - *allocate appropriate resources to enable effective environmental management.*

Alliance holds ISO 14001:2015 environmental management systems certifications, as well as numerous quality certifications including ISO 9001:2015. ISO 14001 is an internationally recognised environmental management standard. As part of this system, all environmental aspects and impacts of Alliance's plants are identified and prioritised for action, and processes are put in place to control these aspects. Targets and objectives are established and monitored to enable demonstration of continuous performance and improvements are driven by internal audits and management reviews.

Alliance employs a Group Environmental Manager who has authority and responsibility to co-ordinate and implement the on-site environmental management systems in conjunction with site Environmental Managers or Environmental Representatives. The Group Environmental Manager is also responsible for ensuring that all the necessary regulatory consents and approvals are held and are current, and that compliance with all conditions of the consents held is being achieved. The board of directors of Alliance receive and review on a monthly basis a report on environmental performance matters including environmental compliance. Alliance also engages expert environmental advisors.

3. THE EXISTING ENVIRONMENT

3.1 LOCATION

The Alliance Mataura Plant is in the Mataura township on the true right bank of the Mataura River (see Figure 2). The first meat processing plant was established on this site in 1893, and since that time the Plant has been a vital component of Southland's agricultural sector, processing stock from the region.

The true left bank of the river is occupied by the former Carter Holt Harvey paper mill, now an industrial site managed by the Mataura Industrial Estate (MIE).

The Mataura township has a population of 1509 (2013 census) and is a small rural service centre whose residents have a high reliance on the Mataura Plant for employment opportunities.

Figure 2: Mataura Township with Mataura River flowing from north to south.

3.2 THE MATAURA RIVER

3.2.1 Overview

The Mataura River catchment is the largest river catchment in the Southland Region with a catchment area of 5,400 km^2 which stretches from its steep alpine headwaters in the north

near Lake Wakatipu, to the south coast of Southland at Toetoes Estuary, approximately 35 km east of Bluff.

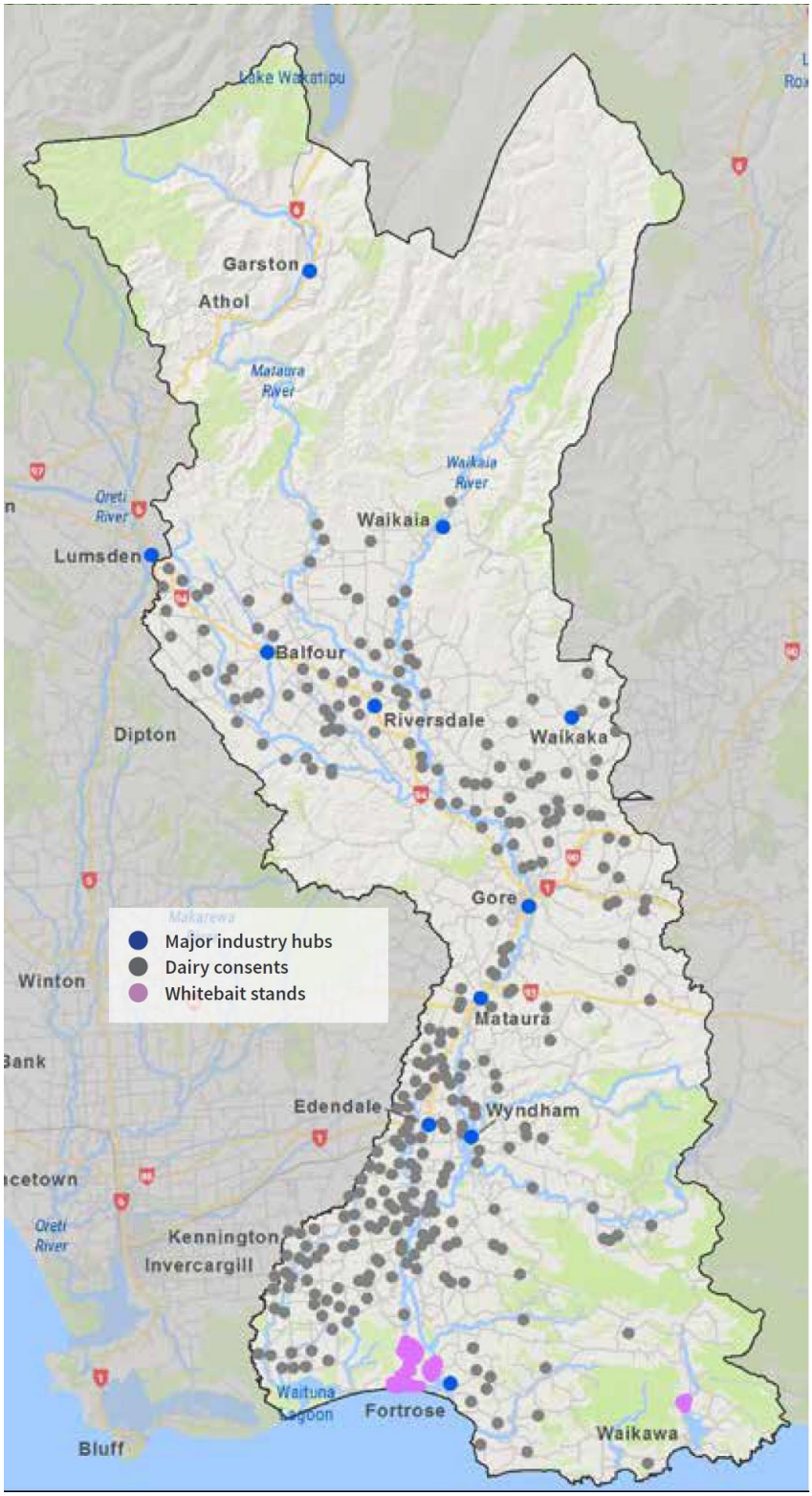

Figure 3: The Mataura Catchment

Over 70% of the Mataura catchment has been developed for farming (reflected in the prevalence of dairy farming related consents shown in Figure 3) and between 1940 and 1980 there was widespread willow clearing, channel straightening and artificial drainage installed which has significantly altered the catchment hydrology and water quality. The Mataura Plant is in the lower section of the Mataura Catchment, approximately 12 km downstream of Gore, and 44 km upstream of the Toetoes Estuary (at Fortrose). This lowland section is the most heavily modified section with water quality influenced by the cumulative effects of land use and diffuse and point source discharges.

The Gore District Plan lists the Mataura River as a significant natural feature, and in 1997 a water conservation order was made over the river recognising the fishery values as being nationally outstanding.

3.2.2 The Mataura Weir and Hydro Race

Immediately upstream of the Mataura Plant is an existing concrete U-shaped weir. This weir is believed to have been constructed in the 1920s or 1930s (see Figure 4).

Water is diverted by the weir along the true right bank of the river into a diversion channel adjacent to the Plant. From there it is directed through a turbine system which generates around 72,000 kW per week, supplying around 25% of the meat processing plant's electricity needs before being returned to the Mataura River approximately 400 m downstream of the weir below the Mataura Falls. A similar diversion and hydro plant exists on the true left bank adjacent to the MIE site.

On the Alliance Plant's side of the river, the damming, diversion and use of water using the weir and hydro race, and its discharge back to the Mataura River, is authorised by existing resource consents AUT.20171566-01 and AUT.20171566-02 and this activity forms part of the existing environment for these applications.

Figure 4: Weir, hydro race and discharge.

3.2.3 Hydrology

The flow within the Mataura River is highly variable, mostly because of its alpine headwaters and also its considerable catchment size. The Mataura River flow is continuously monitored by Environment Southland at Tuturau approximately 6 km downstream of the Plant. Summary flow statistics from this flow recorder for the period 1982 – 2018 are presented in Table 1.

Table 1: Summary flow statistics for the Mataura River.

Statistic	Value
Minimum flow	10.1 m^3/s
Maximum flow	1820.9 m^3/s
Mean flow	74.2 m^3/s
Median flow	56.8 m^3/s
Coefficient of variation[1]	89%
7 day mean annual low flow	19.0 m^3/s

The flow regime is characterised by long periods of low flow interspersed with high magnitude but low frequency flood events. Key points to note in that respect:

- FRE3 events (events where flows > 3x annual median flow, and generally considered to be a flood event which can disturb the river bed and cause ecological disturbance): ranged from 9 in 1982, 1998 and 2001 to 48 in 2013 with an average of 21 events per year.
- Accrual periods (the time between bed-moving floods, when high benthic biomass can develop): The number of 20+ day accrual periods ranged from 2 (in 1982) to 8 (in 1999) while the number of very long accrual periods (100+ days) when nuisance periphyton growths are more likely to occur ranged from 0–2 per year.
- Minimum flows occur between January and April with maximum flows during May and June. Minimum monthly median flows occur in February.

The Water Conservation (Mataura River) Order 1997 (Mataura WCO) places restrictions on the rate of flow in the Mataura River. The relevant part of the Mataura WCO states:

> *The minimum rate of flow at any point in the Mataura River and the Waikaia River above the Mataura Island Road Bridge (approximate map reference NZMS 260 F46:850158), where the flow is estimated by the Southland Regional Council from measurements taken at that point, must be 95% of—*
>
> *(a) the flow so estimated by the Southland Regional Council at that point; plus*
>
> *(b) water taken in accordance with the Act from the protected waters upstream of that point and not returned to the protected waters—*

[1] A measure of flow variability.

less authorised inflows upstream of that point which did not have their source in the protected waters.

3.2.4 Water Quality

Surface water quality in the Mataura catchment has undergone significant changes over the past 30 years. Point-source discharges and associated effects (Biological Oxygen Demand **(BOD**), ammoniacal nitrogen (**Amm-N**) and dissolved oxygen (**DO**)) in the lower catchment were a major issue in the 1970's (as shown in Figure 3, there are several industry hubs in the catchment), but improvements to the quality of wastewater discharges have significantly reduced these effects. However, over the corresponding period, an increase in contaminants (particularly nutrients) associated with the intensification of agricultural land use has occurred across much of the catchment.[2]

The surface water quality monitoring data that Alliance has obtained generally supports these findings. It shows water quality in the vicinity of Mataura is characterised by:

- Water temperature (between 2.3–23.2°C) and DO levels (>6 g/m^3) suitable for protecting river ecosystem health;
- Variable visual clarity (0.07m – 3.29m).
- Nitrate and Amm-N concentrations which meet National Policy Statement for Freshwater Management 2014 (**Freshwater NPS**) Attribute State A or B for toxicity, but which exceed the relevant ANZECC (2000) 'physical and chemical stressor' trigger values which relate to nuisance plant growth;
- Nutrient indicators (e.g. Dissolved Inorganic Nitrogen (**DIN**) and Dissolved Reactive Phosphorus **(DRP**)) which regularly exceed the Ministry for the Environment periphyton guideline for protecting benthic biodiversity; and
- Very high *E.coli* concentrations which mean the Mataura River sits in the Red Freshwater NPS Attribute State for *E.coli*.

However, while water quality is clearly degraded for some parameters, water quality monitoring data collected by Environment Southland does not suggest further deterioration is occurring in this catchment in the vicinity of the Plant (refer to Table 2).

[2] *Mataura Catchment Strategic Water Study*, Report prepared for Environment Southland. May 2011. Liquid Earth Aqualinc Research Harris Consulting.

Table 2: Water quality state and trends in the lower Mataura River

Parameter	Commentary on Current State	Trend from ES Water Quality Data[3]		
		Period	Gore	Mataura
Clarity	Variable clarity at Gore (median 1.18, range 0.08 m - 3.82 m) and Mataura (median 1.11 m, range 0.07–3.15 m).	2012 - 2016	Deterioration	Indeterminate
		2007 - 2016	Indeterminate	Indeterminate
		2000 - 2016	Indeterminate	Improvement
Nitrate nitrogen	Freshwater NPS Attribute State A for nitrate-nitrogen at Gore (annual median range 0.78 – 0.94 g/m^3) and Mataura (annual median range 0.76–0.90 g/m^3). Median nitrate nitrogen concentrations exceeded the ANZECC (2000) 'physical and chemical stressor' trigger for lowland rivers (0.444 g/m^3) at both sites.	2012 - 2016	Indeterminate	Indeterminate
		2007 - 2016	Indeterminate	Indeterminate
		2000 - 2016	Deterioration	Deterioration
Amm-N	Amm-N concentrations are in the Freshwater NPS Attribute State A for toxicity at Gore, and are below the ANZECC (2000) 'physical and chemical stressor' trigger value for Amm-N in lowland rivers (0.021 g/m^3).	2012 - 2016	Indeterminate	Indeterminate
		2007 - 2016	Improvement	Improvement

[3] Hodson R., Dare J., Merg M., Couldrey, M. (2017), Water Quality in Southland: Current State and Trends. Environment Southland publication No: 2017-04.

Parameter	Commentary on Current State	Trend from ES Water Quality Data[3]		
		Period	Gore	Mataura
	Freshwater NPS Attribute State B for toxicity at Mataura (annual median range 0.035–0.050 g/m^3), which is a slight increase in ammoniacal nitrogen concentrations compared with Gore. Annual median concentrations of Amm-N at Mataura are also higher than the ANZECC (2000) 'physical and chemical stressor' trigger values for Amm-N in lowland rivers.	2000 - 2016	Improvement	Indeterminate
Total Nitrogen	Total nitrogen concentrations at Gore and Mataura exceed the ANZECC (2000) guideline value (< 0.614g/m^3)	2012 - 2016	Indeterminate	Indeterminate
		2007 - 2016	Indeterminate	Indeterminate
		2000 - 2016	Deterioration	Indeterminate
Dissolved Reactive Phosphorus (DRP)	The ANZECC (2000) DRP trigger value of 0.01 g/m^3 was exceeded on 19% of sampling occasions at Gore (median 0.01 g/m^3, range <0.004 – 0.04 g/m^3) and 49% of sampling occasions at Mataura (median 0.010 g/m^3, range <0.004 – 0.047 g/m^3).	2012 - 2016	Indeterminate	Indeterminate
		2007 - 2016	Indeterminate	Improvement
		2000 - 2016	Improvement	Improvement

Parameter	Commentary on Current State	Trend from ES Water Quality Data[3]		
		Period	Gore	Mataura
Total Phosphorus	TP concentrations at Gore and Mataura did not exceed the ANZECC (2000) trigger value of 0.33 g/m^3 on any sampling occasion.	2012 - 2016	Indeterminate	Indeterminate
		2007 - 2016	Improvement	Improvement
		2000 - 2016	Indeterminate	Improvement
E.coli	*E.coli* levels are representative of Freshwater NPS Attribute State E (Red) at both Gore and Mataura. Concentrations of *E.coli* exceeded the New Zealand single sample bathing water standards 36% of the time at Gore, and 75% of the time at Mataura.	2012 - 2016	Indeterminate	Indeterminate
		2007 - 2016	Indeterminate	Indeterminate
		2000 - 2016	Indeterminate	Deterioration

3.2.5 Habitat

Habitat in the lower Mataura catchment is characterised by its cobble dominated bed and willow lined channel (see Figure 5), although coal seams and bedrock outcrops become more common in the reach below Mataura.

Figure 5: Mataura River approximately 2 km downstream of the discharge point.

3.2.6 Aquatic Flora

While water quality (DIN and DRP concentrations in particular) indicates that periphyton growths should occur, such growths are not frequent in the Mataura River below Gore. However, periphyton growths are observed during longer accrual periods.

3.2.7 Benthic Invertebrates

The benthic macroinvertebrate community in the Mataura River is typical of lowland gravel bed rivers, and supports a range of water quality sensitive and tolerant taxa. It is dominated by Ephemeroptera (mayflies) and Trichoptera (caddisflies) with Diptera (true flies) the next most common group. *Deleatidium* are the most common mayfly and the filter feeding Aoteapsyche is the most abundant caddisfly taxon recorded across all years. Alliance's ecological monitoring data has recorded poor to fair macroinvertebrate community quality class across all monitoring sites both upstream and downstream of the Plant.

When periphyton growths are observed during longer accrual periods, the Macroinvertebrate Community Index (MCI) score typically decreases.

3.2.8 Fish

The lower Mataura River supports moderate to high native fish diversity (13 native fish have been recorded) including eight species with an 'At Risk Declining' conservation status - longfin eels, torrentfish, lamprey, Gollum galaxias, galaxias southern, inanga, giant kokopu and koaro.

3.2.9 Recreational Values

The Mataura River is regarded as one of New Zealand's premier lowland brown trout fisheries and is internationally recognised. The Mataura WCO recognises the importance of the river from source to sea with its outstanding fisheries and angling amenity.

With respect to other recreational values, the Mataura River supports a very popular whitebait fishery in its lower reaches and is subject to relatively high use for swimming during the summer months, both up and downstream of Mataura. This includes a bathing site in the vicinity of the Mataura Bridge approximately 100m downstream of the most southern end of the Plant site.

The Mataura River's various riverbanks, berms, reserves and angler access points are also used for a variety of terrestrial activities, mostly around settlements.

3.3 TOETOES ESTUARY

The Mataura River flows into the Toetoes Estuary. This estuary is a medium sized "tidal lagoon" type estuary that discharges to Toetoes Beach at Fortrose, and it drains a large and primarily high productivity agricultural catchment. The shallow estuary (mean depth of around 2 m) has a large freshwater influence because the estuary is small in relation to the freshwater input. It has a wide range of habitats (extensive mudflats and saltmarsh areas, very small patches of seagrass), but has historically lost large areas of saltmarsh (estimated loss of approximately 75% (250 ha)). Virtually all of its surrounding wetland has also been lost through drainage and reclamation and conversion to pasture. This has greatly reduced the estuary's ability to filter, dilute, and assimilate nutrient and sediment inputs.

Recent Environment Southland monitoring has shown the estuary is in a "MODERATE" but declining condition in relation to eutrophication, and that the ongoing drainage and loss of saltmarsh and densely vegetated terrestrial margins is placing the estuary under pressure. Excessive nutrient inputs are the primary driver of the eutrophication symptoms being expressed.

3.4 CULTURAL LANDSCAPE

Iwi have a long association and a strong traditional relationship with the Mataura River. A Statutory Acknowledgement exists for the Mataura River in Schedule 42 of the Ngai Tahu Claims Settlement Act 1998. This Statutory Acknowledgement outlines Ngai Tahu's association with the Mataura River. Above the Mataura Falls, the river was traditionally used by the descendants of the Ngati Mamoe chief, Parapara Te Whenua, along with other famous tupuna. The Statutory Acknowledgement states that:

> *"The Mataura was an important mahinga kai, noted for its indigenous fishery. The Mataura Falls were particularly associated with the taking of kanakana (lamprey). The tupuna had considerable knowledge of whakapapa, traditional trails and tauranga waka, places for gathering kai and other taonga, ways in which to use the resources of Mataura, the relationship of people with the river and their dependence on it, and tikanga for the proper and sustainable utilisation of resources. All of these values remain important to Ngai Tahu today.*
>
> *The mauri of the Mataura represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngai Tahu Whanui with the river."*

The Mataura River is also subject to a Mātaitai Reserve. This reserve status recognises the importance of the river as providing a mahinga kai resource for Ngāi Tahu Whānui because of its use as an access route between coastal Muruhiku (Southland) to Fiordland and the West Coast for the gathering of pounamu. The Mataura was particularly noted for the gathering of kanakana (lamprey) and tuna (eels), with annual fishing expeditions in season to favoured nohoanga (campsites) along the river. The bylaw for the reserve prohibits commercial fishing within the area. Customary fishing is permitted subject to approval.

The takiwā of three rūnanga (Hokonui, Waihōpai and Awarua) extend across the area of the Mataura River catchment including the headwaters, main stem and coastal area. The Plant itself is located within the takiwā of Hokonui Rūnanga.

4. DESCRIPTION OF THE MATAURA PLANT AND ACTIVITIES

This section provides a description of the activities for which consent is sought. It includes:

- A description of the Mataura Plant.
- A description of the proposed take and use of water for cooling and processing purposes.
- A description of the cooling water discharge.
- A description of the wastewater discharge.

4.1 THE MATAURA PLANT

The Alliance Mataura Plant is located on the right bank of the Mataura River at the northern end of Mataura Township (see Figure 2). A site plan is provided in Figure 6.

The Plant has historically processed up to 10,000 sheep per day and 560 beef animals per day (with additional by-products processing including casings and rendering). In 2012 the processing of sheep and rendering ceased and beef production increased to up to 1,120 beef animals per day. For the foreseeable future, it is expected that the Mataura site will continue to operate solely as a beef processing plant.

The Plant generally operates five days per week, over almost 24 hours during peak processing. Sunday processing has also been undertaken recently for mycoplasma bovis infected stock culled by the Ministry for Primary Industries. All processing of stock killed at Mataura is carried out on-site, except for some transfer of soft offal and bones off-site for further processing or rendering. Processed carcasses and meat cuts are refrigerated and stored in large on-site chillers and freezers.

Stock are held in yards prior to slaughter. Cattle yards are located at the north end of the site. Cleaning of the yards occurs regularly.

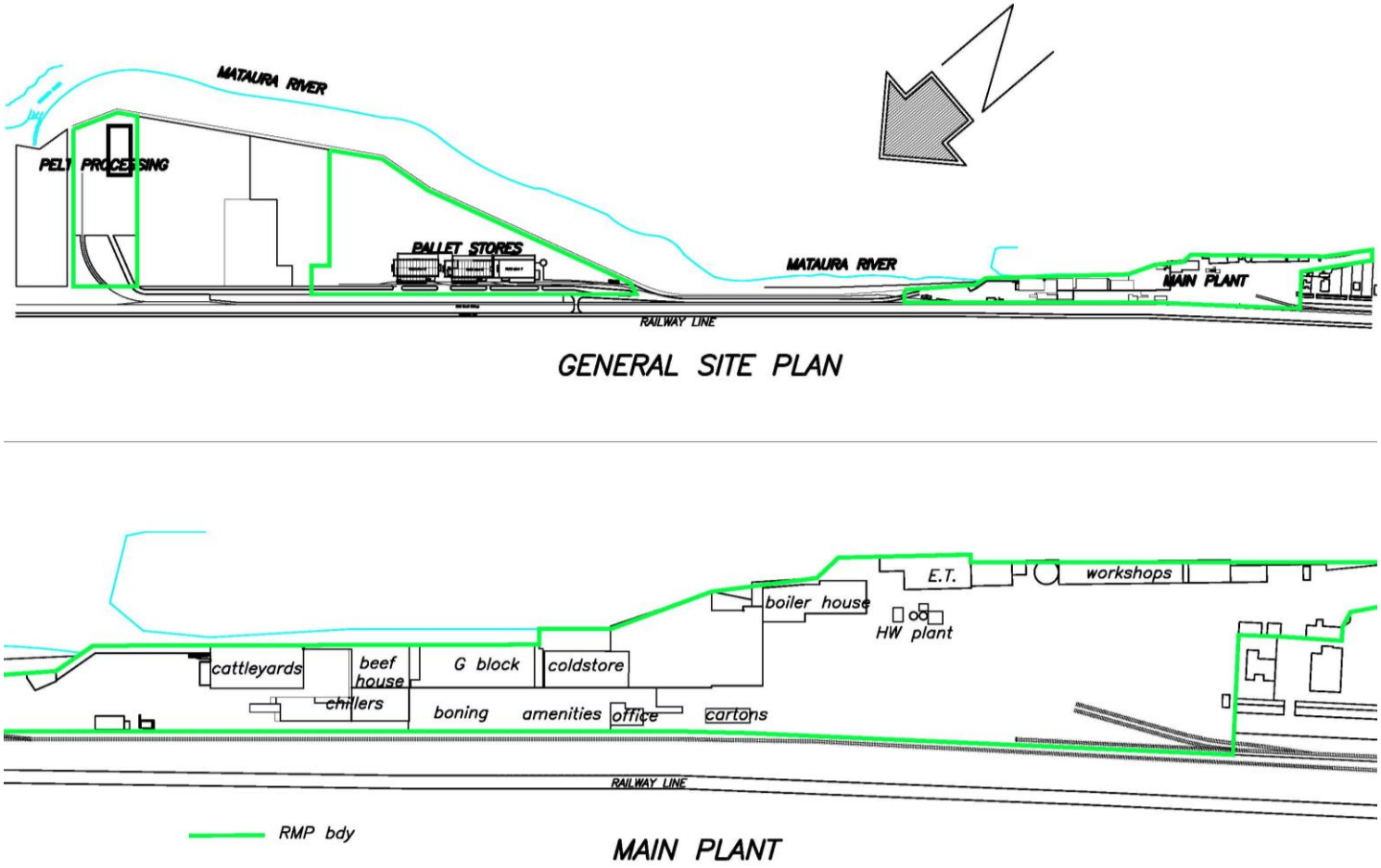

Figure 6: Alliance Mataura Site Plan.

4.2 TAKE AND USE OF WATER

Abstraction of water is essential for operations at the Plant. The existing consent authorises the taking of up to 35,600 m^3/day of water for freezing works supply. This is made up of:

- 21,200 m^3/day for cooling water; and
- 14,400 m^3/day for processing water.

Alliance is of the view that all of the water taken is non-consumptive with the exception of approximately 5% of the water taken for processing purposes and reserves its right in this regard.

The water is taken using 18 intake pumps (see Figure 7). Six of these (pumps 6 – 11) supply cooling water. The others supply process water.

Eleven of the intake pumps (No 1 – 11) are located in the hydro race and are screened with an aperture size of 5 - 6 mm to prevent debris and fish from being drawn into the takes. The remaining pumps (No. 12 – 18) are in a channel between the hydro race and the Plant. Fish and debris are prevented from entering this channel by a passive screen which has a bar spacing of 1.5 mm.

The existing consent was amended in May 2018 to require meters to be installed on all intakes which abstract processing water. The taking of engine room condenser water and engine room cooling water is not metered.

Since the processing of sheep and rendering ceased at the Plant, the amount of water taken and used for processing purposes has reduced significantly from the 14,400 m^3/day provided for in the existing consent. This is reflected in the proposed conditions which allow only 8,000 m^3/day of process water to be abstracted.

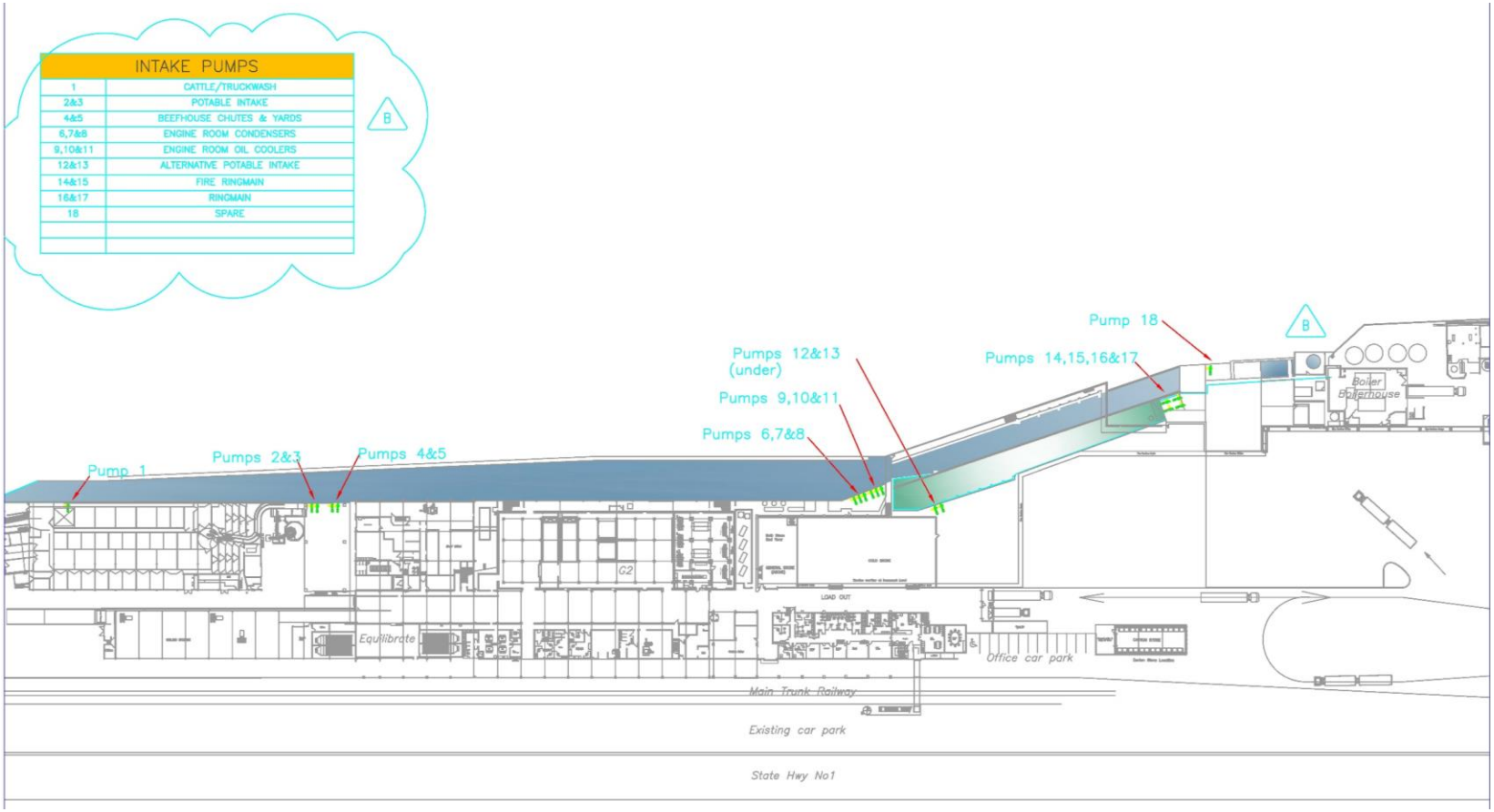

Figure 7: Plant location, hydro race and pump locations.

4.3 THE COOLING WATER DISCHARGE

The Plant contains large on-site chillers and freezers and the take, use and discharge of water from and to the hydro race adjacent to the Plant is essential to their operation.

The condenser cooling water pumps operate continuously because the demand for refrigeration at the site is continuous. The estimated total condenser cooling water take is 21,200 m^3/day based on pump capacities. The cooling water system takes water from the race, passes through the condensers once and then discharges water back into the hydro race (see Figure 7).

There are water temperature monitoring requirements upstream and downstream of the discharge.

4.4 THE WASTEWATER DISCHARGE

4.4.1 Synopsis

Two waste streams are generated on-site;

- green waste from the stockyards, gut cutting and tripe processing; and
- non-green wastes which are sourced from the slaughter floor, further processing and hide wash overflow.

Wastewater from staff amenities is separated at source and discharged to the Gore District Council wastewater system.

The wastewater treatment system at Mataura is designed to remove suspended solids, including associated organic matter, oil and grease and some nitrogen and phosphorus from the wastewater prior to its discharge. It comprises preliminary treatment (screening), primary treatment (settling) and physio-chemical treatment via a dissolved air floatation (DAF) system of the wastewater prior to it being discharged to the Mataura River.

All solids are transported from site where they are composted by third parties, however there is contingency for discharge to land, the Lorneville treatment plant, or landfill in the event the material is not suitable for composting

The green and non-green waste streams are subject to a more advanced different treatment process with the green waste stream being subject to an additional alkali DAF stage (ie. pH is lifted through the addition of lime) to remove phosphorus due to its comparatively high phosphorus load (Figure 8). The non-green waste does not contain high concentrations of phosphorus.

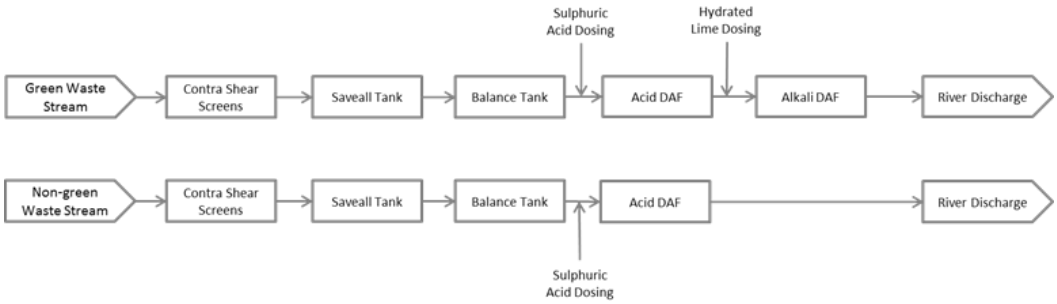

Figure 8: Existing wastewater treatment process at the Mataura Plant.

Treated wastewater is discharged through two 200 mm diameter pipes that exit the Plant approximately 100 m below the hydro race discharge and drop approximately 10 m to the river bed.

Figure 9: Final dried DAF solids ready to be taken off-site for composting.

4.4.2 Discharge Quality

Wastewater is discharged into the Mataura River on the true right bank. A summary of the discharge quality since the cessation of sheep and lamb processing at the Plant occurred in 2012/2013 is provided in Table 3.

Table 3: Summary of the discharge quality since November 2012 (all units g/m³ unless stated).

	pH	Conductivity[4]	TSS	Sulphide	COD	BOD	TKN	Amm-N	TP	DRP
Med.	8.5	130	67	0.48	340	190	40	15	3.5	0.20
Min.	5.5	46	30	<0.4	50	30	10	2.1	1.0	0.013
Max.	9.6	470	220	2.1	1600	430	140	40	8.0	2.2
5%-ile	6.8	58	42	<0.4	180	83	19	5.9	1.5	0.06
95%-ile	9.3	360	100	1.1	520	290	59	29	5.9	0.88

With respect to the microbial content of the discharge, monitoring shows it contains very high *E.coli* concentrations, up to 10^6 CFU/100mL. However, whilst *E.coli* are the key faecal indicator bacteria ('**FIB**') used for regulatory purposes in NZ freshwaters, it is the pathogens for which they are intended to indicate that are of most concern for human health risk assessment. The two key groups of pathogens of most concern in animal wastewater are bacteria and protozoans[5]. Monitoring of the wastewater from the Mataura Plant has shown levels of these pathogens is much lower and more variable (Table 4).

Table 4: Pathogen monitoring data for treated wastewater from the Mataura Plant.

Pathogen	May 18	Dec 18	Jan 19	Feb 19
Salmonella (CFU/100ml)	1	21	4	<3
Campylobacter (CFU/100ml)	24	<3	9	4
E.coli 0157: H7 (CFU/100ml)	0	<3	<3	*
Giardia (oocysts /1,000ml)	<1	32	150	2
Cryptosporidium (oocysts /1,000ml)	<1	310	250	1
E.coli (CFU/100ml)	1,460,000	300,000	4,500,000	90,000

* E. coli O157 was detected in this sample, however quantification was not possible due to the presence of inhibitory substances in the matrix

[4] Units: mS/m.

[5] literature indicates there are no substantial human health risks established for transmission of fungi and viruses through animal wastewater discharge.

4.5 RECENT AND PLANNED UPGRADES

4.5.1 Past Upgrade – Phosphorus Reduction

Since the existing resource consents were granted in 2004, Alliance has completed a significant upgrade to its wastewater treatment plant to reduce phosphorus (particularly DRP) concentrations in the discharge. The key elements of this upgrade were:

- Improving separation of the high and low DRP waste streams entering the wastewater treatment plant; and
- Modifications to the DAF plant, such that the waste stream with high DRP levels is now subject to lime dosing and an additional alkali DAF stage to precipitate out the DRP.

4.5.2 Planned Upgrades

4.5.2.1 Year 1 – 3: Implementing water reduction opportunities and addressing existing resilience issues.

Pattle Delamore Partners (PDP) has identified potential intermittent cross contamination points between the green and non-green waste stream and potential failure points within the reticulation system. To address these resilience issues, the following will be completed in the first year of the new consent term:

- Re-route all pipework that runs above or in the water race to a location that prevents the risk of waste leaking into the water race or fresh water leaking into the treatment system;
- Re-route all pipework that runs above the river to a location that prevents the risk of waste leaking into the river;
- Modify the beef sump milli-screen overflow to prevent the risk of green waste overflows into the non-green waste stream; and
- Modify the stockyard and tripe recycle area to prevent the risk of green waste overflows into the non-green waste stream.

PDP has also identified scope to reduce the Plant's water use, and the volume of the wastewater discharge by approximately 37% by recycling white water within the wastewater treatment plant, although there are issues relating to discharge quality that need to be worked through, and which may mean this extent of reduction may not be able to be realised prior to installation of the biological treatment system described in Section 4.5.2.3 below. The proposed conditions require Alliance to complete this process within the first three years of the new consent term.

4.5.2.2 Year 5: Tertiary Disinfection of Microbial Contaminants.

Within five years of the commencement of the new consent, Alliance proposes that any wastewater discharged to the Mataura River is treated via a UV plant (or equivalent disinfection unit), in order to inactivate pathogens.

This upgrade is expected to incur capital costs of approximately $4.14 million, and additional annual operational expenditure of $230,000.

Following installation of the treatment system the proposed conditions require the *E.coli* concentration in the discharged wastewater to not exceed an annual median of 1,000 CFU/100ml and 95th percentile of <10,000 CFU/100mL. This is a substantial reduction relative to the concentrations set out above in Table 4.

4.5.2.3 Year 15: Biological Treatment System

By Year 15, Alliance proposes to install a full biological treatment system to treat the Plant's wastewater. This system will reduce BOD, ammoniacal nitrogen and total nitrogen loads.

Detailed design of the new biological treatment system will be completed closer to the installation date. However, it is currently anticipated a large, lagoon based, biological reactor will be installed. Due to the large lagoon size (approximately 8,500 m^3), it will likely be located 2 km away on land currently owned by Alliance Group Ltd, with wastewater being pumped to the lagoon for treatment, and then back to the Plant for discharge via the existing outfall.

The additional capital cost of installing tertiary disinfection of microbial contaminants and a biological treatment system is significant and estimated to be $13.98 million with annual operating costs of $1.06 million.

Following installation of the biological treatment system, the discharge concentrations of each parameter are expected to significantly reduce, and this is reflected in the allowable concentrations in the proposed conditions following installation of the biological treatment system (refer to **Appendix 1**).

More detail on these upgrades and the associated consent limits on discharge quality is provided in Section 9.3 of this AEE.

5. RESOURCE CONSENT REQUIREMENTS AND ASSESSMENT MATTERS

There are currently two regional plans which contain rules relevant to the proposed activity:

- The Operative Regional Water Plan for Southland (**Operative Plan**); and
- The Proposed Southland Water and Land Plan (**Proposed Plan**).

Table 5 identifies the resource consents required from the Regional Council for the proposed activities and the activity status of those consents under the Operative and Proposed Plans.

Table 5: Resource consent requirements and activity status.

Activity	Operative Plan	Proposed Plan	Activity Status
To discharge 14,400m^3/day of treated meat works wastewater, including treated wastewater from hide and skin processing to the Mataura River.	Rule 1 of the Operative Plan states that the discharge of any contaminant to water into a surface water body is a discretionary activity provided the discharge does not reduce the water below any standards set for the relevant water body in Appendix G "Water Quality Standards" after reasonable mixing. The Water Plan classifies the Mataura River as being "Mataura 3", and includes water quality standards for suspended solids, grease and oil, water temperature, pH, colour, clarity, oxygen concentration, toxicity, bacterial and slime growths, fish palatability, faecal coliforms and *E.coli.* The monitoring identifies that the discharge will achieve the prescribed standards with the exception of *E. coli*. Although the monitoring of *E. coli* upstream indicates that water	Rule 5 of the Proposed Plan provides for the discharge of any contaminant, or water into a surface waterbody as a discretionary activity provided the discharge does not reduce the water quality below any standards set for the relevant water body in Appendix E "Water Quality Standards" at the downstream edge of the reasonable mixing zone. The Proposed Plan classifies the Mataura River as being "Mataura 3", and includes water quality standards for suspended solids, grease and oil, water temperature, pH, colour, clarity, oxygen concentration, toxicity, bacterial and slime growths, fish palatability, faecal coliforms and *E.coli.* Compliance with these conditions can be achieved, with the exception of the *E. coli* limits). Consent is	Non-complying activity

Activity	Operative Plan	Proposed Plan	Activity Status
	quality being received by the Plant can at times already exceed the water quality standard of 1000 *E. coli* per 100ml, monitoring indicates that it can be further affected downstream of the discharge point, beyond the zone of reasonable mixing. Further, as set out in Table 4 above, monitoring indicates that the key human health risk pathogens for which E. coli acts as an indicator are at low levels in the discharge. Rule 2 provides that where a discharge cannot meet the conditions in Rule 1 it is a non-complying activity.	therefore also required as a non-complying activity pursuant to Rule 6 of the Proposed Plan.	
To discharge condenser cooling water from freezing works to the Mataura River.	The discharge of cooling water into the hydro race is governed by Rule 1 of the Water Plan. The cooling water discharge can comply with the limits set out in Appendix G (refer above) and therefore retains a discretionary activity status.	The discharge of cooling water is a discretionary activity pursuant to Rule 5 of the Proposed Plan, due to compliance with the water quality standards set out in Appendix E.	Discretionary activity
To take water from the hydro race which is fed by the Mataura River for cooling water purposes.	As outlined in Section 4.3, cooling water is taken from and discharged to the hydro race. Rule 18(d)(iii) provides that where water is returned in the vicinity of the abstraction point, it is a restricted discretionary activity.	Rule 18(b)(ii) provides that the taking of water is a restricted discretionary activity where the water is returned within 100 metres of the take or diversion point.	Restricted discretionary.
To take water from the hydro race which is fed by the Mataura River meat	Approximately 14,400m^3/s of the abstracted water is used for meat processing and truck wash activities. A large proportion of this water is	The return point for the processing water is beyond 100m downstream of the abstraction point. The take is consistent with the flow	Discretionary.

Activity	Operative Plan	Proposed Plan	Activity Status
processing and truck wash activities.	returned via the processing discharge back to the Mataura River, however as it is further than 100m downstream of the abstraction point, it is arguably "not within vicinity". Rule 18(d) classifies the taking and use of water from any surface water body where the total volume of water allocated at any time is less than 10 percent of the mean annual low flow at any downstream point in the catchment as a restricted discretionary activity. Alliance understands that is the case here.	regime and allocation specified in the WCO and is therefore assessed to be in accordance with Rule 49(c) as a discretionary activity.	

6. SOCIAL AND ECOMOMIC EFFECTS OF ALLOWING THE ACTIVITIES

When considering these applications, the RMA requires the consent authority to have regard to the actual and potential effects of allowing the activity, including positive effects.

A detailed assessment of the economic benefits of the Plant continuing to operate has been completed by Brown, Copeland & Co Ltd (the economic assessment). A copy of the economic assessment is provided in **Appendix 6** of this AEE.

The economic assessment has confirmed there are significant economic benefits accruing from the Plant, and that it is an asset for the Gore District and Southland region. Obtaining resource consents which allow the Plant to continue to operate would allow these benefits to continue.

The Plant employs 500 full time salaried staff and seasonal workers at the peak. This equates to 340 full time equivalent staff (FTEs). The Plant pays out $22 million in wages and salaries per annum and spends an estimated additional $12.3 million per annum in the Southland region on goods and services. These are quantified as direct economic impacts for the region's economy arising from the Plant's operation.

Figure 10: Beef boners at the Mataura Plant.

In addition, the economic assessment has identified a number of indirect impacts arising from:

- The effects on suppliers of goods and services provided to the Plant from within the region (i.e. the "forward and backward linkage" effects); and
- The supply of goods and services from within the region to employees at the Plant and to those engaged in supplying goods and services to the Plant (i.e. the "induced" effects). For example, there are additional jobs and incomes for employees of supermarkets, restaurants and bars as a consequence of the additional expenditure by employees directly employed at the Plant.

When these indirect effects are accounted for, the total contribution of the Plant's operation is assessed to be 595 FTE jobs for Southland residents, and $38.5 million per annum in wages and salaries for local Southland residents.

The economic assessment notes that the Mataura meat processing plant gives the Gore District greater critical mass and, as a consequence, the residents and businesses within the District benefit from economies of scale, greater competition, increased resource utilisation and better central government provided services. This is also true for the Southland region, although to a lesser extent given the economic activity generated by the Plant is proportionately less for the region as compared to the Gore District.

Continuation of the Plant at its current site, on a longer consent term (i.e. 35 years) also generates a number of economic efficiency benefits. The economic assessment identifies these as including:

- the continued use of existing plant and equipment with an insured value of $225 million (much of this value is sunk – i.e. it could not be recovered if the plant was forced to downsize, close or be relocated);
- the minimisation of transport costs (and carbon footprint) due to the proximity of the Plant to producers of livestock and finished product dispatch;
- the availability of a trained and experienced workforce and businesses with appropriate expertise and experience within close proximity of the Plant; and
- greater certainty for investment and management of the Plant.

If the Plant were to cease operation and Southland farmers had to truck cattle out of the region for processing, it would add to farmers' costs, reduce their disposable incomes and reduce spending in the Gore District and elsewhere within the region.

Alliance also contributes directly to the economic and social wellbeing of the community via its rates payments and other community contributions.

7. EFFECTS OF ALLOWING THE ABSTRACTION

7.1 INTRODUCTION

A detailed assessment of the potential effects of the proposed water abstraction is included in the Freshwater Solutions (FWS) / Aquatic Environmental Sciences (AES) report – a copy of which is provided in **Appendix 2** of this AEE.

The potential effects of the proposed abstraction identified by the FWS/AES report are:

- Effects associated with the entrainment of fish in the intake; and
- Effects associated with the reduction in flows in the Mataura River.

Each is addressed below.

7.2 ENTRAINMENT

In total the Plant abstracts up to 35,600 m^3/day of water using 18 pumps located in the hydro race. As outlined above, the intakes are fitted with screens. The water velocity within the hydro race is high which creates a high sweep velocity across the face of the intake at the screen faces. This reduces the potential for entrainment of juvenile fish compared to many intakes. However, despite this, the FWS/AES report recommends that all the intakes that are currently fitted with 5 – 6 mm screen mesh be fitted with 2 - 3 mm screens to further reduce the potential for entrainment and to meet best practice standards for screening intakes. Alliance propose to implement this recommendation. This is reflected in the proposed conditions.

7.3 INSTREAM FLOWS

Resource consents 20171566-01 and 20171566-02 enable the diversion of water to the hydro race and its discharge from the hydro race discharge (see Figure 11). The effect of this diversion on river hydrology, allocation, natural character, instream habitat and water quality have all been considered via those consents. As is set out in Section 3.2.2, these effects form part of the existing environment.

Of the 35,600 m^3/day Alliance is authorised to abstract from the Mataura River, 21,200 m^3/day is used for cooling purposes. This water is returned to the Mataura River via the hydro race outlet (see Figure 11). The remaining 14,400 m^3/day is used for various process activities on-site, and [nearly] all of that water is returned to the Mataura River a further 100 m below the hydro race discharge via the wastewater treatment plant outfall (see Figure 11).

Figure 11: Take and discharge points.

The additional effect of the process water abstraction reducing baseflows in the Mataura River for an additional 100m is minimal, particularly considering it represents no more than 2% of minimum flow and 1% of MALF, and the Mataura WCO requires 95% of the naturalised flow to remain in the river at this point in order to maintain the river's outstanding features and characteristics. It will only have very minor effects on dissolved oxygen, contaminant concentrations and river water temperature and is not expected to significantly alter the water quality. The results of the benthic invertebrate community monitoring over many years and the large population of resident brown trout indicate that

the water take does not adversely affect the benthic invertebrate community (an important food source for fish), fish habitat or fish migration.

8. EFFECTS OF ALLOWING THE WASTEWATER AND COOLING WATER DISCHARGES

8.1 INTRODUCTION

This section addresses the effects of the wastewater and cooling water discharges on the environment. They include effects on:

- Water quality in Mataura River;
- Aquatic ecology in Mataura River;
- Toetoes Estuary;
- Human health;
- Recreation; and
- Cultural values.

8.2 EFFECTS ON WATER QUALITY IN MATAURA RIVER

8.2.1 Introduction

A detailed assessment of the effects of the wastewater and cooling water discharges on the water quality is contained in the FWS/AES report, which is included in **Appendix 2** of this AEE. A summary of the report's key findings is provided below.

The FWS/AES report is informed by extensive monitoring data collected by Alliance over a number of years in accordance with the requirements of its existing resource consents. This is described further in Section 9 of this AEE. Additional detailed and focused monitoring was also undertaken to inform this consent application, including longitudinal surveys of water quality at multiple points upstream and downstream of the Plant, and additional monitoring of periphyton, benthic invertebrates and fish.

8.2.2 Zone of Reasonable Mixing

The existing consent conditions set the mixing zone for the wastewater discharge 250m downstream of the outfall (see Figure 11), and a recent Streamlined Environmental assessment (see **Appendix 4**) has shown the discharge is fully mixed before this point.

8.2.3 Physio-Chemical Parameters

The FWS/AES report analyses the monitoring data and concludes it shows no evidence that the discharge from the Plant is causing measurable effects on pH, temperature, turbidity, TSS, colour, clarity or DO.

The FWS/AES report identified DO as being particularly important for supporting healthy aquatic ecosystems with concentrations needing to be above 5 g/m^3 as a minimum over

seven days and above 4 g/m^3 as a one day minimum to avoid adverse effects. At all sites on the longitudinal survey, dissolved oxygen concentrations above and below the Plant were above this measure, and depending on the survey, reflected either Freshwater NPS numeric Attribute State A or B.

The FWS/AES report has identified that on occasion, instream water temperature upstream and downstream of the Plant is close to the upper lethal temperature limit (>23°C) for some of the more sensitive benthic invertebrates' resident in this stretch of river. However, the Plant has no apparent effect on water temperature so would not exacerbate this issue.

8.2.4 Colour, Clarity, Foams and Scums

The FWS/AES report concludes that the discharge does not have an adverse effect on colour, clarity, or the generation of foams or scums. Notable observations from the monitoring include:

- The water colour upstream and downstream of the Plant is predominantly pale greenish yellow (2.5GY (32.5) 8/2).
- The Mataura River upstream and downstream of the discharge does meet the black disc visual sighting distance of >1.6 m for waterways that are managed for contact recreation.
- There is a slight decrease in clarity and a slight increase in TSS and turbidity downstream of the Plant, which may be due to the combined effect of the energy from the Mataura Falls resuspending fine material and the discharge.
- While some foam has been observed below the Mataura Falls, it has originated upstream of the Plant's wastewater discharge indicating the discharge is not causing that foam.

No changes to these effects due to the Plant's operation are expected in the future.

8.2.5 Ammonia & Nitrate Toxicity

The FWS/AES report analysis of monitoring data concludes the Plant's wastewater discharge is elevating Amm-N concentrations in the Mataura River immediately downstream of the discharge.

The monitoring data shows water quality reducing from Freshwater NPS Attribute State A for toxicity (annual medians 0.02 – 0.03 g/m^3) upstream of the Plant to Freshwater NPS Attribute State B (annual medians 0.05 – 0.06 g/m^3) downstream. The FWS/AES report has examined this in some detail and advised it does not represent an effect which requires immediate or urgent mitigation on ecological grounds.

This is because freshwater mussels are the only species protected by Freshwater NPS Attribute State A Amm-N water quality, and they do not occur in the Mataura River

immediately upstream or downstream of the discharge. The Amm-N sensitive species that do occur in the Mataura River in the vicinity of the discharge are the mayfly *Deleatidium* sp. and the snail *Potamopyrgus antipodarum* and these are protected by the Attribute State B – which is achieved.

Following installation of the biological treatment system required by the proposed conditions, the concentration of Amm-N in the discharge would be significantly reduced, and it is expected the discharge will no longer elevate downstream Amm-N concentrations in the manner currently observed.

Nitrate nitrogen is also an issue in many New Zealand rivers. However, in this case the FWS/AES report notes that the discharge contains very low concentrations of nitrate nitrogen, there is little difference between concentrations upstream and downstream of the discharge, and instream concentrations meet Freshwater NPS Attribute State A for toxicity.

8.2.6 Biological Oxygen Demand (BOD)

Monitoring results show median BOD concentrations both upstream and downstream of the Plant are below the guideline of 2 g/m^3 for avoiding nuisance heterotrophic growths. Therefore, the FWS/AES report concludes that effects on aquatic biota, or the formation of heterotrophic growths, immediately downstream of the discharge due to BOD are not anticipated. This is supported by the regular visual observations during summer lower flow conditions between the discharge point and Mataura Bridge by Alliance staff.

No changes are expected in the immediate future. And following installation of the biological treatment system required by the proposed conditions, the concentration of BOD in the discharge would be further reduced.

8.2.7 Nutrient Enrichment

Algal growths in rivers are strongly influenced by a range of chemical (e.g. nutrient concentrations), biological (e.g. grazing pressure from macroinvertebrates) and physical factors (e.g. frequency of flow disturbance events). Therefore, for this assessment, the FWS/AES report used the MfE (2000) periphyton guidelines which relate nutrient concentrations to accrual periods and flow disturbance events to assess the potential effects of the nutrients from the discharge on algal growth.

The relevant DRP and DIN results are set out in Table 6 below. Concentrations are very similar between upstream and downstream sites and the FWS/AES report analysis of the monitoring data does not identify the Plant's discharge as having any notable impact on downstream concentrations.

However, the FWS/AES report does identify that the mean monthly DIN and DRP concentrations at all sites upstream and downstream exceed the MfE periphyton guideline

for protecting benthic biodiversity across all growth periods (see Table 7) , and significantly so for DIN. The proposed upgrade to the wastewater treatment plant will reduce the Plant's contribution to the baseload of DIN in the catchment downstream of the Plant.

Table 6: DIN and DRP concentrations upstream and downstream of the Plant.

	DIN		DRP	
	Upstream (U1/U2)	Downstream (D1/D2)	Upstream (U1/U2)	Downstream (D1/D2)
Min	0.4/0.4	0.4/0.4	0.002/0.002	0.002/0.002
Max	1.5/1.6	1.5/1.5	0.029/0.022	0.017/0.015
Mean	0.9/0.9	0.9/0.9	0.011/0.011	0.010/0.010

Table 7: The MfE (2000) guideline maximum mean monthly DIN and DRP concentrations for preventing excessive periphyton growth

Days of accrual	DIN (g/m^3)	DRP (g/m^3)
20+	<0.295	<0.026
30+	<0.075	<0.006
40+	<0.034	<0.0028
50+	<0.019	<0.0017
75+	<0.010	<0.001
100+	<0.010	<0.001

8.2.8 Microbial Parameters

E.coli is the principle measure used by the Freshwater NPS (see Section 12.2) and Environment Southland's RMA plans (see Section 12.6 and 12.7) for determining the suitability of a river for contact recreation. *E. coli* is used as the indicator of possible faecal contamination because it is commonly found in human and animal faeces and it is relatively inexpensive to monitor. As is the case for a significant number of New Zealand's

waterbodies in lowland farming areas, *E.coli* levels in the Mataura River, including downstream of the Plant, are high. They sit in the Red Freshwater NPS Attribute State, and exceedances of the New Zealand single sample bathing water standards[6] are common (Table 8).

Table 8: Freshwater NPS Attribute State of Mataura River based on historical *E. coli* data.

Location	% exceedances over 540	% exceedances over 260	Median concentration (cfu/100ml)	95th percentile *E.coli*/100 ml)	Attribute State
Mataura River 200m d/s Mataura Bridge	77	83	1551	12551	E (Red)
Mataura River at Gore	35	59	361	5401	E (Red)
Mataura River at Mataura Island Bridge	42	56	401	4451	E (Red)
Mataura River at Parawa	17	30	156	1066	D (Orange)
Mimihau Stream at Wyndham	39	69	391	2651	E (Red)
Mokoreta River at Wyndham River Road	35	58	321	3801	E (Red)
Oteramika Stream at Seaward Downs	55	82	601	4551	E (Red)
Waikaia River at Waipounamu Bridge Rd	20	31	161	2751	E (Red)
Waikaka Stream at Gore	42	61	331	19251	E (Red)

[6] 260 CFU/100mL and 540 CFU/100ml.

As outlined in Section 4.4.2, the Plant's discharge also contains relatively high concentrations of *E.coli,* and instream monitoring data shows *E.coli* concentrations increase significantly downstream of the Plant due to its wastewater discharge. For instance, at the site immediately downstream of the discharge (Mataura River 200m d/s Mataura Bridge), exceedance of the 540 CFU/100mL single sample standard increased from 35% to 77%. This suggests the Plant's discharge is having an effect on the *E.coli* levels in the river downstream of the Plant.

However, as is outlined in Section 4.4.2, despite the Plant's discharge containing relatively high *E.coli* levels, the level of pathogens in the discharge, which are of most concern when considering effects on human health, are much lower and more variable. In turn, the Plant's impact on the levels of those pathogens in the Mataura River below the discharge would also be much smaller. This is discussed further in Section 8.5 below which addresses the human health related effects of this change in water quality.

8.3 EFFECTS ON AQUATIC ECOLOGY IN MATAURA RIVER

In addition to assessing effects on water quality, the FWS/AES report assessed effects on in-stream ecological values with a view to identifying any instream effects of the Plant's discharge. Potential effects of concern which the FWS/AES report investigated included:

- Proliferation of nuisance algal growths;
- Reduced benthic invertebrate community health; and
- Reduced fish abundance, diversity and health.

A summary of the FWS/AES report's key findings is provided below.

8.3.1 Algal Growths

Nuisance algal growths include sewage fungus and periphyton. The amount of periphyton in a river is determined by interactions between flow regime, nutrient status, light and temperature, streambed substrate and benthic invertebrate grazing. Algal growths are the most direct indicator of nutrient related effects on rivers and in turn have been monitored upstream and downstream of the Plant at least annually since 2012.

This monitoring has recorded variable algal cover and biomass between sites upstream and downstream of the Plant, and among surveys. It indicates that while DRP and DIN concentrations are relatively high, this is not stimulating periphyton growths upstream or downstream of the Plant except following very long late summer – early autumn accrual periods (the most noticeable example of which was in February / March 2019). The FWS/AES report also notes the sewage fungus and periphyton monitoring data shows no effect from the Plant's wastewater discharge.

8.3.2 Benthic Invertebrates

Benthic invertebrates are a commonly used indicator of water quality with indices such as the MCI, QMCI and percent EPT[7] designed to specifically assess nutrient related effects. Benthic invertebrates have been monitored at least annually at several locations upstream and downstream of the Plant since the early 1990s.

Overall, the benthic invertebrate community upstream and downstream of the discharge reflects the cumulative effect of catchment-wide inputs upstream and is generally in fair to poor health across most benthic invertebrate indices.[8]

Total taxa number and EPT taxa number have been variable across sites and between surveys over the 2012–2019 period with no clear evidence that the discharge causes a reduction in total diversity or the diversity of water quality sensitive taxa. Prior to the most recent surveys, there had been a general increasing trend in *Deleatidium* sp. abundance at downstream monitoring locations. In February 2019, *Deleatidium* sp. abundance at the downstream monitoring sites was lower compared to upstream sites. The decline in *Deleatidium* sp. abundance at downstream sites in February 2019 is not explained by periphyton cover and biomass or Amm-N concentrations, which are all potential effects of the discharge. Rather, the FWS/AES report has assessed that this decline in abundance could be attributed to high river temperatures leading up to and at the time of the February 2019 survey and an increase in overall stress that occurred at the time. A sharp decline at upstream and less pronounced decline at downstream sites in *Deleatidium* sp. was also recorded in March 2019. This is very likely to be related to the elevated river temperature and extensive late successional stage algal growths at the time of the survey associated with the longest late summer – early autumn accrual period since 2012. It also suggests the upstream decline may have been slightly delayed compared with downstream.

MCI scores have been similar upstream and downstream of the Plant over the period between January 2012 and March 2019 and remained within the 'fair' stream health range for all sites. QMCI scores have been variable across years largely as a result of differences in the relative abundance of *Deleatidium.* Overall, the FWS/AES report concludes that results indicate the treated wastewater discharge has not resulted in a consistent decrease in MCI and QMCI scores between upstream and downstream locations over a range of accrual periods between April 2013 and December 2017. The FWS/AES report also identifies no evidence or causal links that can be associated with the discharge for the February 2019 survey and the March 2019 declines that occurred both upstream and downstream.

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[7] EPT stands for Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) which are macroinvertebrates that are sensitive to water pollution.

[8] It is notable however, that QMCI is sometimes in the 'good' range.

8.3.3 Fish

The lower Mataura River is a migratory pathway for a range of whitebait species, brown trout, salmon. Fish abundance and health can be influenced by a wide range of factors including proximity to the coast, barriers such as the Mataura Falls, habitat quality and water quality.

Results from fish surveys indicate that the fish community in run habitat is dominated by a small number of species – longfin and shortfin eel, elvers and upland bully. Elvers were more abundant at downstream sites compared to upstream sites and could either be attributed to differences in habitat suitability, or simply the timing of the upstream migration by a particular group of new recruits into the river. The fish community in the reach between the Mataura Falls and Mataura Bridge, based on survey results, indicates that the Mataura River immediately upstream and downstream of the discharge supports a healthy longfin eel population including several very large fish (+5 kg).

Anecdotal evidence indicates that there is a large resident population of brown trout and late summer and early autumn runs of sea run brown trout and salmon are regularly seen and caught between the Mataura Falls and the Mataura Bridge. The presence of such large numbers of brown trout and seasonal migration of brown trout and salmon indicate that the water quality in this section of the river is suitable for supporting salmonids that are amongst the most water quality sensitive species present in New Zealand.

The contaminants that can make fish unsuitable for consumption are persistent pollutants such as certain metals (e.g. mercury) and persistent organic pollutants (e.g. dioxins). There are no persistent pollutants of this type in the wastewater discharge and therefore adverse effects from the discharge on fish health or the consumption of fish are not expected.

8.4 EFFECTS ON TOETOES ESTUARY

As outlined in Section 3.3, Toetoes Estuary is in declining condition in relation to eutrophication with excessive nutrient inputs being the primary driver of the eutrophication symptoms being expressed.

The TN and TP loads received by the Estuary have been estimated at 3,110 tonnes per year and 345 tonnes per year respectively.

On this basis since 2012 the contribution of the Plant's discharge to Toetoes Estuary TN loads has been assessed as being 1.1 - 1.7% and its contribution to TP has been assessed as 0.7 - 1.3%, with the majority of the TN and TP load entering Toetoes Estuary derived from other catchment inputs, particularly diffuse sources.

In turn, the FWS/AES report concludes that the effects of TN and TP in the Plant's discharge on Toetoes Estuary are no more than minor.

However, the FWS/AES report is of the view that Alliance will need to reduce its levels over time as part of catchment-wide initiatives to improve water quality.

This will occur following installation of the biological treatment system which the proposed conditions require to be commissioned within 15 years of the commencement of the new consent, which is expected to reduce the concentration of TN in the discharge by approximately 68% and annual loading by approximately 50% relative to present.

However, while this represents a significant reduction in the TN load contributed by the Plant, it represents less than 1% of the total TN load received by the Estuary. In turn, the FWS/AES report expect it to have little, if any, detectable effect on the nutrient status of Toetoes Estuary.

8.5 HUMAN HEALTH

E.coli is the principle measure used by the Freshwater NPS and Environment Southland's RMA plans for determining the suitability of a river for contact recreation. *E.coli* is used as the indicator of possible faecal contamination because it is commonly found in human and animal faeces and it is relatively inexpensive to monitor. As is the case for a significant number of New Zealand's waterbodies in lowland farming areas, *E.coli* levels in the Mataura River, including downstream of the Plant, are high. They sit in the Red Freshwater NPS Attribute State, and exceedances of the New Zealand single sample bathing water standards[9] are common. They also do not meet the relevant Southland Land and Water Plan standards. A recent Environment Southland study of Campylobacter risk in this catchment using actual instream data for that parameter (rather than levels of *E.coli* as an indicator) suggests that the health risk in this catchment may not be anywhere near as high as is suggested by the *E.coli* concentrations present,[10] and additional monitoring data collected in 2018 by Streamlined Environmental supported this finding. However, Alliance understands that baseline water quality conditions in the Mataura River (absent any contribution from the Plant) may be 'un-swimmable' at times due to the contribution of pathogens from other upstream sources.[11]

As outlined in Section 4.4.2, the Plant's discharge also contains relatively high concentrations of *E.coli*, and as outlined in Section 8.2.8, instream monitoring data shows *E.coli* concentrations increase significantly downstream of the Plant due to its wastewater discharge. However, as is also outlined in those sections, despite the Plant's discharge containing relatively high *E.coli* levels, the level of pathogens in the discharge, which are of

[9] 260 CFU/100mL and 540 CFU/100ml.

[10] Cressey, P., Hodson, R., Ward, R., & Moriarty, E. (2017). Use of QMRA to Assess the Human Health Risk of the Mataura River, Southland http://isrs2017.com/images/Cressey_Peter.pdf.

[11] Cressey, P., Hodson, R., Ward, R., & Moriarty, E. (2017). Use of QMRA to Assess the Human Health Risk of the Mataura River, Southland http://isrs2017.com/images/Cressey_Peter.pdf.

most concern when considering effects on human health, are much lower and more variable.

To further understand the effect of the Plant elevating downstream *E.coli* levels on human health, a Quantitative Microbial Risk Assessment (QMRA) has been undertaken by Streamlined Environmental to predict the health risk to people swimming in the Mataura River below the Plant's discharge point as a result of the Plant's discharge only. A copy of this QMRA report is included in **Appendix 3** of this AEE.

The QMRA shows that while the Plant causes *E.coli* concentrations in the Mataura River to increase significantly below the Plant's discharge point, this does not equate to a significant increase in health risk, and the risk of a person swimming below the Plant becoming ill due to the Plant's discharge is well below 1% which is considered an acceptable level. It is noted that this is broadly consistent with the aforementioned Environment Southland study which concluded the Plant's discharge contributed only a relatively small proportion of the overall Campylobacter risk in this catchment.[12]

However, while the Environment Southland and Streamlined Environmental studies show the baseline health risk in this catchment, and the Plant's contribution to that health risk, are not as significant as measured *E.coli* levels would suggest, this does not equate to there being no risk. It is evident that there are times when the Mataura River is un-swimmable and as is outlined in Section 12.2 of this AEE, Environment Southland is obliged under the Freshwater NPS to set policy and methods to improve water quality so that it is suitable for primary contact more often. The key indicator for how that is being achieved is also instream *E.coli* concentrations.

In that context, Alliance acknowledges it should contribute to any catchment-wide plan for improving water quality for contact recreation, and reducing *E.coli* concentrations in the Mataura River. This will occur following installation of the UV treatment plant required by the proposed conditions, which is expected to reduce the *E.coli* levels in the Plant's wastewater discharge by more than 99%.

8.6 EFFECTS ON RECREATION

Rob Greenaway & Associates has undertaken a qualitative and quantitative assessment in order to determine the recreational values that exist in the Mataura River and whether these are being affected by the Plant, and more specifically, the wastewater discharge to the Mataura River (the recreation report). A copy of the recreation report is provided in **Appendix 5**.

[12] Cressey, P., Hodson, R., Ward, R., & Moriarty, E. (2017). Use of QMRA to Assess the Human Health Risk of the Mataura River, Southland http://isrs2017.com/images/Cressey_Peter.pdf.

As outlined in Section 3 of this AEE, the following key recreational values have been identified:

- The outstanding nature of the Mataura River for brown trout fishing;
- Its relatively high use for swimming, both upstream and downstream of Mataura;
- A very popular whitebait fishery in the lower reaches;
- Use of the riverbanks, berms, reserves and angler access points for a variety of terrestrial activities, mostly around settlements, and with relatively high activity levels at the Coal Pit Road angler access point;
- A low level of use of the river for salmon fishing;
- Some use of the river for jet boating and kayaking, but with no relevant data to quantify these uses.

Consultation (including formal interviews) with key recreational stakeholders and users of the Mataura River was also completed. The interviewees provided a variety of views on the changes to the above recreation values over time.

While no-one interviewed would drink from the Mataura River below Cattle Flat, all agreed that the river's water quality was far better than in the 1980s when there were a variety of untreated municipal and industrial discharges occurring. Several respondents – mostly anglers – considered the water quality now to be quite good, but potentially of decreasing quality due to farming intensification. Others considered the water quality to be poor. Many noted a variety of sources of contamination, including farming and treated municipal wastewater, particularly at Gore. The Alliance discharge did not feature as a major issue for most respondents, but was noted by kayakers.

Opinions about the quality of the fishery also varied and the presence of the Plant's discharge does not appear to be having an adverse effect on the people's use and enjoyment of the fishery. Most agreed that the mayfly rise on the Mataura River had declined in frequency and intensity, with several theories as to the cause. The most experienced angler on the river downstream of Mataura – with detailed angling diaries – considered the insect life in the river to be quite healthy, but that warmer summer temperatures (climate change) were confining the rise to evenings and night, were less frequent generally, and were occurring later in the 'summer' season ('May is the new April'). Warmer temperatures were also considered a cause in the change in the patterns of the hatch by other anglers, but nutrification and sedimentation and (therefore) fewer insects were also identified. Opinions about the number and quality of trout varied, with some considering the numbers and quality to be consistent, and others considering size, quality and numbers to have all declined. Some considered a reduction in trout size to be the result of a cleaner river. The change in the frequency, timing and duration of the mayfly

hatch has influenced a change in fishing technique, with more nymphing over dry fly fishing.

Swimming appears to be, in the main, a very local activity with a small number of regular users – also influenced by the recent closure of the community swimming pool at Mataura. There appears to be no common local conversation about illnesses from contact with the river water, and bathing water quality reports issued by Environment Southland do not appear to affect many swimmers' choices. The results of the QMRA report are also important when considering the effects of the Plant's discharge on swimming.

Having considered these responses, the FWS/AES report and the QMRA the key finding of the recreation assessment is that:

- The key potential issues when considering the effects of the proposed activities on recreation values are:
    - The degree to which the proposed activities increase the risk of contracting a waterborne disease from water contact recreation, including swimming, paddling and trout and whitebait fishing;
    - The effect of the discharge on trout and whitebait abundance and quality, associated with water quality and other habitat parameters, such as the health of the in-river macroinvertebrate community and water temperature;
    - The degree to which the discharge exacerbates nuisance periphyton growths, affecting bathing quality and the risk of anglers slipping; and
    - Odour from the discharge, alterations of water colour and clarity and the generation of foams and scums, affecting water contact recreation as well as visual amenity, angling and white baiting.
- The contribution of the discharge and water take to adverse effects on recreation in the Mataura River in respect of the above are very slight and subsumed by the many other sources of nutrification and contamination.
- There appears to be no causal relationship between the discharge and levels of periphyton, macroinvertebrates, colour, clarity or the generation of foams or scums – and hence trout and whitebait habitat and the ability to catch them.
- The Plant should reduce its levels of key contaminants as part of catchment wide initiatives to improve water quality.
- While not urgent considering the existing low scale of effect on recreation amenity (and ecological values), it is recommended that options to reduce *E.coli* levels in the discharge be implemented during the life of a renewed consent.

8.7 CULTURAL EFFECTS

In order to identify and assess the cultural effects of the activities, Alliance requested Te Ao Marama Inc (**TAMI**) to prepare a Cultural Values Report. Alliance has also engaged with TAMI and Hokonui Runanga in respect of these applications and that process.

It is clear from the engagement that has occurred thus far that iwi have a long association and strong traditional relationship with the Mataura River, and mahinga kai resources, nohoanga and mātaitai are all important and relevant values here.

It is also clear that:

- The disposal of wastewater directly to water is an activity which is of potential cultural concern.
- Generally speaking, Hokonui Runanga do not believe consents should be granted for a term exceeding 25 years, as doing so is essentially making decisions for the next generation.
- Meaningful ongoing engagement and suitably recognising the role of Hokonui Runanga as kaitiaki of the Mataura River is important.

These first two of these issues were important considerations in the detailed assessment of alternative options for treatment and disposal of the Plant's wastewater which is described in Sections 9.3.1 and 10. However, for reasons set out in Section 10, a discharge to land option is not practicable here, and the proposed wastewater treatment plant upgrades, along with a consent term which allows those upgrades to be progressively implemented and the financial investment to be justified and secured over an appropriate timeframe, is considered to be the best practicable option.

Alliance welcomes the third matter and Key Alliance staff also met with key Te Ao Marama and Hokonui Runanga on 23 May 2019 to discuss the development of a Memorandum of Understanding (MoU) between the two parties, separate from this consent process. It is expected that any MoU would eventually incorporate meaningful ongoing engagement between the parties and provision for Hokonui Runanga to exercise kaitaikai over the Mataura River.

8.8 SUMMARY

A comprehensive assessment of the effects of the discharge on the receiving environment has determined that no adverse effects trigger the need for immediate or urgent mitigation.

However, that assessment has identified that the lower Mataura River contains very high levels of *E.coli*, and the Plant's discharge significantly increases those levels in the receiving water downstream. But because the level of pathogens in the discharge, which

are of most concern when considering effects on human health are much lower and more variable, the Plant's discharge does not cause a significant increase in the health risk experienced by a person swimming below the Plant, and the risk of a person becoming ill due to the Plant's discharge is well below 1%, which is considered an acceptable level. It also appears the Plant's discharge is not having an adverse impact on people's use of the river for recreation purposes. However, Alliance accepts it will need to reduce its levels of *E.coli* as part of catchment-wide initiatives to improve water quality. And this will occur following the planned installation of the UV treatment plant required by the proposed conditions, which is expected to reduce the *E.coli* levels in the Plant's wastewater discharge by more than 99%.

The assessment also identifies the Mataura River is degraded in terms of the nitrogen levels present, periphyton reflects moderate to high enrichment at times, and MCI and QMCI data are representative of fair to poor (but occasionally good) health. Toetoes Estuary also continues to degrade with extensive macroalgal growth driven by very high nutrient loads from the catchment. While there is no evidence suggesting the Plant's discharge has a direct adverse effect on these stressors downstream of the discharge, it does contribute a small portion to the overall loads of Amm-N and TN downstream of the discharge.

Alliance accepts it will need to reduce its levels of Amm-N and TN as part of catchment-wide initiatives to improve water quality. And this will occur following installation of the biological treatment system required by the proposed conditions, which is expected to reduce the concentration of TN in the discharge by approximately 68% relative to present.

The Mataura River is attributed significant value by iwi. Alliance is continuing to engage with Hokonui Runanga and TAMI with a view to identifying appropriate alternate means of avoiding, remedying or mitigating the effects of the discharge on cultural values.

9. MANAGEMENT AND MONITORING OF ACTUAL AND POTENTIAL EFFECTS

9.1 INTRODUCTION

The assessment of effects in sections 6 - 8 identifies a range of positive and adverse actual and potential environmental effects that will, or are likely to arise as a result of the ongoing operation, maintenance and upgrading of the Plant. That assessment is based on the various technical assessments commissioned by Alliance. It is noted that many of the technical assessments have recommended the implementation of various measures in order to assist in avoiding, remedying or mitigating potential adverse effects from the proposed activities on the environment.

These recommendations have shaped the development of the suite of management and monitoring measures that are proposed as conditions on the resource consent applications that are being sought by Alliance. A copy of the proffered consent conditions is provided in **Appendix 1** to this AEE.

This section describes those measures.

9.2 ABSTRACTION

The main management and monitoring measures proposed are:

- Upgrading the intake screens;
- Reducing use;
- Implementation of a low flow contingency plan; and
- Monitoring the rate and volume of water abstracted.

9.2.1 Intake Screening

As set out in Section 7, the only potential effect of any consequence associated with the take of water is the potential for juvenile fish to be entrained in the intakes. FWS recommended that all the intakes that are currently fitted with 5 – 6 mm screen mesh be fitted with 2 - 3 mm screens to further reduce the potential for this to occur and to meet best practice standards for screening intakes. Alliance propose to implement this recommendation.

9.2.2 Reducing Use

PDP have identified scope to reduce the Plant's water use, and the volume of the wastewater discharge by approximately 37% by recycling white water within the wastewater treatment plant. However, for reasons outlined in Section 9.3.1 below this has implications for discharge quality which need to be carefully considered to avoid

unforeseen adverse toxicity and eutrophication effects on aquatic organisms within the mixing zone and downstream.

In turn, while the conditions require water use to be reduced within 3 years of the commencement of the new consent, rather than specifying a fixed reduction percentage now, they require the actual volume reduction to be determined via a Resilience and Water Saving Strategy which determines what can be reasonably achieved:

- without increasing the total contaminant load within the discharge when measured on a daily basis when assessed against the limits which will apply from the commencement of the new consent; and
- without giving rise to unforeseen adverse toxicity and eutrophication effects on aquatic organisms within the mixing zone and downstream.

This is discussed further in Section 9.3.1 below.

9.2.3 Low Flow Contingency Plan

During times of extreme drought, when flows are low, farmers can often be forced to de-stock their farms, which leads to an influx in animals at Alliance's plants. It is therefore essential to enable Alliance's plants to continue to process stock in the interests of animal welfare during such periods.

To mitigate the effects of operating during low flows, the existing consent requires Alliance to prepare and implement a low flow contingency plan which describes the practicable measures to be taken by Alliance to minimise the abstraction of water during times when the flow of the Mataura River at the Tuturau recording site is less than 20 cubic metres per second. This will be retained.

9.2.4 Monitoring

Alliance is proposing to take up to approximately 21,200m^3 of water per day for cooling water purposes. As set out in Section 4, the cooling water system takes water from the race, passes it through the condensers and then discharges the water back into the race. No monitoring is proposed for this take, other than recording the daily volume of water taken using the existing methods deemed appropriate during a 2018 resource consent process on that matter.

The remainder of the water that is to be taken by Alliance is used in processing activities, potable water and for activities such as truck washing. The majority of this water is also returned to the river via the treated wastewater discharge. As part of the existing consent obligations, Alliance is required to install and maintain water metering devices on those takes where the water is used or associated with Plant processing activities. Alliance will continue to maintain this water metering and measure the quantum of take for processing activities as part of this proposal.

9.3 DISCHARGES

9.3.1 Three Stage Upgrade of the Wastewater Treatment Plant (Reducing Volumes and Improving Quality)

A comprehensive assessment of the effects of the discharge on the receiving environment has determined that no adverse effects trigger the need for immediate or urgent mitigation.[13]

However, that assessment has identified that:

- The lower Mataura River contains very high levels of *E.coli*, and the Plant's discharge significantly increases those levels in the receiving water downstream; and
- The Mataura River can generally be characterised as degraded in respect of its nutrient loads, and the estuary is in a "MODERATE" but declining condition in relation to eutrophication, with the Plant's discharge contributing to catchment nutrient loads.

As set out in Section 12, the planning framework which applies here also anticipates a long-term catchment-wide improvement in water quality for these key parameters. No detail is available yet on the extent of the catchment scale improvement anticipated for each parameter, or the timeframes and methods for achieving that improvement, including which parameter should be afforded priority. The planning framework anticipates these matters will be determined via a soon to be commenced collaborative planning process for the Mataura Freshwater Management Unit involving all key stakeholders. The initial outputs from that collaborative planning process are expected in 2022, and they are not expected to be formalised via the RMA Schedule 1 process until at least 2024/2025.

While the plan for improving catchment water quality will not be known for several years, it will be finalised, and implemented during the term of the resource consents being sought by Alliance. Alliance has sought detailed advice from PDP on what methods and technology could be potentially employed in order to reduce the loads of these key parameters from the Plant to the Mataura River (refer **Appendix 7** attached).

After considering the PDP assessment, a staged upgrade of the wastewater treatment plant represents the best practicable option for the disposal of the Plant's wastewater. This is addressed in more detail in Section 10 below.

The proposed upgrade represents a significant capital undertaking and it is proposed that will be completed in a staged manner as follows:

[13] Freshwater Solutions Ltd 2019. Assessment of the Effects of Alliance Mataura's Discharges and Water Take on Mataura River and Toetoes Estuary. Submitted to Alliance Group Ltd (DRAFT). March 2019.

Year 1 – 3: Implementing water reduction opportunities and addressing existing resilience issues.

PDP have identified potential intermittent cross contamination points between the green and non-green waste stream and, potential failure points within the reticulation system. To address these resilience issues, the following will be completed in the first 3 years of the new consent term:

- Re-route all pipework that runs above or in the water race to a location that prevents waste leaking into the water race or fresh water leaking into the treatment system;
- Re-route all pipework that runs above the river to a location that prevents waste leaking into the river;
- Modify the beef sump milli-screen overflow to prevent green waste overflows into the non-green waste stream;
- Modify the stockyard and tripe recycle area to prevent green waste overflows into the non-green waste stream.

PDP has also identified scope to reduce the Plant's water use, and the volume of the wastewater discharge by approximately 37% by recycling white water within the wastewater treatment plant. This is an essential initial step, in that any water reduction measures that are successfully implemented will influence the sizing parameters applied to any subsequent treatment upgrades required to further treat the discharge. However, as set out above PDP note that recycling of treated wastewater for white-water generation will require careful management to avoid foam generation in the inter-stage tank, and that consideration will need to be given to the implications of the decreased dilution effect of the white-water and the likely increase in concentration (but not load) of key parameters in the discharge.

To address this uncertainty, within six months of the commencement of this consent, the proposed conditions require Alliance to prepare and submit to Environment Southland a Resilience and Water Saving Strategy, the purpose of which is to identify:

- Measures to avoid potential intermittent cross contamination points between the Green and Non-Green waste streams and potential failure points within the reticulation system; and
- Methods to enable the recycling of white water within the wastewater treatment plant to reduce the total volume of wastewater discharged to the Mataura River to the extent that can be reasonably achieved:
    - without increasing the total contaminant load within the discharge when measured on a daily basis when assessed against the limits which apply from the commencement of the new consent; and

- without giving rise to unforeseen adverse toxicity and eutrophication effects on aquatic organisms within the mixing zone and downstream.

The proposed conditions require this Strategy to include:

- The new contaminant concentration limits to be applied to meet this obligation (acknowledging that the volume of the discharge is reduced meaning that the proportion of contaminant load to discharged volume will be higher within the discharged waste stream); and
- A review by a suitably qualified and experienced ecologist which assesses the effects of the discharge in order to confirm that the newly set contaminant limits for the discharge will unforeseen adverse toxicity and eutrophication effects on aquatic organisms within the mixing zone or downstream.

The proposed conditions require Alliance to implement the measures described in the Resilience and Water Saving Strategy within three years of the commencement of the new consent. Once implemented and trialling of the new system is complete, the proposed conditions also require Alliance to commission a review by a suitably qualified and experienced ecologist to assess the effects of the discharge in order to confirm that the newly set contaminant limits within the discharge are not giving rise to adverse toxicity effects on aquatic organisms within the mixing zone. Year 5: Tertiary Disinfection of Microbial Contaminants.

Alliance proposes that within five years of the commencement of the new consent equipment will be installed (a UV plant or similar) to disinfect the wastewater discharged from the site in order to inactivate pathogens.

This upgrade is expected to incur capital costs of approximately $4.1 million, and additional annual operational expenditure of $230,000.

Following installation of the treatment system the proposed conditions would require the *E.coli* concentration in the discharged wastewater to not exceed an annual mean of 1,000 CFU/100ml and 95th percentile of <10,000 CFU/100mL. This is a substantial reduction relative to the concentrations set out above in Table 4.

Year 15: Biological Treatment System

By Year 15, Alliance proposes to install a full biological treatment system to treat the Plant's wastewater to reduce BOD, ammoniacal nitrogen and total nitrogen concentrations.

Alliance will firm up the detailed design of the new biological treatment system closer to the installation date. However, it is currently anticipated a large, lagoon based, biological reactor will be installed. Due to the large lagoon size (approximately 8,500 m^3), it will likely be located 2 km away on land currently owned by Alliance Group Ltd, with wastewater

being pumped to the lagoon for treatment, and then back to the Plant for discharge via the existing outfall.

The additional capital cost of installing tertiary disinfection of microbial contaminants and a biological treatment system is significant and estimated to be $13.98 million with annual operating costs of $1,060 million.

Discharge concentrations for Amm-N and TN are expected to significantly reduce and this is reflected in the allowable concentrations in the proposed conditions following installation of the biological treatment system.

The annual TN load will also reduce significantly relative to current, even if the Plant operates at a significantly increased capacity relative to the numbers of stock processed in the past five years.

9.3.2 Discharge Limits

In accordance with the advice of Alliance's technical advisors, the proposed conditions include:

- A series of day to day compliance limits on the concentration of key parameters in the wastewater discharge; and
- Compliance limits on the total annual load of nutrients the Plant contributes to the catchment per year.

The day to day concentration limits are important in respect of the discharge's effects on the Mataura River, and are included for this purpose.

The annual load limits are important in respect of the discharge's effects on Toetoes Estuary and are included for this purpose.

9.3.2.1 Day to Day Consent Limits

Concentration based limits are included to protect the Mataura River. As set out in Table 10 below, the proposed conditions include four stages of concentration-based limits as, namely:

- **Limits which apply immediately**, and which reflect the limits on the existing consent and current discharge quality;
- **Limits which apply following the implementation of the Resilience and Water Saving Strategy** - which is expected to reduce water use by more than 30%, and wastewater discharge volumes by a similar amount. The total load of each parameter is not expected to change as a result, but the concentration of each parameter in the wastewater discharge is expected to increase due to that load being entrained within a lower volume of wastewater. The proposed conditions do not specify what the

concentration limits are following the implementation of the Resilience and Water Saving Strategy. Rather they require those limits to be determined by the Resilience and Water Saving Strategy itself, and a certification process is included in the conditions to ensure the revised limits:

  - Do not increase the total contaminant load within the discharge when measured on a daily basis when assessed against the limits which apply immediately; and
  - Do not cause unforeseen adverse toxicity and eutrophication effects on aquatic organisms within the mixing zone and downstream.

- **Limits which apply following the implementation of the Resilience and Water Saving Strategy and disinfection plant.** The only change at this stage is the addition of a limit on the *E.coli* concentrations in the discharge.
- **Limits that apply following installation of the biological treatment**. These require a substantial improvement in water quality for nearly all parameters

9.3.2.2 Annual Nutrient Loads

Alliance's technical advisors note it is the annual load of nutrients received by Toetoes Estuary that is of concern from an ecological perspective and that limits on the annual nutrient load discharged from the Plant is important in that context.

Annual load is a function of the discharge concentration of the wastewater discharged, and the total annual volume discharged. It therefore fluctuates depending on the number of stock units Alliance processes per season. And this is reflected in the annual load discharged by the Plant in recent years (see Table 9).

Table 9: Total nitrogen load discharged in the Plant's wastewater.

Season	Annual Total Nitrogen Load (tonnes)	Dressed weight (tonnes)
2010/2011	56	30,895
2011/2012	53	30,918
2012/2013	40	26,678
2013/2014	33	26,313
2014/2015	43	30,230
2015/2016	36	29,042

Season	Annual Total Nitrogen Load (tonnes)	Dressed weight (tonnes)
2016/2017	39	30,567
2017/2018	52	33,709
2018/2019 (as at 27 April 2019-	30 (equal to the same time in 2017/2018)	22,239

After Alliance ceased its sheep and lamb operation at Mataura, and commissioned its new cattle processing plant at the site it took some time for cattle processing numbers to increase, and this is reflected in the dip in TN load discharged from the Plant between 2012/2013 and 2016/2017 (see Table 9). However, since 2017/2018 stock numbers have returned to expected levels, through a combination of a general increase in cattle numbers, some processing of m. bovis infected stock, and some destocking as a result of the droughts.

Alliance expects processing levels to remain at current levels in the future. While processing of m. bovis infected cattle is only expected to continue for the next two to three years (assuming no new cases of m. bovis arise), this is expected to be offset by a continued increase in general cattle numbers and there is also a proposal to move soup stock processing from Lorneville to Mataura (to save the transport costs (and emissions) associated with transporting raw beef bones from Mataura to Lorneville).

The proposed conditions contain limits on the annual load of total nitrogen in the discharge for the period prior to and following the proposed wastewater treatment plant upgrade.

Two limits are proposed prior to the upgrade:

- A maximum annual load of 60 tonnes per year; and
- A total TN load of 780 tonnes that can be discharged prior to the wastewater treatment plant upgrade being commissioned (this is equivalent to 52 tonnes per year being discharged over a 15 year period).

These accommodate some interannual variability in stock processing numbers while capping TN loads at about the same levels as currently occur. If Alliance were to consistently discharge annual TN loads at the higher end of that allowed, it would need to bring its proposed upgrade forward to accommodate that.

The limit which applies following the wastewater treatment plant upgrade is 25 tonnes per year. This represents approximately a 50% reduction in annual load relative to that which is currently occurring.

Table 10: **Proposed limits for new discharge permit (note: consistently maintained means 4 out of 5 samples meeting the relevant limit).**

Parameter	Pre-Volume Reduction	Post Volume Reduction	Post Volume Reduction and Disinfection	Post Biological Treatment System
Discharge Concentration Limits				
Ammoniacal Nitrogen	Shall not exceed a maximum of 50 g/m^3 and consistently maintained at <30 g/m^3	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy t	Shall not exceed a 12 month median of 5 g/m^3 95th%ile of 10g/m^3
cBOD$_5$ Load	Shall not exceed a maximum of 3,500 kg/day	Shall not exceed a maximum of 3,500 kg/day	Shall not exceed a maximum of 3,500 kg/day	Shall not exceed a maximum of 3,500 kg/day
cBOD$_5$	Shall not exceed a maximum of 300 g/m^3	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	Shall not exceed a rolling 12 month median of 50 g/m^3 and 95th%ile of 100 g/m^3
Total Suspended Solids	Shall not exceed a maximum of 200g/m^3 and consistently maintained at <100 g/m^3	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	Shall not exceed a rolling 12 month median of 20 g/m^3 and 95th%ile of 40 g/m^3
Total Kieldahl nitrogen	Shall not exceed a rolling 12 month median of 60 g/m^3 and 95th%ile of 80 g/m^3	No change to daily load.	No change to daily load.	No limit

Parameter	Pre-Volume Reduction	Post Volume Reduction	Post Volume Reduction and Disinfection	Post Biological Treatment System
		Concentration to be determined by the Resilience and Water Saving Strategy	Concentration to be determined by the Resilience and Water Saving Strategy	
Total nitrogen	No limit	No limit	No limit	Shall not exceed a rolling 12 month median of 20 g/m^3 and 95th%ile of 40 g/m^3
Total Phosphorous	Shall not exceed a rolling 12 month median of 5.5 g/m^3 and 95th%ile of 10 g/m^3	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	No change to daily load. Concentration to be determined by the Resilience and Water Saving Strategy	Shall not exceed a rolling 12 month median of 5 g/m^3 and 95th%ile of 10 g/m^3
Dissolved Reactive Phosphorus	The total load of dissolved reactive phosphorus discharged to the river shall not exceed 14.4 kg/day	The total load of dissolved reactive phosphorus discharged to the river shall not exceed 14.4 kg/day	The total load of dissolved reactive phosphorus discharged to the river shall not exceed 14.4 kg/day	The total load of dissolved reactive phosphorus discharged to the river shall not exceed 14.4 kg/day
E.coli	No limit	No limit	Shall not exceed a 12 month rolling median of 1,000 CFU/100ml and 95th%ile of 10,000 CFU/100ml	Shall not exceed a 95th%ile of 1,000 CFU/100ml
Annual Load Limits				
Total Nitrogen	Annual maximum load 60 tonnes.	Annual maximum load 60 tonnes.	Annual maximum load 60 tonnes.	Annual maximum load 25 tonnes.

Parameter	Pre-Volume Reduction	Post Volume Reduction	Post Volume Reduction and Disinfection	Post Biological Treatment System
	No more than 780 tonnes of nitrogen may be discharged from commencement of the new consent until the biological treatment system is commissioned.	No more than 780 tonnes of nitrogen may be discharged from commencement of the new consent until the biological treatment system is commissioned	No more than 780 tonnes of nitrogen may be discharged from commencement of the new consent until the biological treatment system is commissioned	

9.3.3 Monitoring

Central to the monitoring required by the proposed conditions, is the preparation and implementation of a comprehensive new Environmental Monitoring Plan (EMP).

The purpose of the EMP is to describe the methods for monitoring the physical characteristics and water quality parameters of the discharge, and the physical, water quality and biological characteristics and parameters of the Mataura River receiving waters.

The objectives of the monitoring are to:

- Confirm compliance with consent limits on discharge quality; and
- Understand the effects of the discharge on Mataura River water quality and instream ecology and confirm no unexpected effects are arising as a result of the exercise of this consent.

The proposed conditions require the EMP to include but not be limited to:

- A description and maps identifying the monitoring sites;
- A description of the methods and appropriate timing for undertaking the following monitoring requirements:
    - Discharge stream monitoring
    - Receiving water quality monitoring
    - Ecological instream monitoring
    - Fish health monitoring
- Reporting requirements.

As a minimum, the EMP is to require:

- The time and volume of treated wastewater discharged each day to be recorded;
- Representative weekly samples of treated wastewater at the point of discharge, and of receiving water both upstream and downstream of the point of discharge, while a discharge is occurring for the parameters set out in Table 11 below;
- Ecological monitoring to understand the effects of the discharge including by monitoring the periphyton and benthic invertebrate communities of the Mataura River at points above and below the point of the discharge;
- Provision for fish health monitoring.

Alliance currently undertakes monitoring in the river for both contaminants and ecological parameters both upstream and downstream of the discharge point (see Figure 12). It is proposed to continue to undertake monitoring at these locations in the river.

Table 11 Parameters for which the proposed conditions require weekly sampling (Matters in bold underline are for compliance purposes)

Parameter	Discharge Monitoring	In-River Monitoring
Enumerate *E.coli*	**Yes**[14]	Yes
Temperature	Yes	Yes
pH	Yes	Yes
Total Kjeldahl nitrogen	**Yes**	Yes
Ammoniacal nitrogen	**Yes**	Yes
Nitrate nitrogen	No	Yes
Total nitrogen	Yes	Yes
Total suspended solids	**Yes**	Yes
Total phosphorous	**Yes**	Yes
Dissolved reactive phosphorous	**Yes**	Yes
Carbonaceous BOD5	**Yes**	Yes
Dissolved oxygen concentration and saturation	No	Yes

[14] For compliance purposes only following installation of equipment to disinfect the process wastewater discharged from the site in order to inactivate pathogens.

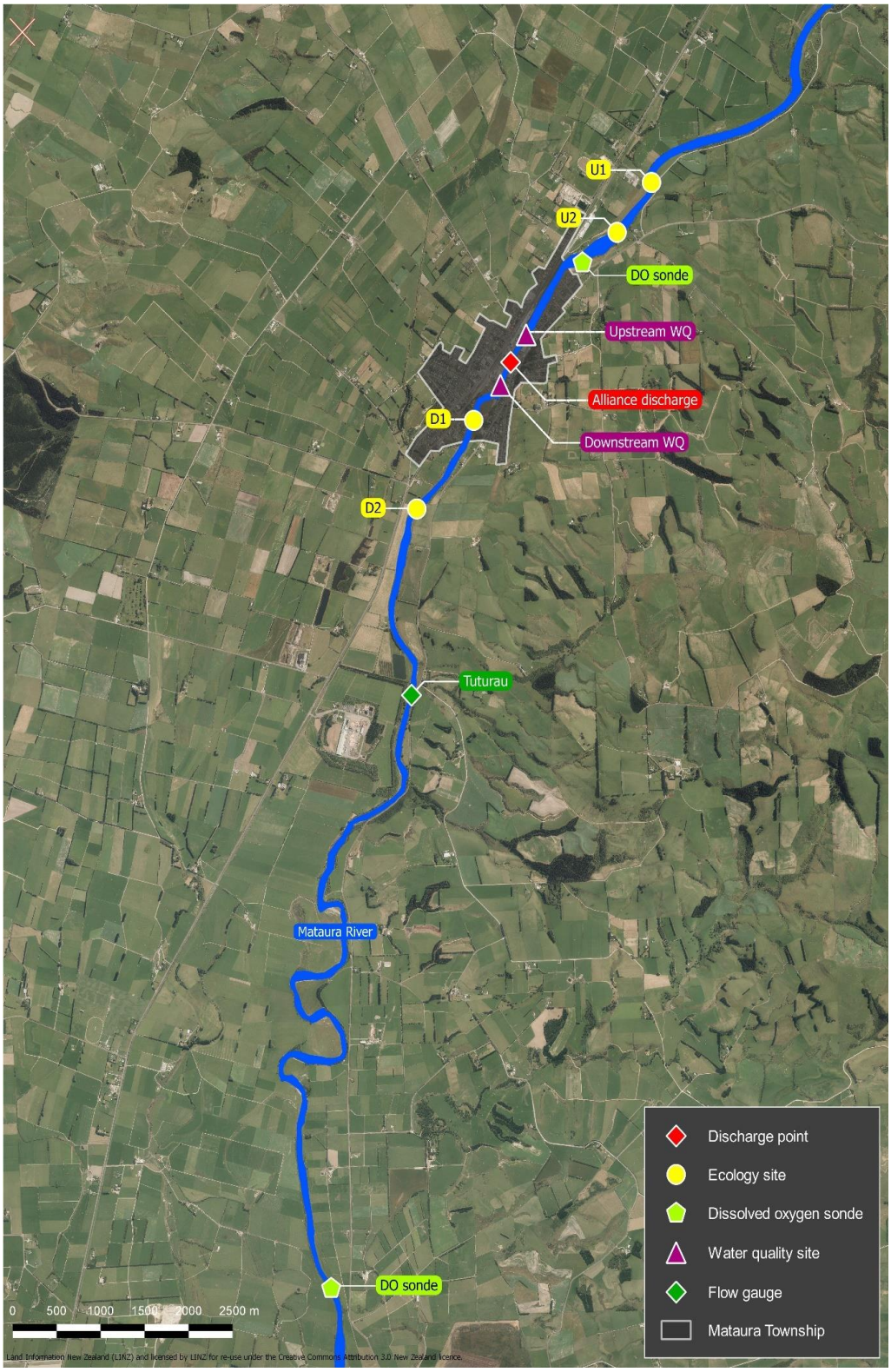

Figure 12: Monitoring locations.

9.4 KAITIAKI INPUT

TAMI and Hokonui Runanga have both expressed the view that meaningful ongoing engagement and suitably recognising the role of Hokonui Runanga as kaitiaki of the Mataura River is important in respect of the proposed activities.

Alliance is committed to doing this and is committed to continuing to work with TAMI and Hokonui Runanga on exactly how this should be done.

Alliance is in the process of establishing a Memorandum of Understanding with Hokonui Runanga which is expected to incorporate these principles.

9.5 SUMMARY OF MITIGATION, MONITORING AND OTHER MEASURES FOR MANAGING ADVERSE EFFECTS

A range of mitigation, remediation, management and monitoring measures are either occurring at the Plant or are recommended as part of this consent process. These measures are summarised in Table 12 below:

Table 12: Summary of recommended mitigation, monitoring and reporting.

Actual or Potential Effect Identified	Assessment	Mitigation Options	Monitoring and Reporting
Take and Use of Water			
Potential for fish entrainment in water intake structures.	High sweep velocity reduces the potential for entrainment of juvenile fish compared to many intakes. But some screens are 6mm which is not best practice.	All intakes to be fitted with 3 mm screens or better.	None required.
Reduced flow in the river	The only additional effect of this take on instream flows is it is remaining out of the Mataura River's main stem for a further 100 m than it would if the take did not occur and the water were discharged from the hydro race. This is not considered to have any additional or cumulative effects that are more than minor	Low flow contingency plan.	Rate and volume of water taken each day for process use monitored using water meter and datalogger. Volume of water taken each day for cooling purposes by combining the records of discharge monitoring, take monitoring, pump capacities and pump operation.
Discharge of Cooling Water			
Effects on water temperature	No measurable downstream effect.	None required.	Water temperature in the hydro race as per the existing conditions.

Actual or Potential Effect Identified	Assessment	Mitigation Options	Monitoring and Reporting
Discharge of Waste Water			
Increased microbial contamination downstream (at times) of the discharge point.	While it has been identified that the Plant discharge is having an effect on the levels of *E.coli* in the receiving water downstream of the discharge point, it has been determined that such increases do not necessarily relate to the abundance of zoonotic pathogens or individual illness risk. It is however acknowledged by Alliance that overall *E.coli* levels in the catchment are high, and these need to be improved to achieve consistency with national and regional water quality policy and outcomes for contact recreation in the river.	Installation of a disinfection system to inactivate pathogens within five years of the new consent term. This is expected to reduce the concentrations of *E.coli* in the Plant's wastewater by more than 99%	Monitoring of discharge quality and receiving river environment as part of the ongoing consent obligations.
Water temperature, BOD_5, DO, pH levels, turbidity, colour and clarity, foams and scums.	No apparent downstream adverse effect.	None required. However, following installation of the biological treatment system the amount of BOD in the discharge is expected to be significantly reduced	Monitoring of discharge quality and receiving river environment as part of the ongoing consent obligations.

Actual or Potential Effect Identified	Assessment	Mitigation Options	Monitoring and Reporting
Amm-N and Nitrate N levels downstream of the discharge point which could cause toxicity effects to biological resources.	There is an increase in Amm-N levels downstream of the discharge, however this is not considered to be of such significance that toxicity of aquatic species present in the river is likely to occur.	None required. However, following installation of the biological treatment system the concentration of Amm-N in the discharge is expected to reduce significantly.	Monitoring of discharge quality and receiving river environment as part of the ongoing consent obligations.
High nutrient (TN / TP / Amm-N / DIN / DRP) levels downstream of the discharge causing increases in nuisance algae and eutrophication.	Monitoring data shows evidence that the discharge from the Plant is elevating Amm-N and TN concentrations in the immediate vicinity downstream. The Plant's discharge will also be contributing to overall catchment loading of other nutrients downstream of the discharge. The lack of nuisance algal growths in the periphyton surveys indicates the discharge is unlikely to be stimulating nuisance algal growths despite the apparent high concentrations.	No adverse effects observed due to the discharge which trigger the need for immediate or urgent mitigation But Alliance accepts it needs to contribute to improving water quality. This will occur following installation of the biological treatment system required by the proposed conditions, which is expected to reduce the concentration of TN in the discharge by approximately 68% relative to present. The Plant already implements specific management measures (see Section 4.5.1) to reduce the TP concentrations in the discharge.	Monitoring of discharge quality and receiving river environment as part of the ongoing consent obligations.

Actual or Potential Effect Identified	Assessment	Mitigation Options	Monitoring and Reporting
Altered species composition and biomass of periphyton and benthic invertebrate community.	Overall, in terms of nutrients, periphyton and MCI and QMCI in the river, upstream and downstream of the discharge appears to generally be in fair to poor health and a degraded state, but there is no evidence linking these stressors to the discharge.	No adverse effects observed due to the discharge which trigger the need for immediate or urgent mitigation. Following installation of the biological treatment system required by the proposed conditions, Alliance's contribution to catchment loads of key parameters which contribute to this degradation (particularly TN and Amm-N) will be significantly reduced.	Monitoring of discharge quality and receiving river environment as part of the ongoing consent obligations.
Contribution of contaminants to loads within the Toetoes Estuary.	The contribution of the Plant's discharge to Toetoes Estuary TN loads has been assessed as being 1.1 - 1.7% and its contribution to TP has been assessed as 0.7 - 1.3%. The vast majority of TN and TP load entering Toetoes Estuary is derived from other catchment inputs particularly diffuse sources, and in turn, even a marked reduction of the Plant's TN and TP loads would have little, if any, detectable effect on the nutrient status of Toetoes Estuary.	No adverse effects observed due to the discharge which trigger the need for immediate or urgent mitigation. However, FWS and AES have advised that Alliance will need to reduce its levels over time as part of catchment-wide initiatives to improve water quality. This will occur following installation of the biological treatment system required by the proposed conditions, which is expected to reduce the annual TN load	None.

Actual or Potential Effect Identified	Assessment	Mitigation Options	Monitoring and Reporting
		contributed by the Plant's wastewater discharge by approximately 50% relative to present. The Plant already implements specific management measures (see Section 4.5.1) to reduce the TP concentrations in the discharge.	
Effects on fish species – salmonids and native fish.	No evidence of any adverse effects as the river supports a healthy fish population overall.	No adverse effects observed which trigger the need for immediate or urgent mitigation.	EMP to require fish health monitoring.
Effects on recreational fishing.	The assessment of effects on recreational use of the Mataura River shows that the Mataura River downstream of the discharge is currently an outstanding trout fishery, a very popular whitebait fishery.	No adverse effects observed which trigger the need for immediate or urgent mitigation.	None
Effects on cultural values and Tangata Whenua.	Alliance has commissioned Te Ao Marama Inc. to complete a cultural impact assessment of the proposed activities. TAMI have advised key points of interest would likely be the term of the consent sought, being longer than their preference for a	To be confirmed with TAMI and Hokonui Runanga	To be confirmed with TAMI and Hokonui Runanga

Actual or Potential Effect Identified	Assessment	Mitigation Options	Monitoring and Reporting
	maximum term of 25 years, and the decision to continue to discharge to water rather than land.		

10. CONSIDERATION OF ALTERNATIVES AND THE BEST PRACTICABLE OPTION

10.1 INTRODUCTION

Under the RMA, a consideration of alternative locations and methods is relevant in certain respects:

- Schedule 4 requires an AEE to include a description of any possible alternative locations or methods for undertaking the activity where it is likely that the activity will have a significant adverse effect on the environment;
- Where an activity includes the discharge of a contaminant, Schedule 4 also imposes an obligation on an applicant to provide a description of any possible alternative methods of discharge, including discharge into any other receiving environment;
- Similarly, section 105 of the RMA requires decision makers to have regard to various matters including “any possible alternative methods of discharge, including discharge into any other receiving environment”; and
- Section 108 of the RMA also sets out that a condition may be imposed on a discharge permit requiring the consent holder to adopt the best practicable option in order to prevent or minimise any actual or likely adverse effects on the environment of the discharge.

As is set out in Section 12.7.3 below, adoption of the best practicable option is also a key policy directive in the Proposed Plan for managing the treatment and discharge of contaminants derived from industrial and trade processes.

As defined in section 2 of the RMA, the best practicable option (BPO) in relation to a discharge of a contaminant means:

> *The best method for preventing or minimising the adverse effects on the environment having regard, among other things, to—*
>
> *(a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and*
>
> *(b) the financial implications, and the effects on the environment, of that option when compared with other options; and*
>
> *(c) the current state of technical knowledge and the likelihood that the option can be successfully applied.*

Determining what the BPO is in a given circumstance requires a decision maker to weigh competing considerations, including the nature of the discharge, sensitivity of the environment and practicalities of that and any other option. The use of the words "among other things" clearly signals that other factors can also be taken into consideration.

As noted in the quote below, the words 'BPO' do not mean the best option, the best technical option, the best economic option, or the best environmental option. Nor do they require adherence to what might be considered "best practice". A judgement needs to be made as to what is practicable and proportionate to the risks likely from a contaminant to be discharged. The key word is 'practicable' and this means not granting consents that require adherence to an option that would be prohibitively expensive or involve procedures that are unnecessarily onerous or impractical.

These considerations have been summarised by Dr Royden Somerville QC in his paper "How to give effect in regional plans to the National Policy Statement for Freshwater Management 2011", dated 20 January 2012:

> *"The words 'best practicable option' do not mean the best option, the best technical option, the best economic option, or the best environmental option. A judgement needs to be made as to what is practicable and proportionate to the risks likely from a contaminant. The Shorter Oxford English Dictionary defines "practicable" as "capable of being carried out in action; feasible".*
>
> *In Medical Officer of Health v CRC, it was held that "practicable" is the key word in the definition of BPO, and it would be wrong to impose conditions which afforded the holder no practical means of compliance.*
>
> *The words "among other things" in the definition do not limit the considerations a regional council may address, to those matters in paras (a), (b) and (c).*
>
> *The matters in paragraphs (a), (b) and (c) are relative. This approach reflects the "principle of proportionality" which allows for a dilution of absolute standards and is used in European community law. Some overseas jurisdictions put more emphasis on technical options for addressing pollution. This is sometimes known as a technologically forcing regulatory approach. The BPO is the optimum combination of all methods to manage the risk of an adverse environmental effect to the greatest extent practicable. It is necessary to consider the options and financial implications when determining how best to attain the BPO.*
>
> *Thus, what constitutes the BPO in any given case is a question of fact and degree. Regard is to be had primarily to all three subsections (a), (b) and (c) of the definition, although one or more may be given more weight than others in any given case. The environmental performance targets being aspired to by using the BPO should be set out in the documentation."*

As part of its preliminary resource consent investigations, Alliance has undertaken an extensive assessment into the availability and practicalities of alternative methods and technologies in order to minimise any actual or potential adverse effects arising from its discharges to water. This section of the report summaries these investigations and determination of the best practicable options available to be implemented now and in the future.

10.2 OPTIONS ASSESSMENT

For reasons outlined in Section 8, a comprehensive assessment of the effects of the discharge on the receiving environment determined that no adverse effects trigger the need for immediate or urgent mitigation. However, it noted the Mataura River is degraded in respect of *E.coli* and nutrients, and advised that Alliance should be reducing the amount of *E.coli*, Amm-N and TN it contributes to catchment loading as part of long term efforts to improve water quality in the catchment.

Alliance sought advice from PDP on what methods and technology could be potentially employed to do this over the term of the consent to be sought.

The PDP options assessment is included as **Appendix 7** to this AEE.

As an initial step, PDP developed a long-list of available alternative management options for the Plant. Options incorporating continued discharge to the Mataura River, irrigation to land, or a dual discharge combination, and discharge to trade waste were considered. Of the assessed long list options, those incorporating significant risk and uncertainty, and substantial lifecycle costs were removed from further assessment.

The options selected for further assessment included:

- Existing river discharge with biological treatment for BOD and nitrogen removal with UV disinfection;
- Existing river discharge with filtration and UV disinfection;
- Existing river discharge with biological treatment for BOD and nitrogen removal of the green waste stream with UV disinfection ;
- Dual discharge with the existing river discharge combined with discharge to dairy pasture with no treatment prior to river discharge; and
- Dual discharge with the existing river discharge combined with discharge to a cut and carry system with no treatment prior to river discharge.

Each of the short-listed options was then assessed further, considering the potential for the option to reduce contaminant loads to the Mataura River, practical matters, option resilience and lifecycle costs.

10.3 PROPOSED APPROACH

After considering each option through the lens of the BPO test described in Section 10.1 above, improved treatment via a staged upgrade of the Plant's wastewater treatment plant, and continued disposal to the Mataura River was selected.

As outlined in Section 4.5.2, the staged upgrade of the wastewater treatment plant includes:

- Year 1 – 3: Implementing water reduction opportunities and addressing existing resilience issues.
- Year 5: Tertiary disinfection of microbial contaminants with a UV system (or similar) to reduce *E.coli* concentrations.
- Year 15: Biological treatment of the wastewater to reduce TN, Amm-N and BOD.

The proposed option is considered to be the BPO for the following reasons:

- The technical assessments identified no adverse effects of the Alliance discharge requiring immediate or urgent redress.
- The proposed option achieves significant year-round long term reductions in the Plant's discharge of Amm-N, TN and *E.coli* which are identified as the key parameters of concern in this catchment with respect to water quality.
- The most significant effect of the Plant's discharge on instream water quality and instream contaminant loads is on *E.coli* levels, and the preferred option achieves a significant year-round reduction in the *E.coli* concentrations discharged by the Plant relatively soon.
- The magnitude of the proposed long term reductions in the Plant's discharge of the key contaminants (approximately 68% reduction in concentration and 50% reduction in load for TN, and a greater than 99% reduction in *E.coli*) are expected to be more than proportionate to the baseline reduction in these key contaminants required by the new planning framework established for this catchment to give effect to the Freshwater NPS (see Section 12.2).
- The required timeframes for the reduction of these key contaminants are also expected to be more expedient than the corresponding timeframes required by that new planning framework for achieving a meaningful reduction in the input from the diffuse sources which contribute a significant majority of overall catchment loading.
- The costs of the upgrade option will have significant financial implications for Alliance. However, the proposed timeframes allow the capital expenditure to be integrated into Alliance's long term capital expenditure plan over the first 15 years of the commencement of the new consent in a manageable way.
- The technology involved in the proposed upgrades to the wastewater treatment plant is proven and there is a high degree of certainty it will achieve the environmental outcomes anticipated. It is also subject to a lower degree of operational complexity and uncertainty than many of the other options considered, particularly options incorporating land-based disposal.

10.4 ALTERNATIVE OPTIONS

During consultation TAMI and Fish and Game both expressed an interest in why a river rather than land based discharge is proposed.

Environment Southland also expressed the view that Alliance should demonstrate why earlier installation of the biological treatment is not the best practicable option.

Over recent months, Alliance has given significant consideration to these alternative options, and an overview of why Alliance does not consider they are the best practicable option in this case is provided below.

10.4.1 Discharge to Land

As outlined in Section 12, the Operative and Proposed Plans, and Te Tangi a Tauira - The Cry of the People (the relevant iwi management plan) express a preference for wastewater being discharged to land rather than directly to water. During consultation TAMI and Fish and Game both expressed an interest in why a river rather than land based discharge is proposed.

Of relevance to this preference the PDP options assessment identified:

- Options for avoiding a discharge to the Mataura River completely; and
- Dual discharge options which would largely confine the Mataura River discharge to the period May to November inclusive.

An overview of why each is not considered the best practicable option for disposal of the Plant's wastewater is provided below.

10.4.1.1 Avoiding a River Based Discharge

PDP identified two general options for avoiding any river-based discharge:

- Year-round irrigation of the Plant's wastewater on neighbouring farmland; and
- Construction of a biological treatment and storage facility of sufficient capacity to store effluent from May to September, with irrigation to neighbouring farmland occurring exclusively between October to April.

Year-Round Irrigation

The PDP report identified two options for year-round irrigation of neighbouring farmland:

- Slow rate irrigation to dairy grazing land owned by a third party; and
- Slow rate irrigation to company owned cut and carry operation.

However, it identified significant issues with each option, namely:

- Operational complexities associated with irrigating in this environment during winter and during wet summer periods;
- Difficulty in finding suitable land; and
- A significant increase in costs for a company owned cut and carry operation due to the need to purchase land.

With respect to the first matter, PDP has identified the hydraulic capacity of the soil on farmland, and a lack of soil moisture deficit, significantly limits the ability to irrigate wastewater to that land during winter, and during wet summer periods. Irrigation to saturated land is particularly problematic from an environmental perspective due to the significant runoff of nutrients that can occur.

This hydraulic limitation would be particularly difficult to manage for any option involving irrigation of dairy grazing land owned by a third party due to the operational requirements of the dairy farm, and the lower degree of ground saturation that can be accommodated.

The large wastewater volume generated by the Plant also means a large area of land is needed for year-round irrigation (>160ha).The flatter land around Mataura does not have soils with favourable properties for irrigation, and the areas with moderate to well-draining soils are found to the east of the Plant on areas with steeper terraced topography. Due to the prevailing land parcel size in this area:

- Slow rate application to dairy grazing land would require at least 3 - 4 relatively adjacent landowners willing to accept year-round irrigation from the Plant, including during the problematic winter periods when soils in this area are often already saturated; or
- A company owned cut and carry operation would require at least 3- 4 relatively adjacent landowners willing to sell their properties to Alliance.

The cut and carry option would also incur approximately $10 million in additional capital costs relative to the preferred option due to the need to purchase land, and in turn increased financial implications.

Winter Storage – Summer Irrigation

PDP identified winter storage as an option for avoiding the discharge of wastewater to the river during the winter period when the hydraulic capacity of surrounding soils makes wastewater irrigation prohibitively difficult.

However, it also identified significant issues associated with this option, including:

- It would still require Alliance to obtain access to a large area of land for irrigation (160 ha) and in turn the cooperation of 3 - 4 adjacent landowners willing to either integrate

wastewater irrigation into their dairy farming operations, or sell their properties to Alliance;

- It would require construction of a significant new treatment and storage facility, and involve much greater operational complexity than the preferred option; and
- It would incur significant additional costs relative to the preferred option, with capital expenditure alone being approximately $12 million higher for the irrigation of third-party dairy farmland, and $23 million higher if Alliance were to purchase the irrigation area and operate a cut and carry operation.

10.4.1.2 Dual Discharge Options

PDP identified four options for a dual discharge, whereby wastewater is discharged predominantly to land between October and April, and to the river between May and November, namely:

- Dual discharge to Mataura River (May to September) and irrigation to third party owned dairy pasture, with no additional treatment prior to the river discharge;
- As above, but with biological treatment for cBOD5 and nitrogen removal with UV disinfection prior to river discharge;
- Dual discharge to Mataura River (May to September), and irrigation to a cut and carry system (October to April) on purchased land; and
- As above, but with biological treatment for cBOD5 and nitrogen removal with UV disinfection prior to river discharge.

However, as per the full-time land-based irrigation options outlined above, PDP identified significant issues with each option, namely:

- Operational complexities due to the hydraulic capacity of the surrounding farmland;
- Significant difficulty in finding suitable land; and
- A significant increase in costs for the three options involving a company owned cut and carry operation and / or biological treatment prior to the Mataura River discharge.

With respect to the first matter, because irrigation would only occur over summer, the operational complexities due to hydraulic capacity of the surrounding farmland are not as prohibitive as the full-time land discharge options outlined above. However, these types of systems are still subject to significant operational complexities, particularly for the options involving irrigation to third party owned dairy pasture. While the Plant's wastewater would help maintain soil water conditions for pasture growth during drier periods, as seasonal rainfall increases soil water content, farmer acceptance of irrigation generally reduces due to the potential for soil conditions to be negatively impacted.

With respect to land access, avoiding winter irrigation means the amount of irrigation land required (135 ha) is a little less than a year round land discharge (160 ha). However, it would still require cooperation of 3 separate (but proximate) land owners willing to either integrate the irrigation of the Plant's wastewater into their dairy farming operations, or willing to sell their farms to Alliance.

With respect to costs, the capital expenditure required for either of the options involving further biological treatment of the effluent prior to the river-based discharge were prohibitively high (more than $10 million higher than the preferred option for the dairy farm irrigation option, and $18 million higher for the company-owned cut and carry option).

The costs associated with the two dual discharge options which do not include additional biological treatment are not as significant, and in the case of the dual discharge to third party owned dairy pasture they are less than the preferred option.

However, if biological treatment is not included, there is no significant ecological rationale for favouring the dual discharge options, noting that Alliance has received advice from its ecological specialists that:

- Nutrification is not just a summer issue, and they would not favour any option which would not result in the Plant's long-term contribution to instream Amm-N and TN concentrations being reduced during the winter and shoulder seasons as well as during the summer; and
- Total annual loading of TN is important when considering impacts on Toetoes Estuary, and in that respect, there is little difference between the reduction in the annual load achieved by the proposed option and the dual discharge option.

A dual discharge options involving no additional UV treatment would also not address the microbial contamination issue in this catchment as fully as the preferred option. While the dual discharge option would totally remove the Plant's contribution to downstream *E.coli* concentrations during the summer months (relative to the more than 99% reduction that would be achieved by the preferred option), it would not reduce the Plant's contribution at all during the river discharge season. The Plant would continue to significantly elevate downstream *E.coli* levels over those months, and compromise the effectiveness of any long term catchment-wide efforts to reduce *E.coli* concentrations, as is directed by the Freshwater NPS and Regional Council Planning documents (see Section 12.2).

10.4.1.3 Summary

The operational difficulties, establishment difficulties, and financial implications for some options outlined above mean avoiding the discharge of wastewater to Mataura River is not the best practicable option in this case.

10.4.2 Earlier Adoption of Biological Treatment

The proposed conditions require Alliance to upgrade its wastewater treatment system to disinfect the wastewater and inactivate pathogens within five years, and full biological treatment within 15 years of any new consent term.

Alliance considered earlier adoption of these wastewater treatment plant upgrades, however, it was not deemed the best practicable option because:

- The relative difference in the effects on the environment from earlier adoption of biological treatment do not provide a strong justification for this alternative; and
- The financial implications of adopting the biological treatment system earlier are significant.

The main difference in the adverse effects of the discharge pre and post the biological treatment system upgrade will be a reduction in the Plant's contribution to cumulative catchment degradation from mass loadings of Amm-N and TN. There are no toxicity effects associated with the current discharge quality, or any other adverse effects that trigger the need for immediate or urgent mitigation.

The reduction in the annual TN load contributed to the catchment equates to approximately a 1% reduction in the total catchment loading of this contaminant in Toetoes Estuary, with a majority of the catchment's TN load coming from diffuse sources (i.e. farms). Therefore, the main change in adverse effects achieved by earlier adoption of the biological treatment system would be to reduce TN loads in the Mataura River and Toetoes Estuary by approximately 1 % several years earlier than is proposed.

This reduction will have little, if any, detectable effect on the nutrient status of Toetoes Estuary. A meaningful improvement in environmental quality in the lower Mataura River and Toetoes Estuary, due to lower nutrient levels, will only be realised when a meaningful reduction is achieved in the nutrients contributed by the diffuse sources which contribute the majority of the catchment nutrient load. Experience from other catchments elsewhere in New Zealand suggests this is unlikely to be achieved in advance of the proposed 15-year timeframe proposed by Alliance.

With respect to financial implications, the expected capital cost of upgrading to a biological treatment system is significant, both in terms of capital expenditure (approximately $13.98 million) and annual operating costs ($1,060 million). It represents a major project, and the funds need to be budgeted and provided for alongside other capital and environmental projects Alliance needs to undertake across all its plants.

To put the required spend into perspective, Alliance typically spends approximately $15 million per year, across the business (including all seven processing plants), on safety and

sustainability capital projects. This is split between projects to address health and safety requirements, food safety changes and environmental improvements, among other things.

A review of the forward picture for Alliance indicates that both forecast health and safety and environmental capital requirements are significant. Recent health and safety changes have brought more focus to managing ammonia on site (which is also an environmental issue). There are also legacy asbestos and machine guarding improvements to be made.

A risk assessment indicates Alliance is required to spend approximately $12 million across all its plants to address 'intolerable' risks (e.g. a building rated at less than 30% of building code which houses hazardous gases), an additional $68 million on 'substantial' risks (e.g. upgrading aged refrigeration plant (which contains hazardous gases) to meet current standards) and $100 million on marginal risks (e.g. developing inspection and detection process for corrosion, and rectification of defective plant containing hazardous gases) for Health and Safety alone .

Based on Alliance risk category definitions, the impacts that will be addressed by the biological upgrade would sit in the 'marginal' risk category (i.e. there is an emission (which you can measure) which is almost certain (the highest likelihood rating), but it has no observable impact on the environment). It is known from measurements that the plant is emitting nitrogen, but investigations indicate that there is no observable effect (on its own) and thus this constitutes a marginal environmental risk.

As part of this consent processing Alliance is committing to spending between $4 – 5 million on capital in the first five years of the consent improving wastewater resilience, water reduction and disinfection. Early indications suggest that Alliance will also be required to spend approximately $3-4 million to upgrade the Mataura boiler early in the upcoming air consent renewal application. Work will also be undertaken and completed on a $20 million plus upgrade of the Lorneville treatment plant in the intervening period between Year 5 and Year 12 of this consent applied for.

It is important to note that work will not start at Year 15 on the biological treatment plant, but the upgrade will be completed, operational and compliant by Year 15. This means work will be required to commence several years before this date, overlapping with the Lorneville upgrades. The challenge this represents for Alliance cannot be underestimated.

Should this upgrade be pulled forward, other projects have to be delayed or farmer payments for stock would need to be reduced, affecting the competitiveness of the business.

The cooperative nature of the company is important in this regard. Money that is set aside for this project is money which cannot be returned back to farmers and subsequently invested by them to improve on-farm environmental management, and for that reason, also needs to be approached with care. Diffuse sources of contamination contribute to the

majority of the nutrient loads in this catchment and addressing that will require farmers to invest in on-farm methods to reduce nutrient runoff. That in turn relies on them having adequate access to capital which will be constrained if prices for meat and dividends received from Alliance are suppressed due to higher than anticipated capital upgrades being required at the Plant.

It is also worthwhile noting that no dividend has been paid to shareholders since the 2010/2011 season. The operating result was a relatively small operating profit of $8 million in 2018, $20.2 million in 2017, $10.1 million in 2016 and $7.9 million in 2015.

It is also worth adding in that at this stage there are no meaningful and practical opportunities available for staging of the wastewater treatment plant upgrade.

11. CONSULTATION

11.1 INTRODUCTION

Alliance initiated consultation on these consents in October 2017. It commenced with meetings with the Technical Working Party and representatives of Environment Southland.

As technical work and preparation of the AEE was nearing completion, individual meetings were held with key stakeholders to share findings of the technical assessment and details of the proposed application and to receive feedback.

In addition, surveys of recreational users of the Mataura River were undertaken.

Details of this consultation is provided below.

11.2 TECHNICAL WORKING PARTY

11.2.1 Background

The Technical Working Party (TWP) was established a number of years prior to the current consent being granted.

The Technical Working Party is made up of representatives from the following organisations:

- AGL;
- Southland Fish and Game;
- Department of Conservation;
- Te Ao Marama Incorporated;
- Hokonui Runanga Incorporated;
- Public Health South;
- Southland District Council;
- Gore District Council; and
- Environment Southland.

An annual report is distributed to the TWP members every year. This report details:

- All wastewater and receiving water monitoring results, including biological monitoring results;
- Identification of non-compliances and measures taken to address the non-compliances;

- An assessment of the effects of the discharge on river water quality, periphyton and benthic communities; and
- A progress report on projects and investigations being undertaken.

Following this, Alliance invites all members of the TWP to an annual meeting to take them through the report, providing an opportunity to discuss the results. It also provides an opportunity for the TWP to recommend reviews of consent conditions, if necessary.

Alliance prepares meeting minutes which are distributed to all members.

This meeting is generally well attended with most organisations represented.

In the years since sheep and lamb processing ceased, the results shared in the annual reports have generally been considered acceptable regarding Alliance's impact on the Mataura River, in particular, comparing upstream with downstream. Based on this, there have been minimal issues raised, with discussion generally centred on any non-compliances or general matters. The exception to this is *E.coli* concentrations which are discussed most years, including whether Alliance has any plans to improve the discharge.

In November 2017, the Wyndham Angling Club resigned from the Technical Working Party. They advised that the decision was not reached lightly, but it was reached after a lengthy discussion at one of their monthly meetings.

The Wyndham Angling Club advised that they were not providing the input they should to remain a member. They advised that Fish and Game would look out for their interests in the future, but because of the excellent results the Plant was achieving in regard to its wastewater discharge, they were confident the Plant was on track as far as the wellbeing of the Mataura River was concerned. A representative of the Wyndham Angling Club recently at a public forum meeting held in Gore commended Alliance for the steps it has taken to improve its discharge of treated wastewater to the Mataura River.

11.2.2 Re-Consenting

11.2.2.1 Meeting 1

At the October 2017 TWP, the consultation process was initiated for the re-consenting. This meeting provided details regarding the consents being reapplied for, including Alliance's intention to apply for long term consents. Alliance provided:

- An overview of Alliance;
- An overview of the Mataura Plant;
- An overview of the full length of the Mataura River;
- An overview of the Mataura Plant resource consents;

- Details of the Mataura Plant's wastewater treatment, including how it works and the changes that have been made over the life of the existing consent;
- Details of compliance monitoring locations and compliance performance;
- Details of the condition of the receiving environment;
- A project plan and the members of the project team; and
- Key considerations for the applications.

Queries raised included questions on monitoring of the DO sag, the consent term to be applied for, and if Alliance was considering disinfection and alternative discharge receiving environments. These items are addressed in this application.

11.2.2.2 Meeting 2

A second meeting was held with members of the TWP in November 2017. This included a visit to the external areas of the Mataura Plant, including the routine river sampling monitoring sites, the cooling water and treated wastewater discharge sites, and some of the biological monitoring sites. Dr Mark James provided an overview of what is done during biological monitoring and identified some of the invertebrates present.

Following the visit, the TWP met back at the Mataura Plant to discuss the proposed Discharge and River Monitoring Plan for the coming year. This included a continuation of historical monitoring, and monitoring specific to the consent application.

Dr James provided the following details:

- A summary of the issues to be addressed by the AEE;
- A summary of the existing monitoring programme for the receiving environment;
- A summary of the existing monitoring regime for the wastewater discharge and proposed additional monitoring parameters; and
- Proposed additional monitoring parameters for the receiving environment.

This was followed by a discussion where the TWP were asked for input into the proposed monitoring plan. Members of the TWP indicated that they were happy with the proposed monitoring plan, including the Fish and Game representative, who commented that the proposed monitoring programme was very comprehensive.

The Public Health South representative asked if Alliance planned to test for cryptosporidium, as there had been recent outbreaks of people becoming ill with cryptosporidium. Cryptosporidium has been addressed as part of this application.

Fish and Game asked about timing of monitoring and consideration of the mixing zone. Both of these things are addressed in the AEE.

11.2.2.3 Meeting 3

The third TWP meeting for the re-consenting was held in October 2018. Alliance provided an overview of the routine monitoring results and discussion, while Dr James provided a summary of the additional information collected from monitoring the treated wastewater discharge and receiving environment for re-consenting.

E.coli, and ammonia were the key items for discussion.

It was noted that ammonia concentrations increase downstream of the discharge.

With respect to *E.coli*, the intricacies associated with it only being a faecal indicator bacteria were discussed, and Alliance outlined that further work was being undertaken for pathogens of concern. It was highlighted during this discussion that early QMRA work identified that the data suggested a low risk for recreation, which didn't reflect the high *E.coli* concentrations in the discharge.

One question was asked regarding the lower concentrations of *E.coli* observed that year, and whether that was the result of any changes on the Plant. Alliance staff responded that they did not consider this to be the case.

11.3 INDIVIDUAL CONSULTATION WITH TECHNICAL WORKING GROUP MEMBERS

In addition to the TWP consultation outlined above, individual consultation was undertaken with TWP members in early May 2019 to provide a summary of the pending resource consent application and assessment of environmental effects (Summary AEE). This Summary AEE can be found in **Appendix 9**.

The Summary AEE provided a high level overview of the technical assessments undertaken to support these resource consent applications, their key findings, and how Alliance was intending on responding to those findings.

It included a preferred option to manage the environmental effects consistent with what is proposed in this application.

Attendees and key points from these meetings are described below

11.3.1 Te Ao Marama and Hokonui Runanga

On 7 May 2019, key Alliance staff met with Stevie-Rae Blair (Iwi Environmental Officer). Penny Nicholas (Hokonui Runanga Representative) was unable to attend.

Stevie indicated that she was not able to provide comment on behalf of the Hokonui Runanga until she had reviewed the Summary AEE, and provided a draft Cultural Impact Assessment to the Hokonui Runanga for consideration.

Stevie did note that the key points of interest would likely be the term of the consent sought, being longer than their preference for a maximum term of 25 years, and the decision to continue to discharge to water rather than land. Stevie acknowledged that discharge to land may not be practicable at the Mataura Plant.

Cultural Monitoring was discussed, and Stevie advised many of the indicators of Cultural Monitoring would likely be addressed by typical monitoring that accompanies the types of activities being applied for, e.g. temperature, however the Cultural Impact Assessment would advise on this.

Alliance expressed a willingness to meet with Hokonui Runanga to discuss the application if needed.

Key Alliance staff also met with key Te Ao Marama and Hokonui Runanga on 23 May 2019 to discuss the development of a Memorandum of Understanding (MoU) between the two parties, separate from this consent process. There was mutual agreement that such an agreement would be appropriate given the importance of the Mataura River to each of the parties. Alliance committed to preparing a Draft MoU to be discussed in late June. Alliance took the opportunity to invite Hokonui Runanga to meet again regarding this consent application.

Alliance has expressed a desire to continue to consult with TAMI and Hokonui Runanga during processing of this consent application.

11.3.2 Environment Southland

Three meetings have been held with Environment Southland in preparation of this consent application.

The first was in October 2017, when Alliance met with key ES planning staff (Stephen West and Alex King). A number of items were identified for Alliance to address as part of the consent application. Refer to meeting notes in **Appendix 10**. Where required, these items have been addressed in this application.

The second meeting was attended by ES science staff (Karen Wilson and Roger Hodson), key Alliance staff and Dr James.

Dr James provided an overview of the proposed monitoring programme similar to that provided at the second TWP meeting.

Again, a number of items were identified for Alliance to address. Where required, Alliance has addressed these items in the application, including additional monitoring. Refer to meeting notes in **Appendix 10**.

In early May 2019, key Alliance staff and John Kyle (Mitchell Daysh Ltd) met with key ES staff (Michael Durand – Consents Manager, Lydia Hayward – Consents Team Leader, and Alex King – Consents Officer) to discuss the Summary AEE.

ES asked why water savings had been identified as a priority over disinfection and biological treatment. Alliance responded it was mainly so that capital upgrades could be appropriately sized, rather than sizing them for a larger volume of water, only to reduce that volume of water in the future.

Key feedback included the need to provide information on any financial reasons to undertake the biological treatment upgrade earlier as opposed to the proposed 15 years. Reasons have been provided in this application.

11.3.3 Department of Conservation

The Summary AEE was provided to the Department of Conservation on 13 May 2019. Receipt of the document was acknowledged, and Alliance was advised that it has been provided to the National RMA team who will assign a DoC planner to consider the document. No further communication has been received at the time of writing.

11.3.4 Public Health South

On 10 May 2019, key Alliance staff and John Kyle (Mitchell Daysh Ltd) met with Kate Marshall (Team Leader – Health Protection Officer) and Renee Cubitt (Health Protection Officer) from Public Health South. In a subsequent follow up email, Public Health South expressed support for all aspects of the application, including the proposed staged programme for upgrading the wastewater treatment plant.

11.3.5 Fish and Game

On 13 May 2019, key Alliance staff met with Jacob Smyth (Resource Management Officer) from Fish and Game. Mr Smyth indicated that the particular points of interest in the application would be the timeframes proposed before upgrades, the consent term and the decision to continue a discharge to water. Each of these items are addressed in this application. Mr Smyth could not comment on Fish and Game's likely position of the application until after the complete application was reviewed by Fish and Game.

11.3.6 Gore District Council

On 8 May 2019, key Alliance staff met with Matt Bayliss (Three Waters Manager) to discuss the consultation document. An apology was received by Ramesh Sharma (General Manager – Infrastructure), who was unable to attend the meeting.

GDC indicated that they were supportive of the application and did not have specific concerns.

11.4 LOCAL RESIDENTS

A leaflet (refer to **Appendix 11**) was posted to all letter boxes (approximately 700 leaflets) in the Mataura Township on 20 May 2019, inviting Mataura residents to a meeting at 7pm on the 23 May at the Mataura Community Centre to hear about the work being undertaken to re-consent key activities at the Plant.

An Attendance Register was completed by 16 Attendees.

A slideshow presentation was provided by key Alliance staff with details of the Summary AEE and the preferred wastewater upgrade option included.

Key issues raised included:

- The need for 15 years before the ultimate upgrade is complete. The response from Alliance was consistent with the details provided in this application.
- Whether there may be other opportunities to improve the discharge between the disinfection upgrade and the biological treatment upgrade. Alliance staff advised that there are only minor opportunities for optimisation of the existing wastewater treatment process, and that the next practical step for improvement is biological treatment.
- Further to the above, it was requested that Alliance consider new technology that may become available between the disinfection stage and the biological treatment stage. Alliance responded that Environment Southland have the opportunity to review the consent, should new technology become available, which may present an updated best practicable option for treating the wastewater discharge.
- Other issues were also raised that were not relevant to this application.

Many of the attendees expressed general support for the continued operation of the Mataura Plant, acknowledged the improvements made over recent years, and confirmed they supported the proposed improvements.

Mataura residents were also invited to contact Alliance if that had any questions about the application. To date, no phone calls have been received.

11.5 REGIONAL FORUM

Key Alliance staff attended the Regional Forum at a public meeting held in Gore on 10 May 2019. Mr Richardson provided a brief presentation at the meeting. This included a summary of the Plant's upcoming resource consent applications. It was identified that Alliance was proposing to 'play its part' in addressing catchment-wide issues. One question regarding the term of the consent being applied for received. Mr Richardson responded that the term being applied for was 35 years, with accompanying reasons consistent with this application.

11.6 RECREATIONAL USERS

In was recognised early in the process of preparing this AEE that the recreation values of the Mataura River are high, particularly in respect of its fishery. As such, Alliance commissioned Rob Greenaway to complete a detailed assessment of the effects of the activity on those values, including interviews and engagement with key recreational users.

The results of that assessment are summarised in Section 8.6, and detailed records of the interviews are set out in **Appendix 5**.

12. PROVISIONS OF THE RELEVANT PLANNING DOCUMENTS

12.1 RELEVANT STATUTORY PLANNING DOCUMENTS

When considering these applications for resource consents, the consent authority must, subject to Part 2, have regard to any relevant provisions of the following planning documents:

- The National Policy Statement for Freshwater Management 2014 ("**Freshwater NPS**").
- Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 ("**Water Measurement Regulations**").
- The Southland Regional Policy Statement ("**RPS**").
- The Operative Regional Water Plan ("**Operative Plan**").
- The Proposed Southland Water and Land Plan ("**Proposed Plan**").

The relevant provisions of these planning documents were considered when assessing the effects of the proposed activities, and in determining how the effects of the activities could best be avoided, remedied or mitigated through the proposed conditions.

An assessment of those provisions, and how the proposed activities sit in relation to them is provided below.

In our view an analysis of the Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008: *Te Tangi a Tauira - The Cry of The People* ("**Te Tangi a Tauira***")* is also reasonably necessary as the river is clearly of importance to iwi, and the plan's provisions touch directly on the issues under consideration. Therefore, we have provided an analysis of how the iwi management plan speaks to the proposal under consideration

12.2 NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT 2014

12.2.1 Synopsis

The Freshwater NPS provides national direction for the management of freshwater under the RMA.

It has sections relating to the following:

- Te Mana te Wai;
- Water quality;
- Water quantity;
- Integrated management;

- National Objectives Framework;
- Monitoring Plans;
- Accounting for freshwater takes and contaminants;
- The role and interests of tangata whenua; and
- Progressive implementation programme.

Environment Southland has given public notice of its revised Progressive Implementation Programme to fully implement the Freshwater NPS by 31 December 2025.

There are two general parts to this programme:

- **The Proposed Southland Water and Land Plan**: This is intended to prevent further degradation of freshwater quality in Southland while the process for setting formal objectives, limits and targets in accordance with the collaborative planning methodology specified by the Freshwater NPS is completed. Appeals on the Proposed Plan are currently being heard by the Environment Court.
- **The freshwater objective, limit and target setting exercise**: This comprises a collaborative planning exercise whereby objectives, limits and targets are developed for the Mataura Catchment. The freshwater objectives, limits and targets developed through the collaborative planning process will then be inserted into the Water and Land Plan via a Schedule 1 plan change process. It is currently intended this plan change be notified by 2022 and be operative by 2025.

While the new framework to give effect to Freshwater NPS objectives in the Mataura Catchment has not yet been established, as per the above timeframes, it will be within the life of the consents Alliance is seeking for its wastewater and cooling water discharges. Therefore, while a direct assessment of the proposed discharge regime against the future framework is not possible, Alliance has had regard to the requirements of that framework when developing its proposed discharge regime.

In particular, that has included consideration of:

- The Freshwater NPS water quality objectives the new framework is required to give effect to;
- The compulsory values the Freshwater NPS requires that management framework include;
- The various attributes which the management framework is required to manage in respect of those values; and
- The suite of provisions inserted into the Freshwater NPS in 2017 focussed on managing water quality, so it is suitable for swimming more often.

Each is described below.

The Water Quality Objectives

The relevant water quality objectives state:

> ***Objective A1***
>
> *To safeguard:*
>
> *a) the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems, of fresh water; and*
>
> *b) the health of people and communities, as affected by contact with fresh water;*
>
> *in sustainably managing the use and development of land, and of discharges of contaminants.*
>
> ***Objective A2***
>
> *The overall quality of fresh water within a freshwater management unit is maintained or improved while:*
>
> *a) protecting the significant values of outstanding freshwater bodies;*
>
> *b) protecting the significant values of wetlands; and*
>
> *c) improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.*
>
> ***Objective A3***
>
> *The quality of fresh water within a freshwater management unit is improved so it is suitable for primary contact more often, unless:*
>
> *a) regional targets established under Policy A6(b) have been achieved; or*
>
> *b) naturally occurring processes mean further improvement is not possible.*
>
> ***Objective A4***
>
> *To enable communities to provide for their economic well-being, including productive economic opportunities, in sustainably managing freshwater quality, within limits.*

The Compulsory Values and Attributes

The two compulsory values which the Council is required to manage the Mataura River for, *'ecosystem health'* and *'human health for recreation',* and the compulsory attributes it is required to set limits for in respect of each of those values, are set out below.

Table 13: Compulsory values and attributes.

Value	Compulsory Attributes
Ecosystem health – The freshwater management unit supports a healthy ecosystem appropriate to that freshwater body type (river, lake, wetland, or aquifer). In a healthy freshwater ecosystem ecological processes are maintained, there is a range and diversity of indigenous flora and fauna, and there is resilience to change. Matters to take into account for a healthy freshwater ecosystem include the management of adverse effects on flora and fauna of contaminants, changes in freshwater chemistry, excessive nutrients, algal blooms, high sediment levels, high temperatures, low oxygen, invasive species, and changes in flow regime. Other matters to take into account include the essential habitat needs of flora and fauna and the connections between water bodies.	• Periphyton (Trophic state). • Nitrate (Toxicity) • Ammonia (Toxicity) • Dissolved Oxygen Note: To achieve a freshwater objective for periphyton within a freshwater management unit, the Freshwater NPS directs regional councils to at least set appropriate instream concentrations and exceedance criteria for dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP).
Human health for recreation – In a healthy waterbody, people are able to connect with the water through a range of activities such as swimming, waka, boating, fishing, mahinga kai and water-skiing, in a range of different flows. Matters to take into account for a healthy waterbody for human use include pathogens, clarity, deposited sediment, plant growth (from macrophytes to periphyton to phytoplankton), cyanobacteria and other toxicants.	• Escherichia coli (*E.coli*)

The 2017 Swimmability Provisions

In 2017, the Government introduced a suite of amendments to the Freshwater NPS focussed on managing water quality, so it is suitable for swimming more often.

The suite of provisions in the Freshwater NPS now include:

- **A national target** which describes a national-level outcome for water quality. The desired outcome is to make 80 per cent (of total river length of fourth order rivers) suitable for primary contact by 2030, and 90 per cent by 2040.[15]

  'Suitable for primary contact' in this context is described as water quality in the blue, green and yellow categories for *E.coli* as set out in Appendix 2 of the Freshwater NPS.

[15] Appendix 6.

- **A requirement to develop regional targets that describe regional outcomes, aimed at contributing to the national target.**[16] Environment Southland did this in December 2018, setting minimum primary contact targets for its region of 65.7% and 80% of rivers being suitable for primary contact by 2030 and 2040 respectively.
- **An objective to improve** (not maintain) freshwater management units so they are '*suitable for primary contact more often*' which the Freshwater NPS defines as meaning '*reducing the percentage and magnitude of E. coli exceedances for rivers … according to the attribute tables in Appendix 2'*. This means improving water quality across all attribute states, even those that are already considered suitable for swimming (Objective A3).
- **Attribute states** which comprise a series of bands (A – E) which classify a waterbody according to how often a water body is suitable for swimming.
- **Policies requiring more specific plan content,** stating how specified rivers and lakes and primary contact sites will be improved. Councils have discretion around timeframes for achieving improvements, and where they focus their efforts (Policy A5).
- **Reporting requirements** to track efficacy of planning and progress toward regional targets over time (Policy E1(g)).
- **Surveillance monitoring requirements** at primary contact sites (Appendix 5 of the NPS).

Together these provisions place an obligation on Environment Southland to set policy and methods to improve water quality so that it is suitable for primary contact more often, and the key indicator for how that is being achieved is also instream *E.coli* concentrations. 2030 and 2040 are the key reporting timeframes for measuring progress.

12.2.2 Ecosystem Health

As outlined in Section 8, the technical assessments have concluded that there is no evidence the discharge itself is having an adverse effect on downstream water quality such that life supporting capacity or ecological values are compromised.

However, those technical assessments do identify that a cumulative catchment degradation issue is present due to nutrient enrichment to which the Alliance discharge makes a contribution. And the cumulative impact of nutrient discharges throughout the catchment may be having an adverse effect on ecosystem health. This includes high DIN and DRP concentrations in the main stem of the Mataura River, and Toetoes Estuary experiencing eutrophication symptoms due to excessive nutrient inputs, particularly TN.

[16] Policy A6.

It would therefore seem inevitable that the freshwater objective and limits. which are ultimately set for the Mataura River through the Freshwater Management Unit (FMU) process. will require an improvement in the quality of freshwater in this catchment, with a focus on periphyton levels and DIN and DRP concentrations in the river, and TN in Toetoes Estuary.

Most of the nutrients discharged into this catchment come from diffuse sources and reducing this contribution will require different farm mitigation practices and / or land use change. However, point source discharges will also need to be better managed.

Alliance acknowledges this, and that acknowledgement has influenced the decision to include in these consent applications an upgrade to the wastewater treatment plant to significantly reduce Amm-N and TN in the wastewater discharge within the first 15 years of any new consent term. Alliance expects this proffered contribution to be more than proportional to the wider catchment reduction in nutrients achieved by the diffuse sources, and is also comparatively expedient. Noting that experience from similar catchments in other parts of New Zealand (i.e. catchments with a high proportion of pastoral farming and nutrient enrichment). suggests any significant reduction in the contribution from diffuse sources will take some time.

12.2.3 Human health for Recreation

As set out in Section 3, the Mataura River, upstream, and downstream of the Plant's discharge is Attribute State Red, and the Plant's discharge significantly increases downstream *E.coli* concentrations. The Freshwater NPS attribute state considered suitable for swimming is Attribute State Yellow. Streamlined Environmental 2019 (see **Appendix 3**) has calculated moving Mataura River water quality to Attribute State Yellow absent any contribution from the Plant will require a 77% reduction in instream *E.coli* concentrations.

This magnitude of reduction will be exceedingly difficult to achieve in this catchment, and potentially difficult to justify, based on the existing Environment Southland and Streamlined Environmental studies that suggest *E.coli* levels may significantly overestimate the human health risk posed by water quality in this catchment when the dose / response relationship which underpins the Freshwater NPS attribute states is used.

It is also important to note in that regard that there is no 'national bottom line' for *E.coli* levels that Environment Southland must manage the Mataura River to achieve. Instead, the requirement is that the river be managed so it is suitable for primary contact more often. The Environment Southland commitment to make only 65.7% of rivers swimmable by 2030 is also relevant in this context and perhaps reflects the management challenges that will be faced in catchments such as the Mataura.

Irrespective of this, Alliance acknowledges that a reduction in *E.coli* concentrations needs to be achieved in this catchment, and that its discharge contributes significantly to the

current *E.coli* levels downstream of the Plant. In that context, the proposed conditions commit Alliance to wastewater treatment plant upgrades which will yield more than a 99% reduction in the *E.coli* levels discharged by the Plant in the first five years of any new consent issued.

12.2.4 Conclusion

It is readily apparent that implementing the Freshwater NPS is going to require an improvement in Mataura River water quality for some key contaminants, particularly nutrients and *E.coli*.

The extent of the required improvement, how it will be achieved and the timeframes for achieving it, will be developed through the upcoming collaborative planning exercise required by the Freshwater NPS, and which Environment Southland expects to be completed by 2025.

Alliance expect that as a consequence of the measures it is proposed in this application, its contribution to catchment reductions in these key contaminants will be more than proportional to the wider reduction achieved in the catchment, and also comparatively expedient. Noting that experience from similar catchments in other parts of New Zealand (i.e. catchments with a high proportion of pastoral farming and nutrient enrichment), suggests any significant reduction in the contribution from diffuse sources will take some time.

The proposed activities undertaken in accordance with the proposed conditions are therefore consistent with the requirements of the Freshwater NPS.

12.3 RESOURCE MANAGEMENT (MEASUREMENT AND REPORTING OF WATER TAKES) REGULATIONS 2010

Water measurement requirements were recently addressed in detail in respect of these takes, with the conclusion being that:

- The take and use of water for Plant processing activities, including water that is used for cleaning, potable water supply, wastewater processing and truck washing, should be subject to water metering in accordance with the Water Measuring Regulations; but
- The take and use of water for engine room cooling water and condenser water is to be estimated and reported by combining the records of discharge monitoring, take monitoring, pump capacities and pump operation.

No changes to this approach are proposed. The proposed conditions of consent reflect that.

12.4 NEW ZEALAND COASTAL POLICY STATEMENT 2010

The NZCPS is a relevant consideration on the basis that the ultimate receiving environment of the Plant's discharge to the Mataura River includes the Toetoes Estuary. The quality of the Toetoes Estuary is being affected by the cumulative impacts of non-point and point source discharges throughout the catchment, and this is influencing the estuary's ecosystem values. The most relevant policy in the NZCPS when considering this matter in the context of these resource consent applications is Policy 21, which directs that:

- priority be given to improving water quality where the quality of water in the coastal environment has deteriorated so that it is having a significant adverse effect on ecosystems; and
- where practicable, water quality be restored to at least a state that can support such ecosystems and natural habitats.

In order to see an improvement in the quality of the Toetoes Estuary in the manner sought by Policy 21, a whole-of-catchment response will be required. The proposed conditions respond to this policy direction by requiring a substantial reduction in the TN load from the Plant within the first 15 years of the new consent.

12.5 SOUTHLAND REGIONAL POLICY STATEMENT

The RPS was made operative on 9 October 2017. It outlines objectives, policies and methods, which guide the management of Southland's natural resources. It is required to give effect to the Freshwater NPS and postdates it (although not the most recent update in 2017). In turn, its water related provisions prescribe the overarching framework for how the Freshwater NPS framework is to be implemented in Southland.

When considering the proposed take and discharge activities, the most relevant provisions are contained in:

- Chapter 3: Tangata Whenua;
- Chapter 4: Part A Water Quality; and
- Chapter 4: Part B Water Quantity.

Each is addressed below.

12.5.1 Tangata Whenua

Chapter 3 of the RPS sets out the resource management issues of significance to Ngāi Tahu; and sets out the objectives, policies and methods to address those issues.

The objectives and policies that are relevant to the proposed activities state:

Objective TW.2 – Provision for iwi management plans

All local authority resource management processes and decisions take into account iwi management plans.

Objective TW.3 – Tangata whenua spiritual values and customary resources

Mauri and wairua are sustained or improved where degraded, and mahinga kai and customary resources are healthy, abundant and accessible to tangata whenua.

Objective TW.4 – Sites of cultural significance

Wāhi tapu, wāhi taonga and sites of significance are appropriately managed and protected.

Policy TW.1 – Treaty of Waitangi

Consult with, and enhance tangata whenua involvement in local authority resource management decision-making processes, in a manner that is consistent with the principles of the Treaty of Waitangi/Te Tiriti o Waitangi.

Policy TW.3 – Iwi management plans

Take iwi management plans into account within local authority resource management decision making processes.

Policy TW.4 – Decision making

When making resource management decisions, ensure that local authority functions and powers are exercised in a manner that:

(a) recognises and provides for:

- *(i) traditional Māori uses and practices relating to natural resources (e.g. mātaitai, kaitiakitanga, manaakitanga, matauranga, rāhui, wāhi tapu, taonga raranga);*
- *(ii) the ahi kā (manawhenua) relationship of tangata whenua with and their role as kaitiaki of natural resources;*
- *(iii) mahinga kai and access to areas of natural resources used for customary purposes;*
- *(iv) mauri and wairua of natural resources;*
- *(v) places, sites and areas with significant spiritual or cultural historic heritage value to tangata whenua;*
- *(vi) Māori environmental health and cultural wellbeing.*

(b) recognises that only tangata whenua can identify their relationship and that of their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga.

Iwi have a long association and strong traditional relationship with the Mataura River, and mahinga kai resources, nohoanga and mātaitai are all important and relevant values here.

And in accordance with the overarching direction in the above provisions, Alliance has, and continues to consult with Te Ao Marama and Hokonui Runanga on how the proposed take and discharge activities may adversely affect these values, and how those adverse effects can be avoided, remedied or mitigated.

12.5.2 Water Quality

Chapter 4, Part A of the RPS contains overarching direction for managing water quality in the Region. The objectives and policies most relevant to the proposed discharge activities state:

> ***Objective WQUAL.1 – Water quality goals***
>
> *Water quality in the region:*
>
> *(a) safeguards the life-supporting capacity of water and related ecosystems;*
>
> *(b) safeguards the health of people and communities;*
>
> *(c) is maintained, or improved in accordance with freshwater objectives formulated under the National Policy Statement for Freshwater Management 2014;*
>
> *(d) is managed to meet the reasonably foreseeable social, economic and cultural needs of future Generations*
>
> ***Objective WQUAL.2 – Lowland water bodies***
>
> *Halt the decline and improve water quality in lowland water bodies and coastal lakes, lagoons, tidal estuaries, salt marshes and coastal wetlands in accordance with freshwater objectives formulated in accordance with the National Policy Statement for Freshwater Management 2014.*
>
> ***Policy WQUAL.1 – Overall management of water quality***
>
> *(a) Identify values of surface water, groundwater, and water in coastal lakes, lagoons, tidal estuaries, salt marshes and coastal wetlands, and formulate freshwater objectives in accordance with the National Policy Statement for Freshwater Management 2014; and*
>
> *(b) Manage discharges and land use activities to maintain or improve water quality to ensure freshwater objectives in freshwater management units are met.*
>
> ***Policy WQUAL.2 – All waterbodies***
>
> *Maintain or improve water quality, having particular regard to the following contaminants:*
>
> *(a) nitrogen;*
>
> *(b) phosphorus;*
>
> *(c) sediment;*
>
> *(d) microbiological contaminants.*

Policy WQUAL.5 – Improve catchment water quality

Improve water quality by:

(a) identifying water bodies that are not meeting freshwater objectives, including identifying priority freshwater management units;

(b) specifying targets to improve water quality within those water bodies within defined timeframes;

(c) implementing management frameworks to meet the targets taking into account;

(i) the values supported by the water body/ies;

(ii) national or legislative standards and requirements;

(iii) the benefits and costs associated with achieving improvement in water quality.

Maintaining or improving water quality through FMU processes is an overarching theme of these provisions. A particular focus is placed on nitrogen, phosphorus, sediment and microbial contaminants.

The Mataura Catchment FMU process has not yet occurred, and it is therefore uncertain what the freshwater objectives, limits and timeframes for the Mataura FMU will be. However, as set out in Sections 8 and 9.3 of this AEE, the technical assessments have identified high nutrient and *E.coli* levels in the catchment and it would seem highly likely that the planning framework stemming from the FMU process will require a significant reduction in these contaminants in the Mataura catchment over time. This is consistent with Policy WQUAL.2. Diffuse runoff from pastoral land use contributes considerably to this degraded state, and any significant improvement in water quality for these parameters will require a significant change to how this activity occurs in the catchment. This will likely take some time. However, the Plant also contributes to instream concentrations of these key contaminants downstream of Mataura, and the wastewater treatment plant upgrades required by the proposed conditions of consent will ensure Alliance does its part in improving the quality of Mataura River water. This aligns with the expectations of the above provisions.

Other relevant provisions in Chapter 4 Part A are:

Policy WQUAL.8 – Preference for discharge to land

Prefer discharges of contaminants to land over discharges of contaminants to water, where:

(a) a discharge to land is practicable;

(b) the adverse effects associated with a discharge to land are less than a discharge to water.

Policy WQUAL.9 – Untreated human and animal wastes

Avoid the direct discharge of sewage, wastewater, industrial and trade waste and agricultural effluent to water unless these discharges have undergone treatment.

The proposed discharge regime sits comfortably with these provisions noting that:

- For reasons set out in Section 10 of this AEE, the discharge of Plant wastewater to land is not practicable; and
- The wastewater discharge will undergo treatment prior to being discharged to the Mataura River.

12.5.3 Water Quantity

The RPS contains two objectives for water quantity:

Objective WQUAN.1 – Sustainably managing the region's water resources

Flows, levels and allocation regimes of surface water and groundwater in the region are developed in accordance with the National Policy for Freshwater Management 2014 to:

(a) safeguard the life-supporting capacity of water, catchments and related ecosystems;

(b) support the maintenance or improvement of water quality in accordance with Policy WQUAL.1;

(c) meet the needs of a range of uses, including the reasonably foreseeable social, economic and cultural needs of future generations;

(d) comply with limits or targets set to achieve freshwater objectives.

Objective WQUAN.2 – The efficient allocation and use of water

The allocation and use of Southland's water resources:

(a) is efficient;

(b) recognises and makes provision for the Monowai and nationally significant Manapōuri hydroelectric generation schemes in the Waiau catchment and the resultant modified flows and levels.

The associated policies contain various directions for achieving these objectives in the Region, most of which are targeted at future regional plan processes and establishing Freshwater NPS compliant flow and allocation regimes through the upcoming FMU processes.

These provisions are not directly relevant to activities entailing the proposed take and use of water. However, the activity will be undertaken in accordance with the flow and allocation regime set by the Mataura WCO, which will achieve Objective WQUAN.1. Improving water efficiency is also an important aspect of the proposed activities, and the

Plant's allocation and use will be consistent with the associated outcome sought by Objective WQUAN.2.

12.5.4 Summary

The proposed activities are broadly consistent with the RPS, and will help, rather than hinder, Environment Southland's efforts to implement it, particularly in respect of improving water quality.

12.6 OPERATIVE WATER PLAN

The Operative Water Plan was made operative in April 2010. In that respect, it predates both the Freshwater NPS and the RPS. Of most relevance to the proposed activities are its objectives and policies which address water quality and water quantity. An assessment of the proposed take and discharge activities against those provisions is provided below.

12.6.1 Water Quality

The planning framework for water quality matters in the Operative Plan is relevant when considering the proposed discharge of cooling water and wastewater.

Objectives

The water quality objectives most relevant to the proposed activities state:

> ***Objective 2 – Maintain water quality***
>
> *To manage water quality so that there is no reduction in the quality of the water in any surface water body, beyond the zone of reasonable mixing for discharges, below that of the date this Plan became operative (January 2010).*
>
> ***Objective 3 – Surface water bodies other than in Natural State Waters***
>
> *To maintain and enhance the quality of surface water bodies so that the following values are protected where water quality is already suitable for them, and where water quality is currently not suitable, measurable progress is achieved towards making it suitable for them.*
>
> *In surface water bodies classified as … Mataura 3:*
>
> *(a) bathing, in those sites where bathing is popular;*
>
> *(b) trout where present, otherwise native fish;*
>
> *(c) stock drinking water;*
>
> *(d) Ngāi Tahu cultural values, including mahinga kai;*
>
> *(e) natural character including aesthetics.*
>
> ***Objective 4 – Gradual improvement in surface water quality parameters***
>
> *To manage the discharge of contaminants and encourage best environmental practice to improve the water quality in surface water bodies classified as hill,*

lowland (hard bed), lowland (soft bed) and spring fed, and in particular to achieve a minimum of 10 percent improvement in levels of the following water quality parameters over 10 years from the date this Plan became operative (January 2010):

(a) microbiological contaminants

(b) nitrate

(c) phosphorus

(d) clarity

Key matters to note in respect of these objectives are:

- Environment Southland water quality data suggests that while Objective 2 has been largely achieved in the Mataura River at Mataura (as per Table 2 – Environment Southland monitoring data shows no statistical change in water quality for key parameters at its monitoring site 200m downstream of Mataura Bridge since the Plan became operative in 2010), and over this period the quality of the Plant's discharge has also not degraded.
- That same Environment Southland water quality data suggests the 10 percent improvement in certain water quality parameters sought by Objective 4 has not been achieved. However, when considering the Plant's wastewater discharge the following is relevant:
    - The contribution of the Plant to instream phosphorus concentrations has been significantly reduced since 2010;
    - While no change to the microbial contaminants discharged from the Plant has occurred since 2010, a significant reduction in the concentration of *E.coli* is required by the proposed conditions; and
    - Nitrate concentrations in the Plant's discharge are very low, and nitrate and clarity do not appear to be in a degraded state in the Mataura River at Mataura.
- With respect to Objective 3(a), while the Mataura River downstream of the Plant may be un-swimmable at times, the risk of a person swimming below the Plant becoming ill due to the Plant's discharge is well below 1%, which is considered an acceptable level. The risk due to the Plant's discharge will also be further reduced following the installation of the UV disinfection required by the proposed conditions, although this will have limited effect on reducing the baseline risk in the river as it is mainly affected by upstream land use.
- As described in FWS (2019), water quality in Mataura River downstream of the discharge is suitable for trout and native fish, as sought by Objective 3(b).
- As described in FWS (2019), water quality in Mataura River downstream of the discharge is suitable for stockwater, as sought by Objective 3(c).

- With respect to aesthetic and natural character values (Objective 3(d)), key matters of concern for this type of discharge would include any changes to the natural colour and clarity of the water, and the formation of bacterial or fungal slime growths visible to the naked eye as obvious plumose growths or mats. In respect of these matters:
    - Environment Southland monitoring data shows clarity at Mataura is better than the relevant ANZECC 2000 guideline, and FWS (2019) conclude the discharge does not cause a conspicuous change in clarity;
    - FWS (2019) concludes the discharge does not appear to result in the generation of conspicuous foams, scums or heterotrophic growth; and
    - Periphyton growths, which are reflective of moderate to high enrichment, occur during long accrual periods, however this occurs upstream and downstream of the discharge. Addressing this effect will require a whole-of-catchment response to reduce nutrient loads, and the Plant's contribution to that is included in the proposed conditions.

Policies

Central to the Plan's provisions for managing water quality are the following policies which set out how the effects of the discharge are to be managed, relative to upstream water quality, and a suite of specified water quality standards (noting that the Plant is located in the Mataura 3 water body class):

> ***Policy 1 – Surface water body classes***
>
> *(a) Recognise the different characteristics of the following surface water body classes when managing discharges:*
>
> *(x) Mataura 3*
>
> *(b) Apply water quality standards established under any Water Conservation Order.*
>
> ***Policy 3 – No reduction in water quality***
>
> *Notwithstanding any other policy or objective in this plan, allow no discharges to surface water bodies that will result in a reduction of water quality beyond the zone of reasonable mixing, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so.*
>
> ***Policy 4 – Surface water bodies outside Natural State Waters***
>
> *For surface water bodies outside Natural State Waters, manage point source and non-point source discharges to meet or exceed the water quality standards referred to in Rule 1 and specified in Appendix G "Water Quality Standards", unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so and so avoid levels of contaminants in water and sediments that*

could harm the health of humans, domestic animals including stock and/or aquatic life.

Policy 9 Zone of reasonable mixing

When determining the size of the zone of reasonable mixing, minimise the size of the area where the relevant water quality standards are breached. Consideration should be given to, but not be limited to, the following matters:

(a) the aquatic ecosystem values in the affected reach;

(b) the need for fish passage;

(c) the uses of the water body adjacent to and downstream of the point of discharge

The proposed discharge activities undertaken in accordance with the proposed conditions sit comfortably with these policies for the following reasons:

- As set out in Section 8.2.2, the zone of reasonable mixing for the wastewater discharge is currently set at 250 m below the outfall. Having considered the matters listed in Policy 9, this remains appropriate.
- The discharge is subject to the Mataura WCO and complies with all the water quality standards set in the Mataura WCO.
- The discharge is within the Mataura 3 surface water body class, and the only parameter in Appendix G for that class, which will not be achieved below the zone of reasonable mixing, is *E.coli.*
- The only parameters for which the discharge causes a reduction in water quality below the zone of reasonable mixing are *E.coli*, Amm-N and TN.
- Policies 3 and 4 direct, that in the above circumstances, discharges only be allowed where it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the RMA to do so.
- For reasons set out in Section 13.3.5, granting the applications as sought would be consistent with Part 2 of the RMA.

The Operative Plan also includes the following relevant provisions which express preference for certain methods of discharge:

Policy 7 Prefer discharges to land

Prefer discharges to land over discharges to water where this is practicable and the effects are less adverse.

Policy 8 Discharges to water

Prefer point source discharges of contaminants to water at times of high flow over discharges at normal or low flows, and ensure that where discharging does take place at low flows, the effects that could not be practically avoided are minimised.

The analysis completed by PDP on options for discharging the Plant's wastewater to land was partially in response to the expressed preference for a land-based discharge in these policies. However, for the operational, establishment, financial and environmental reasons set out in Section 10.4.1, a full time or partial discharge to land does not represent the best practicable option in this case. Therefore, as Policies 7 or 8 express a preference rather than a requirement, they do not represent a barrier to granting the consents sought.

12.6.2 Water Quantity

As outlined in Section 7.3, two water takes are proposed:

- A take and use of water for engine room cooling water and condenser water, whereby all the water taken is returned back to the hydro race from which it was abstracted.
- A take for various Plant processing activities, in which [almost] all the water taken is returned back to the river via the Plant's wastewater discharge 100 m downstream of the hydro race discharge.

Of most relevance when considering these activities are the Operative Plan provisions which address:

- Water allocation and environmental flow regimes;
- Efficient water use;
- Water metering; and
- Consent term.

Each is addressed below.

Water allocation and environmental flow regimes

The Operative Plan contains the following overarching objective addressing the allocation of water to instream and out of stream uses:

> ***Objective 5 – Sufficient water availability***
>
> *To have sufficient water to support the reasonably foreseeable needs of current and future generations and enable people and communities to provide for their social, economic and cultural wellbeing while protecting aquatic ecosystem health, life supporting capacity, natural character and historic heritage values of surface water bodies.*

When considering how this objective is to be achieved the policies of most relevance state:

> ***Policy 14 – Manage the taking, use, damming or diversion of surface water***
> *While recognising the positive effects resulting from the use and development of water resources, manage the taking, use, damming or diversion of surface water*

so as to avoid where practicable, remedy or mitigate significant adverse effects on:

(a) the quality and quantity of aquatic habitat;

(b) natural character, natural features, and amenity, aesthetic and landscape values;

(c) areas of significant indigenous vegetation and significant habitats of indigenous fauna;

(d) recreational values;

(e) the spiritual and cultural values and beliefs of the tangata whenua;

(f) water quality, including temperature;

(g) the rights of lawful existing users;

(h) groundwater quality and quantity;

(i) historic heritage

Policy 15 – Surface water abstraction, damming, diversion and use

...

(c) Apply allocation and minimum flow and level regimes established under any Water Conservation Order.

...

(e) Recognise and provide for surface water abstraction, damming, diversion and use resulting in positive effects and no net loss of water in a catchment.

...

(h) Require resource consent applications for surface water abstraction, damming, diversion and use to be supported by a level of information that corresponds to the level of risk of adverse environmental effects.

(i) Ensure that surface water abstractions, damming or diversions with a high risk of adverse environmental effects, in conjunction with existing abstractions, damming and diversions, will not:

(a) result in significant adverse ecological effects through the increase in time the relevant surface water body is at or below its minimum flows or levels;

(b) compromise the availability and reliability of water supply for existing users;

(c) result in significant adverse effects on the matters listed in Policy 16(b)(i) to (xvi)

(j) Impose monitoring on resource consents for surface water abstraction, damming, diversion and use that corresponds to the level of risk of adverse environmental effects.

Policy 16 – Environmental flow and level regimes

(a) When granting resource consents for surface water abstraction, damming, diversion and use, the Council where appropriate will apply by way of consent conditions environmental flow and level regimes established under:

(ii) any Water Conservation Order

The proposed take and use of cooling water, and process water sit comfortably with these provisions for the following reasons:

- The sustainable flow regime in this catchment is set by the Mataura WCO, and in accordance with Policy 15(c) and Policy 16(a)(ii), the proposed abstraction will take water in accordance with that flow regime;
- The take and use of water for cooling and process use will result in no net loss of water in the catchment, and in turn, these are a type of abstraction that Policy 15(e) directs be recognised and provided for.
- Because the proposed take and use of water will only reduce flows for a short 100 m section of the Mataura River, and the Mataura WCO will ensure that baseflows through that reach are maintained at 95% of the naturalised flow, the take and use of water does not have a high risk of adverse environmental effects (Policy 15(i)), nor will it result in any of the effects of concern in Policy 15(i)(a) – (c).
- Monitoring of the water take is limited to recording the volume (cooling water) and rate (process water) of take, and this reflects the minimal risk of adverse environmental effects.

Efficiency of use

Efficiency of water use is an important part of the Operative Plan, and it includes the following provisions:

Objective 7 – Efficient Water Use

To maximise the efficiency of water use.

Policy 21 – Reasonable use of water

To ensure that the rate of abstraction and abstraction volumes specified on water permits to take and use water are no more than reasonable for the intended end use.

The proposed rate and volume of abstraction is no more than reasonable for the intended end use and is considered to represent efficient use of water. In accordance with these provisions, Alliance commissioned PDP (see **Appendix 8**) to assess the efficiency of water use on-site. For reasons outlined in Section 9.2.2, that assessment identified the use of raw river water for generation of white-water as a potential area where water use could be

reduced (by approximately 2,000 m^3/day). Alliance has also determined that some of the water currently allocated to it is unnecessary for the proposed use. This is reflected in the proposed conditions allowing a significantly lower daily volume of water to be taken than the current consents.

Measurement

In 2018 Alliance applied for amendment to the water metering conditions on the existing consent to take and use water at the Plant (Resource Consent AUTH-204126), in order to bring those conditions into line with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010.

The outcome of that process is that:

- The take and use of water for Plant processing activities, including water that is used for cleaning, potable water supply, wastewater processing and truck washing, should be subject to water metering in accordance with the Water Measurement Regulations; but
- The take and use of water for engine room cooling water and condenser water is to be estimated and reported by combining the records of discharge monitoring, take monitoring, pump capacities and pump operation.

No changes to this approach are proposed, and it is considered the proposed water measurement aligns with the expectations of the Operative Plan.

Consent Term

As set out in Section 1 of this AEE, Alliance has sought a term of 35 years for all the resource consents sought.

The Proposed Plan includes the following policy which is relevant when determining whether this consent term is appropriate:

> ***Policy 14A– Determining the term of a water permit***
>
> *To determine the term of a water permit consideration will be given, but not limited, to:*
>
> *(a) the degree of certainty regarding the nature, scale, duration and frequency of adverse effects from the activity;*
>
> *(b) the level of knowledge of the resource;*
>
> *(c) relevant tangata whenua values*
>
> *(d) the allocation sought, particularly the proportion of the resource sought;*
>
> *(e) the duration sought by the applicant, plus material to support the duration sought;*
>
> *(f) the permanence and economic life of the activity;*

(g) capital investment in the activity;

(h) monitoring and review requirement in permit conditions;

(i) the desirability of applying a common expiry date for water permits that allocate water from the same resource; and

(j) the applicant's compliance with the conditions of the previous permit (where a new water permit is sought for a previously authorised activity).

In the context of Policy 14A, the following matters would support the 35 year consent term sought:

- The activity is existing, and there is a high degree of certainty on the nature, scale, duration and frequency of its adverse effects on the environment (clauses (a) and (b)).
- The take only reduces instream flows for approximately 100 m (clause (d)).
- The Plant is a significant permanent asset with an insured value of $225 million (clauses (f) and (g)).
- The proposed conditions include provision for Environment Southland to review the consent for the purpose of changing the monitoring conditions, dealing with any unexpected adverse effects that arise from the exercise of the resource consent, or to comply with the requirement of a regional plan (which would include any new flow and allocation regime set for the Mataura River) (clause (m) and (i)).
- Alliance has historically had an excellent compliance record with the conditions of its existing consent to take and use water at the Plant (clause (j)).

With respect to clause (c), Hokonui Runanga and TAMI have expressed a preference for the term of consent to be no more than 25 years.

12.6.3 Conclusion

Water quality downstream of the discharge will achieve the Operative Plan's objectives for water quality in this part of the Mataura River.

The discharge causes levels of *E.coli*, Amm-N and TN to increase downstream of the mixing zone, and in the case of *E.coli,* to also not meet the relevant water quality standards in Appendix G of the Operative Plan. The Plan directs this type of discharge only be allowed where it is consistent with Part 2 of the RMA to do so, which, for reasons set out in Section 13.3.5, is the case here.

The proposed discharge will not be contrary to the objectives and policies of the Operative Plan, and there is nothing in the Operative Plan which means the discharge applications cannot be granted on the terms sought.

12.7 PROPOSED WATER AND LAND PLAN

The Proposed Plan is intended to provide direction and guidance regarding the sustainable use, development and protection of water and land resources in the Southland region.

The Proposed Plan was notified on 3 June 2016, and the submissions and hearing process was completed in October 2017. A decisions version of the Proposed Plan was released on 4 April 2018. It is this decisions version of the Proposed Plan that is the relevant version when considering these consent applications.

However, many of the key provisions are subject to Environment Court appeals and may change. This needs to be acknowledged when having regard to them in respect of these consent applications.

When considering these applications for resource consents, the most relevant provisions in the Proposed Plan are contained in the following sections:

- Region-wide Objectives;
- Ngai Tahu policies;
- Water Quality; and
- Water Quantity policies.

12.7.1 Region-Wide Objectives

The Proposed Plan includes the following region-wide objectives which are relevant when considering the proposed take and discharge activities:

> ***Objective 1***
>
> *Land and water and associated ecosystems are sustainably managed as integrated natural resources, recognising the connectivity between surface water and groundwater, and between freshwater, land and the coast.*
>
> ***Objective 2***
>
> *Water and land is recognised as an enabler of primary production and the economic, social and cultural wellbeing of the region.*
>
> ***Objective 3***
>
> *The mauri of waterbodies provide for te hauora o te tangata (health and mauri of the people), te hauora o te taiao (health and mauri of the environment) and te hauora o te wai (health and mauri of the waterbody).*
>
> ***Objective 4***
>
> *Tangata whenua values and interests are identified and reflected in the management of freshwater and associated ecosystems.*

Objective 5

Ngāi Tahu have access to and sustainable customary use of, both commercial and non-commercial, mahinga kai resources, nohoanga, mātaitai and taiāpure.

Objective 6

There is no reduction in the overall quality of freshwater, and water in estuaries and coastal lagoons, by:

(a) maintaining the quality of water in waterbodies, estuaries and coastal lagoons, where the water quality is not degraded; and

(b) improving the quality of water in waterbodies, estuaries and coastal lagoons, that have been degraded by human activities.

Objective 7

Any further over-allocation of freshwater (water quality and quantity) is avoided and any existing over-allocation is phased out in accordance with freshwater objectives, freshwater quality limits and timeframes established under Freshwater Management Unit processes.

Objective 9

The quantity of water in surface waterbodies is managed so that aquatic ecosystem health, life supporting capacity, outstanding natural features and landscapes and natural character are safeguarded.

Objective 9A

Surface water is sustainably managed to support the reasonable needs of people and communities to provide for their social, economic and cultural wellbeing.

Objective 11

The amount of water abstracted is shown to be reasonable for its intended use and water is allocated and used efficiently.

Objective 13B

The discharges of contaminants to land or water that have significant or cumulative adverse effects on human health are avoided.

Objective 14

The range and diversity of indigenous ecosystem types and habitats within rivers, estuaries, wetlands and lakes, including their margins, and their life-supporting capacity are maintained or enhanced.

Objective 15

Taonga species, as set out in Appendix M, and related habitats, are recognised and provided for.

Objective 17

The natural character values of wetlands, rivers and lakes and their margins, including channel and bed form, rapids, seasonably variable flows and natural habitats, are protected from inappropriate use and development.

Objective 18

All activities operate in accordance with "good management practice" or better to optimise efficient resource use, safeguard the life supporting capacity of the region's land and soils, and maintain or improve the quality and quantity of the region's water resources.

When considering the proposed activities in the context of these objectives, key matters include:

- In accordance with Objective 1, the integrated nature of the land, water and ecosystems in the Mataura catchment has been recognised and incorporated into the assessment of effects undertaken for the proposed activities, and into the proposed means for avoiding, remedying or mitigating effects.
- Objectives 2 and 9 recognise the role of water as an enabler of economic, social and cultural wellbeing of the region, and seek it be managed to support and provide for the reasonable needs of people and their social, economic and cultural wellbeing. Enabling the Mataura Plant to continue utilising the Mataura River for water supply, and as a discharge medium to deliver the social and economic benefits outlined Section 6 of this AEE, would do this.
- With respect to Objectives 3, 4 and 5, iwi have a long association and strong traditional relationship with the Mataura River, and mahinga kai resources, nohoanga and mātaitai are all important and relevant values here. Alliance has, and continues to consult with Te Ao Marama and Hokonui Runanga on how the proposed take and discharge activities effect these values, and how those effects can be avoided, remedied or mitigated. And a new condition is proposed to ensure ongoing, meaningful engagement with, and input from Hokonui Runanga regarding the ongoing monitoring of the effects of the Plant's activities on the surrounding environment.
- With respect to Objectives 6 and 7, water quality in the Mataura River and Toetoes Estuary has been degraded by human activities for certain parameters. The FMU process which is intended to manage this issue has not yet occurred, and it is therefore uncertain what the freshwater objectives, limits and timeframes for the Mataura FMU will be. However, key issues identified by FWS and AES are its high nutrient and *E.coli* levels, and it would seem inevitable that the planning framework stemming from the FMU process will require a significant reduction in these contaminants in the Mataura catchment over time. Diffuse runoff from pastoral land use contributes considerably to this degraded state, and the improvement of water

quality sought by Objective 6 will require a significant change to how this activity occurs in the catchment. This will likely take some time. However, the Plant also contributes to instream concentrations of these key contaminants downstream of Mataura, and the wastewater treatment plant upgrades required by the proposed conditions of consent will ensure Alliance does its part in improving the quality of Mataura River water in respect of these key parameters.

- The Mataura WCO specifies the environmental flow and allocation regime to achieve Objective 9 in the Mataura River. The Plant's take of water is in accordance with that flow regime.
- An independent assessment by PDP (see **Appendix 8**) has shown there are some inefficiencies in the current use of water on-site. The proposed conditions require this to be addressed over the first three years of the new consent term via implementation of a Resilience and Water Saving Strategy. In accordance with Objective 11, this means the amount of water abstracted will be reasonable for the intended use and will be used efficiently.
- The Streamlined Environmental (2019) QMRA has shown the Plant's discharge does not have significant adverse effects on human health and therefore aligns with Objective 13B. Environment Southland and Streamlined Environmental studies also show the baseline health risk in this catchment is not as significant as measured *E.coli* levels would suggest.
- The outcome sought by Objective 14 is influenced by water quantity, quality and land use. With respect to water quantity, the Mataura WCO specifies the environmental flow and allocation regime to achieve Objective 14 in the Mataura River. With respect to water quality, it is apparent that the Mataura River and Toetoes Estuary has degraded water quality for some parameters, and this may be impacting on its life-supporting capacity. The proposed consent conditions set out how the Plant will contribute to maintaining, and then enhancing water quality and life-supporting capacity over the first 15 years of the new consent.
- The only direct effect of concern on a taonga species that Objective 15 seeks to be recognised and provided for is entrainment of native fish in the Plant's water pumps. To address this concern, the proposed conditions require installation of fish screens which meet recognised standards.
- In accordance with Objective 17, the proposed take and discharge activities are not an inappropriate use and development when considering effects on natural character values. The Mataura River is a highly modified river with significantly reduced natural character values, particularly in the vicinity of the take and discharge. The proposed discharges to water will maintain the quality of the existing riverine environment and are not considered to cause any conspicuous change in the colour or clarity of the receiving water, or generation of foams or scums. Likewise, the take and use of water

will have minimal effects on instream flows and will abide by the environmental flow regime set for this river by the Mataura WCO.

12.7.2 Ngāi Tahu Policies

The relevant Ngāi Tahu policies state:

> ***Policy 2 – Take into account iwi management plans***
>
> *Any assessment of an activity covered by this Plan must:*
>
> *1. take into account any relevant iwi management plan; and*
>
> *2. assess water quality and quantity, taking into account Ngāi Tahu indicators of health.*
>
> ***Policy 3 – Ngāi Tahu ki Murihiku taonga species***
>
> *To manage activities that adversely affect taonga species, identified in Appendix M.*

With respect to Policy 2(1), the relevant provisions of *Te Tangi a Tauira - The Cry of the People* are addressed in Section 12.8 of this AEE. And with respect to Policy 3 as outlined above, the only direct effect of concern on a taonga species is entrainment of native fish in the Plant's water pumps. To address this concern, the proposed conditions require installation of fish screens which meet recognised standards.

12.7.3 Water Quality Policies

As required of it by the Freshwater NPS, the Proposed Plan includes the following policy which specifies certain matters to which regard must be had when considering an application for a discharge:

> ***Policy A4 of the National Policy Statement for Freshwater Management 2014 (as amended in 2017)***
>
> *1. When considering any application for a discharge the consent authority must have regard to the following matters:*
>
> *(a) the extent to which the discharge would avoid contamination that will have an adverse effect on the life-supporting capacity of freshwater including on any ecosystem associated with freshwater; and*
>
> *(b) the extent to which it is feasible and dependable that any more than minor adverse effect on freshwater, and on any ecosystem associated with freshwater, resulting from the discharge would be avoided.*
>
> *2. When considering any application for a discharge the consent authority must have regard to the following matters:*
>
> *(a) the extent to which the discharge would avoid contamination that*

will have an adverse effect on the health of people and communities as affected by their contact with freshwater; and

(b) the extent to which it is feasible and dependable that any more than minor adverse effect on the health of people and communities as affected by their contact with freshwater resulting from the discharge would be avoided.

Important conclusions from the technical assessments when having regard to the matters set out in this policy are:

- There is no evidence the discharge is itself having an adverse effect on the life-supporting capacity of the Mataura River or Toetoes Estuary; and
- The risk of a person swimming downstream of the discharge becoming ill due to the discharge is less than 1%, and lower than accepted levels.

The Proposed Plan also contains a relatively comprehensive suite of policies which set out how the effects of discharges are to be managed. Central to this are Policies 13, 15A, 15B and 15C, which direct discharges be managed relative to a suite of water quality standards contained in Appendix E of the Proposed Plan. They state:

Policy 13 – Management of land use activities and discharges

1. Recognise that the use and development of Southland's land and water resources, including for primary production, enables people and communities to provide for their social, economic and cultural wellbeing.

2. Manage land use activities and discharges (point source and non-point source) to enable the achievement of Policies 15A, 15B and 15C.

Policy 15A – Maintain water quality where standards are met

Where existing water quality meets the Appendix E Water Quality Standards or bed sediments meet the Appendix C ANZECC sediment guidelines, maintain water quality including by:

1. avoiding, remedying or mitigating the adverse effects of new discharges, so that beyond the zone of reasonable mixing, those standards or sediment guidelines will continue to be met; and

2. requiring any application for replacement of an expiring discharge permit to demonstrate how the adverse effects of the discharge are avoided, remedied or mitigated, so that beyond the zone of reasonable mixing those standards or sediment guidelines will continue to be met.

Policy 15B – Improve water quality where standards are not met

Where existing water quality does not meet the Appendix E Water Quality Standards or bed sediments do not meet the Appendix C ANZECC sediment guidelines, improve water quality including by:

1. *avoiding where practicable and otherwise remedying or mitigating any adverse effects of new discharges on water quality or sediment quality that would exacerbate the exceedance of those standards or sediment guidelines beyond the zone of reasonable mixing; and*

2. *requiring any application for replacement of an expiring discharge permit to demonstrate how and by when adverse effects will be avoided where practicable and otherwise remedied or mitigated, so that beyond the zone of reasonable mixing water quality will be improved to assist with meeting those standards or sediment guidelines.*

Policy 15C – Maintaining and improving water quality after FMU processes

Following the establishment of freshwater objectives and limits under Freshwater Management Unit processes, and including through implementation of non-regulatory methods, improve water quality where it is degraded to the point where freshwater objectives are not being met and otherwise maintain water quality where freshwater objectives are being met.

The only parameters which do not meet the Appendix E Water Quality Standards or Appendix C ANZECC sediment guidelines downstream of the discharge, are faecal coliforms and *E.coli*.

In turn, Policy 15B(2) requires Alliance demonstrate how, and by when adverse effects will be avoided, where practicable, and otherwise remedied or mitigated so that beyond the zone of reasonable mixing, water quality will be improved to assist with meeting the relevant standards in Appendix E. The proposed conditions do this by requiring a three stage upgrade to the wastewater treatment plant which will significantly reduce the *E.coli* and faecal coliform concentrations in the discharge. This will improve the water quality beyond the zone of reasonable mixing and assist with meeting the Appendix E water quality standards for those parameters.

Because the FMU process has not yet occurred, it is uncertain what the freshwater objectives, limits and timeframes for the Mataura FMU will be, and in turn, how Policy 15C will apply to this catchment. However, as outlined in Section 12.2.4, Alliance expects its contribution to catchment reductions in key contaminants to be more than proportional to the wider reduction achieved in the catchment, and also comparatively expedient.

Other policies which are particularly relevant to the Plant's discharges are Policies 14 and 16A which state:

Policy 14 – Preference for discharges to land

Prefer discharges of contaminants to land over discharges of contaminants to water, unless adverse effects associated with a discharge to land are greater than a discharge to water. Particular regard shall be given to any adverse effects on cultural values associated with a discharge to water.

Policy 16A – Industrial and trade processes that may affect water quality

Minimise the adverse environmental effects (including on the quality of water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries, salt marshes and groundwater) by requiring the adoption of the best practicable option to manage the treatment and discharge of contaminants derived from industrial and trade processes.

The directives in these policies are addressed in detail in Section 10 of this AEE, which addresses alternative methods for discharging the Plant's wastewater. For the reasons set out in Section 10, the continued discharge of wastewater to the Mataura River, but with significant treatment plant upgrade milestones within five and 15 years, is considered the best practicable option for managing the treatment and discharge of contaminants from the Plant. And in accordance with Policy 16A, the proposed conditions require this BPO to be adopted by the consent holder.

The expressed preference in Policy 14 for a discharge to land was considered in this options assessment process. However, for financial, practical and environmental reasons, neither a full nor partial discharge to land option was considered practicable.

12.7.4 Water Quantity

As required of it by the Freshwater NPS the Proposed Plan includes the following policy:

Policy B7 of the National Policy Statement for Freshwater Management 2014 (as amended in 2017)

1. *When considering any application, the consent authority must have regard to the following matters:*
   - *(a) the extent to which the change would adversely affect safeguarding the life-supporting capacity of freshwater and of any associated ecosystem; and*
   - *(b) the extent to which it is feasible and dependable that any adverse effect on the life-supporting capacity of freshwater and of any associated ecosystem resulting from the change would be avoided.*

The key point to note in respect of this policy is the conclusion in Section 7.3, that the effects of the proposed takes on instream flows will be limited to a minimal reduction in flows over a 100 m stretch of river, and in turn, that adverse effects on the life-supporting capacity of the Mataura River would be avoided.

The Proposed Plan also contains a relatively comprehensive suite of policies for managing the take and use of water. Those which are most relevant when considering the proposed take and use of water state:

Policy 20 – Management of water resources

Manage the taking, abstraction, use, damming or diversion of surface water and groundwater so as to:

1A. recognise that the use and development of Southland's land and water resources, including for primary production, can have positive effects including enabling people and communities to provide for their social, economic and cultural wellbeing;

1. avoid, remedy or mitigate adverse effects from the use and development of surface water resources on:

(a) the quality and quantity of aquatic habitat, including the life supporting capacity and ecosystem health and processes of waterbodies;

(b) natural character values, natural features, and amenity, aesthetic and landscape values;

(c) areas of significant indigenous vegetation and significant habitats of indigenous fauna;

(d) recreational values;

(e) the spiritual and cultural values and beliefs of tangata whenua;

(f) water quality, including temperature and oxygen content;

(g) the reliability of supply for lawful existing surface water users, including those with existing, but not yet implemented, resource consents;

(h) groundwater quality and quantity;

(j) mātaitai, taiāpure and nohoanga;

...

3. ensure water is used efficiently and reasonably by requiring that the rate and volume of abstraction specified on water permits to take and use water are no more than reasonable for the intended end use following the criteria established in Appendix O and Appendix L.4.

Policy 21 – Allocation of water

Manage the allocation of surface water and groundwater by:

...

2. determining that a waterbody is fully allocated when the total volume of water allocated through current resource consents and permitted activities is equal to either:

(a) the maximum amount that may be allocated under the rules of this Plan, or

(b) the provisions of any water conservation order;

...

4. when considering levels of abstraction, recognise the need to exclude takes for non-consumptive uses that return the same amount (or more) water to the same aquifer or a hydraulically connected lake, river, modified watercourse or natural wetland.

Policy 42 – Consideration of water permit applications

When considering resource consent applications for water permits to take and use water:

1. *except for non-consumptive uses, consent will not be granted if a water body is over allocated or fully allocated; or to grant consent would result in a water body becoming over allocated or would not allow an allocation target for a water body to be achieved within a time period defined in this Plan; and*
2. *except for non-consumptive uses, consents replacing an expiring resource consent for an abstraction from an over-allocated water body will generally only be granted at a reduced rate, the reduction being proportional to the amount of over-allocation and previous use, using the method set out in Appendix O; and*
3. *installation of water measuring devices will be required on all new permits to take and use water and on existing permits in accordance with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010; and*

...

5. *conditions will be specified relating to a minimum flow or level, or environmental flow or level regime (which may include flow sharing), in accordance with Appendix K, for all new or replacement resource consents (except for water permits for non-consumptive uses, community water supplies and water bodies subject to minimum flow and level regimes established under any water conservation order) for:*
   (a) surface water abstraction, damming, diversion and use; and
   (b) groundwater abstraction in accordance with Policy 23.

Policy 41 – Matching monitoring to risk

Consider the risk of adverse environmental effects occurring and their likely magnitude when determining requirements for auditing and supply of monitoring information on resource consents.

It is considered the proposed take and use of water at the Plant, in accordance with the proposed conditions set out in **Appendix 1**, sits comfortably with these provisions, noting that:

- As set out in Section 6, the take and use of water at the Plant facilitates significant positive benefits for the local community, and in accordance with Policy 20(1A), these are to be recognised when managing the take and use of surface water.
- The flow and allocation regime for the Mataura River is set in the Mataura WCO.
- The effects of the take on the matters in Policy 20(1) will be mitigated by the Plant returning almost all the water taken back to the Mataura River 100 m downstream of the hydro race discharge.

- In accordance with Policy 20(3) and Appendix O, Alliance commissioned an independent audit of its existing use of water at the Plant, and whether it is in accordance with rates and volumes sought and does not result in wastage or inefficient use of water. That assessment identified the use of raw river water for generation of white-water as a potential area where water use could be reduced (by approximately 2,000 m^3/day. The proposed conditions require this to be addressed over the first three years of the new consent term via implementation of a Resilience and Water Saving Strategy. This means the amount of water abstracted will be reasonable for the intended use and will be used efficiently.
- Alliance has not been able to obtain any information from Environment Southland confirming the allocation status of the Mataura River, and in turn it has assumed the River is not overallocated and that Policy 42(1) and (2) do not apply.
- In accordance with Policy 42(3), the current water measuring methodology is in accordance with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010.
- The Mataura River is subject to a minimum flow and level regime in the Mataura WCO, and in turn, no condition specifying a minimum flow or level is required in accordance with Policy 42(5). However, the proposed conditions do require Alliance to prepare and implement a low flow contingency plan to describe the practicable measures to be taken to minimise the abstraction of water during times when the flow of the Mataura River at the Tuturau recording site is less than 20 cubic metres per second.
- Monitoring of the water take is limited to the volume (cooling water) and rate (process water) of take which reflects the minimal risk of adverse environmental effects.

12.7.5 Consent Term

As set out in Section 1 of this AEE, Alliance has sought a term of 35 years for all the resource consents sought.

The Proposed Plan includes the following policy which is relevant when determining whether this consent term is appropriate:

> ***Policy 40 – Determining the term of resource consents***
>
> *When determining the term of a resource consent consideration will be given, but not limited, to:*
>
> 1. *granting a shorter duration than that sought by the applicant when there is uncertainty regarding the nature, scale, duration and frequency of adverse effects from the activity or the capacity of the resource;*
> 2. *relevant tangata whenua values and Ngāi Tahu indicators of health;*
> 3. *the duration sought by the applicant and reasons for the duration sought;*
> 4. *the permanence and economic life of any capital investment;*

5. *the desirability of applying a common expiry date for water permits that allocate water from the same resource or land use and discharges that may affect the quality of the same resource;*

6. *the applicant's compliance with the conditions of any previous resource consent, and the applicant's adoption, particularly voluntarily, of good management practices; and*

7. *the timing of development of FMU sections of this Plan, and whether granting a shorter or longer duration will better enable implementation of the revised frameworks established in those sections.*

In the context of Policy 40, the following matters would support the 35 year consent term sought:

- The activity is existing, and there is a high degree of certainty on the nature, scale, duration and frequency of its adverse effects on the environment (which are minimal) (clause 1).
- The significant capital investment involved in the proposed wastewater treatment plant upgrade will require and be contingent on securing a long consent term in order to enable the upgrades to be progressively implemented and allow the financial investment to be justified and secured over an appropriate timeframe (clauses 3 and 4).
- The Plant is a significant permanent asset with an insured value of $225 million (clause 4).
- Alliance has an excellent compliance record with the conditions of its existing consent to take and use water at the Plant (clause 6).
- The proferred conditions impose a requirement to make progressive upgrades to water use and treatment methods in a programmed way over the life of the consent, structured to be in step with the FMU process. A long-term consent which requires this long term and certain framework (and the significant improvements it requires) benefits Alliance and the wider community due to the certainty it provides. The proposed conditions also include provision for Environment Southland to review the consent for the purpose of complying with the requirement of a regional plan (which would include any new flow and allocation regime set for the Mataura River) (clause 5 and 7).

With respect to clause 2, Hokonui Runanga and TAMI have expressed a preference for the term of consent to be no more than 25 years.

12.7.6 Conclusion

Water quality downstream of the discharge will achieve the Proposed Plan's objectives.

The discharge causes levels of *E.coli*, Amm-N and TN to increase downstream of the mixing zone, and in the case of *E.coli* to also not meet the relevant water quality standards in Appendix E of the Proposed Plan. The Proposed Plan requires this application demonstrate how, and by when adverse effects will be avoided, where practicable, and otherwise remedied or mitigated so that beyond the zone of reasonable mixing water quality, will be improved to assist with meeting the relevant standards in Appendix E. The proposed conditions do this by requiring a three stage upgrade to the wastewater treatment plant which will significantly reduce the *E.coli* and faecal coliform concentrations in the discharge. This will improve the water quality beyond the zone of reasonable mixing and assist with meeting the Appendix E water quality standards for those parameters

The proposed discharge will be not contrary to the objectives and policies of the Proposed Plan, and there is nothing in the Proposed Plan which means the discharge applications cannot be granted on the terms sought.

12.8 TE TANGI A TAUIRA - THE CRY OF THE PEOPLE

In 2008, Te Tangi a Tauira: Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan was published. This Iwi Management Plan consolidates Ngāi Tahu ki Murihiku values, knowledge and perspectives on natural resource and environmental management issues.

Of particular relevance when considering these consent applications are Ngā Kaupapa – policy in Te Tangi a Tauira which address:

- Wastewater disposal;
- Discharges to water;
- Water quality; and
- Water quantity.

12.8.1 Wastewater Disposal

Te Tangi a Tauira includes the following Ngā Kaupapa on wastewater disposal which are relevant to the proposed discharge of wastewater and cooling water:

> 2. *Ensure that Ngāi Tahu ki Murihiku are provided with the opportunity to participate through pre hearing meetings or other processes in the development of appropriate consent conditions for discharge consents, including monitoring conditions.*
>
> 3. *Require that sufficient and appropriate information is provided with applications to allow tangata whenua to assess cultural effects (e.g.*

nature of the discharge, treatment provisions, assessment of alternatives, actual and potential effects).

5. *Assess proposed wastewater discharge activities in terms of:*
    a. *type/ nature of the discharge;*
    b. *location and sensitivity of the receiving environment;*
    c. *cultural associations with location of operations;*
    d. *actual and potential effects on cultural values;*
    e. *available best practice technology;*
    f. *mitigation that can occur (e.g. using plants to filter waste, discharging at specific times to minimise impact, treatment options)*
    g. *community acceptability;*
    h. *cost*
6. *Avoid the use of water as a receiving environment for the direct, or point source, discharge of contaminants. Even if the discharge is treated and therefore considered "clean", it may still be culturally unacceptable. Generally, all discharge must first be to land.*
7. *Assess waste disposal proposals on a case by case basis, with a focus on local circumstances and finding local solutions.*
8. *Wastewater disposal options that propose the direct discharge of treated or untreated effluent to water need to be assessed by the kaitiaki rūnanga on a case by case, individual waterway, basis. The appropriateness of any proposal will depend on the nature of the proposal, and what waterway is involved. Individual waterways possess their individual mauri and values, and kaitiaki Rūnanga are in the best position to assess the potential impacts of a proposal on such values.*
9. *Encourage creative, innovative and sustainable approaches to wastewater disposal that make use of the best technology available, and that adopt principles of waste reduction and cleaner production (e.g. recycling grey water for use on gardens, collecting stormwater for a pond that can then be used for recreation in a new subdivision).*
10. *Require that the highest environmental standards are applied to consent applications involving the discharge of contaminants to land or water (e.g. standards of treatment of sewage).*
15. *Any discharge activity must include a robust monitoring programme that includes regular monitoring of the discharge and the potential effects on the receiving environment. Monitoring can confirm system performance, and identify and remedy any system failures.*
16. *Require that large scale wastewater disposal operations (e.g. town sewage schemes, industry) develop environmental management plans, including contingency plans to cope with any faults, breakdowns, natural disasters, or extreme weather events (e.g. cash bonds for liability).*
17. *Duration of consent for wastewater disposal must recognise and provide*

for the future growth and development of the industry or community, and the ability of the existing operations to accommodate such growth or development.

18. *Recommend a duration not exceeding 25 years, for discharge consents relating to wastewater disposal, with an assumption that upon expiry (if not before), the quality of the system will be improved as technological improvements become available. In some instances, a lesser term may be appropriate, with a condition requiring the system is upgraded within a specified time period.*
19. *Require conditions of consent that allow for a 5-year review of wastewater disposal activities. During review, consent holders should be required to consider technological improvements. If improvements are available, but not adopted, the consent holder should provide reasons why.*
20. *Encourage developers and consent applicants to provide site visits for tangata whenua representatives to observe proposed wastewater treatment systems. Site visits enable ngā rūnanga representatives to see what is proposed "on the ground".*

The key directives in these provisions were had regard to when assessing the effects of the proposed activities, and in determining how the effects of the activities should be avoided, remedied or mitigated through the proposed conditions.

In respect of these provisions, the following is noted:

- In accordance with Policy 2, Alliance has and continues to engage with TAMI and Hokonui Runanga on the development of appropriate, specific consent conditions for the discharge, including monitoring.
- In accordance with Policy 3, this AEE includes information on the nature of the discharge, treatment provisions, assessment of alternatives and actual and potential effects.
- All the matters listed in Policy 5 have been considered by Alliance in preparing this AEE, and in shaping the nature of the activities for which consent will be sought, including the mitigation measures set out in the proposed conditions.
- With respect to Policy 6, various options for discharging the Plant's wastewater were investigated but none is considered practicable here. The reasons for this include local circumstances regarding the suitability and availability of land which is recognised by Policy 7.
- Alliance recognises the role of Hokonui Runanga as tangata whenua and kaitiaki of the Mataura River and has, and continues to engage with Te Ao Marama and Hokonui Runanga in respect of the applications and how the effects of the activity should be managed (Policy 8).

- With respect to Policy 9, a robust assessment of alternative discharge options has been completed.
- In accordance with Policy 15, robust monitoring and reporting is required by the proposed conditions.
- In accordance with Policy 16, Alliance holds and will continue to hold various environmental management systems certifications.
- In accordance with Policy 18, the quality of the wastewater treatment system will be improved and the preference for a consent duration no more than 25 years is acknowledged. However, Alliance considers a longer consent duration is required here to allow the financial investment involved in the proposed wastewater treatment plant upgrade to be justified and secured over an appropriate timeframe. It is also relevant that a proposed upgrade timeline is structured to be in step with the FMU process for improving water quality in this catchment, and a long term consent which includes the long term and certain framework contained in the proposed condition (and the significant improvements it requires) benefits Alliance and the wider community due to the certainty of benefit it provides.
- In accordance with Policy 20, and as part of its ongoing engagement process, Alliance has invited representatives of TAMI and Hokonui Runanga on-site to observe the wastewater treatment system.

12.8.2 Discharges to Water

Te Tangi a Tauira includes the following Ngā Kaupapa on discharges to water:

1. *Avoid the use of water as a receiving environment for the direct, or point source, discharge of contaminants. Even if the discharge is treated and therefore considered "clean", it may still be culturally unacceptable. Generally, all discharge must first be to land. This general policy is a baseline or starting point. From this point, the Rūnanga can assess applications on a case by case basis.*
2. *Assess discharge to water proposals on a case by case basis, with a focus on local circumstances and finding local solutions.*
3. *Consider any proposed discharge activity in terms of the nature of the discharge, and the sensitivity of the receiving environment.*
4. *When existing rights to discharge to water come up for renewal, they must be considered in terms of alternative discharge options.*
5. *When assessing the alternatives to discharge to water, a range of values, including environmental, cultural and social, must be considered in addition to economic values.*
6. *Encourage the establishment of wetland areas, where practical, as an alternative to the direct discharge to water. Discharge to a wetland area allows Papatūānuku the opportunity to filter and clean any impurities.*

7. *Any discharge activity must include a robust monitoring programme that includes regular monitoring of the discharge and the potential effects on the receiving environment.*

8. *Require robust monitoring of discharge permits, to detect non-compliance with consent conditions. Noncompliance must result in appropriate enforcement action to discourage further non-compliance.*

9. *Promote the use of the Cultural Health Index (CHI) as a tool to facilitate monitoring of stream health, and to provide long term data that can be used to assess river health over time.*

10. *Ngāi Tahu ki Murihiku consider activities involving the discharge of contaminants to water a community issue. For this reason, ngā rūnanga may, where seen as appropriate, recommend that a consent application be notified.*

Particular regard was had to the key directives in these provisions when assessing the effects of the proposed activities, and in determining how the effects of the activities should be avoided, remedied or mitigated through the proposed conditions.

In respect of these provisions, the following is noted:

- In accordance with Policy 4, a robust assessment of alternative discharge options has been completed by PDP (2019) and an assessment of the best practicable option for treating and discharging wastewater from the Plant is contained in Section 10 of this AEE.
- In accordance with Policy 5, that assessment considered a range of values, including environmental, cultural and social values, in addition to economic values. As directed by Policy 3, it also considered the nature of the discharge, and the sensitivity of the receiving environment.
- With respect to Policy 1, various options for discharging the Plant's wastewater were investigated but none is considered practicable here.
- In accordance with Policies 7 and 8, robust monitoring and reporting is required by the proposed conditions.
- With respect to Policy 10, Alliance has consulted with the local community, including Te Ao Marama and Hokonui Runanga, on the proposed discharge activities and expects the applications to be publicly notified.

12.8.3 Water Quality

Te Tangi a Tauira includes the following Ngā Kaupapa on water quality which are relevant to the proposed activities:

1. *The role of Ngāi Tahu ki Murihiku as tangata whenua and kaitiaki of water must be recognised and provided for in all water quality*

management.

2. *Strive for the highest possible standard of water quality that is characteristic of a particular place/waterway, recognising principles of achievability. This means that we strive for drinking water quality in water we once drank from, contact recreation in water we once used for bathing or swimming, water quality capable of sustaining healthy mahinga kai in waters we use for providing kai.*

3. *Require cumulative effects assessments for any activity that may have adverse effects of water quality.*

5. *Avoid the use of water as a receiving environment for the direct, or point source, discharge of contaminants. Generally, all discharge must first be to land.*

7. *When assessing the effects of an activity on water quality, where the water source is in a degraded state, the effects should be measured against the condition that the water source should be, and not the existing condition of the water source (see text box on this page).*

10. *Water quality definitions, categories, and standards must be determined, measured, and assessed with cultural values and indicators alongside scientific information. Such indicators and values centre on the ability of the waterway to support life, and the fitness of water for cultural uses.*

11. *Require robust monitoring of discharge permits, to detect non-compliance with consent conditions. Noncompliance must result in appropriate enforcement action to discourage further non-compliance.*

Particular regard was had to the key directives in these provisions when assessing the effects of the proposed activities, and in determining how the effects of the activities should be avoided, remedied or mitigated through the proposed conditions.

In respect of these provisions, the following is noted:

- Alliance recognises the role of Hokonui Runanga as tangata whenua and kaitiaki of the Mataura River and has, and continues to engage with Te Ao Marama and Hokonui Runanga in respect of the applications (Policy 1).
- The preference in Policy 5 for a discharge to land is acknowledged, however for reasons outlined in Section 10 of this AEE, it is not practicable to do so here.
- With respect to Policies 2, 3 and 7, the technical assessments have identified that water quality in the Mataura River is degraded in respect of certain parameters, and the proposed conditions require a significant reduction in the Plant's contribution to the cumulative loading of key contaminants over the first 15 years of the new consent term.
- In accordance with Policy 11, robust monitoring and reporting is required by the proposed conditions.

12.8.4 Water Quantity

Te Tangi a Tauira includes the following Ngā Kaupapa on water quantity and abstractions which are relevant to the proposed activities:

1. *Adopt the precautionary principle when making decisions on water abstraction resource consent applications, with respect to the nature and extent of knowledge and understanding of the resource.*

3. *Require that scientifically sound, understandable, and culturally relevant information is provided with resource consent applications for water abstractions, to allow Ngāi Tahu ki Murihiku to fully and effectively assess cultural effects.*

6. *Encourage water users to be proactive and use water wisely. To encourage best practice and efficient use of water, particularly in terms of:*
   - *sustainable irrigation design, delivery and management;*
   - *making best use of available water before water levels get too low;*
   - *reducing the amount of water lost through evaporation by avoiding irrigating on hot windy days.*

7. *Consideration of consent applications for water abstractions should have particular regard to questions of:*
   a. *how well do we understand the nature and extent of the water resource;*
   b. *how well can we monitor the amount of water abstracted;*
   c. *whether land capability (e.g. soil type, vulnerability of underlying groundwater resources) matches the land use enabled by irrigation;*
   d. *what might happen in the future (e.g. rainfall and recharge of aquifers, climate change).*

9. *Applications for water abstractions may be required to justify the quantities of water requested. Information may need to be provided to Te Ao Mārama Inc. regarding the proposed water use per hectare, estimated water losses, stocking rates, and the level of efficiency for the scheme. This will enable iwi to put the quantity of water sought in context, and ensure that a test of reasonableness can be applied to consents.*

10. *Require catchment based cumulative effects assessments for activities involving the abstraction of water.*

16. *Encourage the installation of appropriate measuring devices (e.g. water meters) on all existing and future water abstractions, to accurately measure, report, and monitor volumes of water being abstracted, and enable better management of water resources.*

17. *Advocate for durations not exceeding 25 years on resource consents related to water abstractions.*

19. *Require that Ngāi Tahu are provided with the opportunity to participate through pre hearing meetings or other processes in the development of appropriate consent conditions including monitoring conditions to address our concerns.*

20. *Avoid adverse effects on the base flow of any waterway, and thus on the mauri of that waterway and on mahinga kai or taonga species.*

Particular regard was had to the key directives in these provisions when assessing the effects of the proposed activities, and in determining how the effects of the activities should be avoided, remedied or mitigated through the proposed conditions.

In respect of these provisions, the following is noted:

- The proposed take and use of water is a re-consenting of an existing activity and there is a high degree of certainty about the nature and scale of the resultant effects on the environment. The effects insofar as these matters are concerned will be negligible. Therefore, there is no need to apply the precautionary principle here (Policy 1).
- In accordance with Policy 3, this AEE includes scientifically sound and understandable information on the proposed activity and its effects (Policy 2).
- Of relevance to Policies 6 and 9 is the PDP audit of existing use of water at the Plant, which identified opportunities for further water saving. The proposed conditions require this to be addressed over the first three years of the new consent term via implementation of a Resilience and Water Saving Strategy. This means the amount of water abstracted will be reasonable for the intended use and will be used efficiently.
- Of relevance to Policies 7, 10 and 20, the cumulative effects of abstraction in the Mataura River, and effects on the base flow of the River, is managed by the flow regime set down in the Mataura WCO.
- The measuring devices appropriate for the water abstractions were recently deemed appropriate considering the nature of those activities (Policy 16).
- The preference in Policy 17 for a consent duration of no more than 25 years is acknowledged. However, Alliance considers a longer consent duration is required here to allow the financial investment involved in the proposed wastewater treatment plant upgrade to be justified and secured over an appropriate timeframe. It is also relevant that a proposed upgrade timeline is structured to be in step with the FMU process for improving water quality in this catchment, and a long term consent which includes the long term and certain framework contained in the proposed condition (and the significant improvements it requires) benefits Alliance and the wider community due to the certainty of benefit it provides.

- In accordance with Policy 19, Alliance has and continues to engage with TAMI and Hokonui Runanga on the development of appropriate consent conditions for the discharge, including monitoring.

13. STATUTORY ASSESSMENT

13.1 INTRODUCTION

This section of the AEE sets out the framework under the RMA that applies to the resource consents that are being sought from Environment Southland. It addresses:

- Section 104D which specifies that Environment Southland can only grant a non-complying activity consent in certain circumstances;
- Section 104 which specifies the matters Environment Southland must have regard to when considering an application for resource consent;
- Section 105 which specifies additional matters which must be considered by Environment Southland when considering the applications for discharge permits; and
- Section 107 which specifies that Environment Southland shall not grant a discharge permit if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water) is likely to give rise to certain effects in the receiving waters.

13.2 SECTION 104D

As outlined in Section 6 of this AEE, the discharge of wastewater is classified as a non-complying activity under the Operative and Proposed Plans because of its impact on downstream *E.coli* concentrations.

Section 104D of the RMA establishes restrictions on the ability of a consent authority to grant resource consents for non-complying activities. It states:

> *(1) Despite any decision made for the purpose of notification in relation to adverse effects, a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either—*
>
> *(a) the adverse effects of the activity on the environment (other than any effect to which section 104(3)(a)(ii) applies) will be minor; or*
>
> *(b) the application is for an activity that will not be contrary to the objectives and policies of—*
>
> *(i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or*
>
> *(ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or*
>
> *(iii) both the relevant plan and the relevant proposed plan, if there is both a plan and a proposed plan in respect of the activity.*

The objectives and policies of the relevant statutory planning documents are identified and assessed in Sections 12.6 and 12.7 of this AEE. As is noted in those sections, the

proposed activities will not be contrary to the objectives and policies of the relevant statutory planning documents. It is also concluded that in most circumstances the environmental effects of the proposed activities will be appropriately managed so that they sit comfortably with the outcomes sought by the objectives and policies in the relevant statutory planning documents.

As such, the requirements of Section 104D(1)(b) of the RMA are met. The resource consent applications can, therefore, be considered in the broader context in accordance with Section 104 of the RMA.

In light of the above, it is not necessary to form an overall conclusion as to whether the adverse effects of the proposed activities on the environment will be 'more than minor' in order to satisfy the first gateway test of Section 104D(1) of the RMA.

13.3 SECTION 104

Section 104 of the RMA identifies the matters that a consent authority must have regard to, subject to Part 2 of the Act, when considering an application for resource consent. It states:

> *(1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to–*
>
> *(a) any actual and potential effects on the environment of allowing the activity; and*
>
> *(ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
>
> *(b) any relevant provisions of—*
>
> *(i) a national environmental standard:*
>
> *(ii) other regulations:*
>
> *(iii) a national policy statement:*
>
> *(iv) a New Zealand coastal policy statement:*
>
> *(v) a regional policy statement or proposed regional policy statement:*
>
> *(vi) a plan or proposed plan; and*
>
> *(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.*
>
> *(2) When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect.*

(2A) When considering an application affected by section 124 or 165ZH(1)(c), the consent authority must have regard to the value of the investment of the existing consent holder.

(2B) …

Section 104 of the RMA does not give primacy to any of the matters to which a consent authority is required to have regard. All of the relevant matters are to be given such weight as the consent authority deems appropriate in the circumstances, and all matters listed in section 104(1) are subject to Part 2 of the RMA.

An assessment of the proposed activities against the relevant matters set out in Section 104 of the RMA is provided in the sections below.

13.3.1 The Actual and Potential Effects of Allowing the Activities

The actual and potential effects of allowing the activities are set out in Sections 6, 7 and 8 of this AEE.

The granting of consents enabling the continued operation of the Plant will maintain the economic wellbeing of people and communities within the Gore District and the Southland region by:

- Maintaining significant direct and indirect employment opportunities for local residents (the Plant employs approximately 500 people in the peak of the season);
- Maintaining significant direct and indirect wages and salaries for local residents (the Plant contributed approximately $22 million in wages and salaries for the 2017/2018 season);
- Maintaining significant levels of direct and indirect expenditure with local businesses;
- Maintaining population and economic activity levels within local communities, thereby maintaining the breadth and quality level of services available to local residents and businesses;
- Providing greater employment choice for local residents; and
- Continuing Alliance's contributions to local community activities, in its role as a responsible employer and "good corporate citizen".

Key points of relevance when considering the water takes are:

- Fish screens will be installed in all intakes which meet or exceed industry practice.
- The water taken for cooling purposes is returned to the water race immediately downstream of where it is taken.
- The process water take only reduces flow in the Mataura River for 100 m and is not considered to have any effect that is more than minor.

Key points of relevance when considering the discharge of cooling water and wastewater are:

- A comprehensive assessment of the effects of the discharge on the receiving environment has determined that no adverse effects trigger the need for immediate or urgent mitigation.
- The lower Mataura River contains high levels of *E.coli*, and the Plant's discharge significantly increases those levels in the receiving water downstream. However, because the level of pathogens in the discharge (which are of most concern when considering effects on human health) are much lower and more variable, the Plant's discharge does not cause a significant increase in health risk, and the risk of a person swimming below the Plant becoming ill due to the Plant's discharge is below 1%, which is considered an acceptable level. However, Alliance accepts it will need to reduce its levels of *E.coli* to improve water quality. And this will occur following installation of the UV treatment plant required by the proposed conditions, which is expected to reduce the *E.coli* levels in the Plant's wastewater discharge by more than 99%
- The Mataura River is degraded in terms of the nitrogen levels present, periphyton reflects moderate to high enrichment at times, and MCI and QMCI data are generally representative of fair to poor health. Toetoes Estuary also continues to degrade with extensive macroalgal growth driven by very high nutrient loads from the catchment. While there is no evidence suggesting the Plant's discharge has a direct adverse effect on these stressors downstream of the discharge, it does contribute a small portion to the overall loads of Amm-N and TN present downstream of the discharge.
- Alliance has acknowledged it will need to reduce its levels of Amm-N and TN over time as part of catchment-wide initiatives to improve water quality. And this will occur following installation of the biological treatment system required by the proposed conditions, which is expected to reduce the concentration of TN in the discharge by approximately 68% relative to present.

13.3.2 Measures Proposed to Offset or Compensate for Any Adverse Effects on the Environment

No measures are proposed to offset or compensate for any adverse effects on the environment. All adverse effects are addressed via avoidance, remediation and mitigation.

13.3.3 Relevant Provisions of the Planning Documents

The provisions of the relevant planning documents, and an assessment of how the proposed activities sit in relation to them is provided in Section 12 of this AEE.

Key points of relevance are:

- It is evident that implementing the Freshwater NPS is going to require an improvement in Mataura River water quality for some key contaminants, particularly nutrients and *E.coli.* The extent of the required improvement, how it will be achieved and the timeframes for achieving it, will be developed through the upcoming collaborative planning exercise required by the Freshwater NPS, and which Environment Southland expects to be completed by 2025.
- Alliance expect its contribution to catchment reductions in these key contaminants to be more than proportional to the wider reduction achieved in the catchment, and also comparatively expedient. Noting that experience from similar catchments in other parts of New Zealand (i.e. catchments with a high proportion of pastoral farming and nutrient enrichment), suggests any significant reduction in the contribution from diffuse sources will take some time.
- The discharge causes levels of *E.coli*, Amm-N and TN to increase downstream of the mixing zone, and in the case of *E.coli*, to also not meet the relevant water quality standards in Appendix G of the Operative Plan, or Appendix E of the Proposed Plan.
- The Operative Plan directs this type of discharge only be allowed where it is consistent with Part 2 of the RMA to do so, which, for reasons set out in Section 13.3.5, is the case here.
- The Proposed Plan requires this application demonstrate how, and by when adverse effects will be avoided, where practicable, and otherwise remedied or mitigated so that beyond the zone of reasonable mixing, water quality will be improved to assist with meeting the relevant standards in Appendix E. The proposed conditions do this by requiring a three stage upgrade to the wastewater treatment plant which will significantly reduce the *E.coli* and faecal coliform concentrations in the discharge. This will improve the water quality beyond the zone of reasonable mixing and assist with meeting the Appendix E water quality standards for those parameters.

In summary, the proposed activities undertaken in accordance with the proposed conditions are:

- Consistent with the requirements of the Freshwater NPS, and the Freshwater NPS provisions and its obligations on Environment Southland for managing the Mataura River do not provide a reason why the consents should not be granted as sought.
- Broadly consistent with the RPS, and will assist, rather than hinder, Environment Southland's efforts to implement it, particularly in respect of improving water quality.
- Not contrary to the objectives and policies of the Operative Plan or Proposed Plan, and there is nothing in the Operative Plan or Proposed Plan which means the discharge applications cannot be granted on the terms sought.

13.3.4 Value of Investment of the Consent Holder

When considering these applications, the consent authority must have regard to the value of the investment of Alliance which is reliant on the proposed activities.

That investment is considerable. The latest estimate (December 2018) for the Mataura Plant's insured value is $225 million, and much of this value is sunk – i.e. it could not be recovered if the plant was forced to downsize, close or be relocated.

13.3.5 Part 2

13.3.5.1 Section 5

The purpose of the RMA (section 5) is to promote the sustainable management of natural and physical resources. The Act defines "sustainable management" as:

> *"managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while—*
>
> *(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."*

In practice, there are two general elements of "sustainable management" in the context of section 5 that must be considered when assessing the resource consent application. They are:

- Enabling people and communities to provide for their social, economic and cultural wellbeing; and
- Safeguarding environmental quality and avoiding, remedying or mitigating adverse effects.

Enabling people and communities to provide for their social, economic and cultural wellbeing

With respect to the likely implications of granting the consents as sought in terms of enabling people and communities to provide for their social and economic wellbeing, it is clear from the economic report in **Appendix 6** that the Plant plays an important role in the local economy, and is also an important part of the local community. The Plant provides substantial employment, both directly and indirectly, and provides important social context to the area. The Plant is totally reliant on being able to operate under the consents sought

in this application, including the ability to take water from the Mataura River, and use it as a discharge medium. Not granting the resource consents as sought would place the ongoing operation of the Plant in question.

Safeguarding Life-Supporting Capacity

As set out in Sections 7 and 8, a comprehensive assessment of the effects of the proposed activities on the receiving environment by FWS/AES has determined that no adverse effects on the life-supporting capacity of the Mataura River and its ecosystems trigger the need for immediate or urgent mitigation.

The improvement in discharge quality as a result of the proposed wastewater treatment plant upgrade will also help contribute to a long-term improvement in the life-supporting capacity of the river, if that life-supporting capacity is currently being depressed by the high baseload of nutrients in the catchment.

Requirement of Avoid, Remedy or Mitigate

Section 5(2)(c) of the RMA requires that adverse effects of activities on the environment are "avoided, remedied or mitigated". It is not required that all effects be avoided, or that there is no net effect on the environment, or that all effects are compensated for in some way. Rather, section 5(2)(c) is about doing what is reasonably necessary, given the circumstances of the particular case, to lessen the severity of effects. Some flexibility is necessary when exploring mitigation measures that can be used to reduce the impact of adverse effects, to ensure that the mitigation itself is sustainable.

The ongoing approach used in relation to avoiding, remedying or mitigating the effects of the Plant, set out in Section 9 and summarised in Section 9.4, is consistent with these principles.

13.3.5.2 Sections 6, 7 and 8

Sections 6, 7 and 8 of the RMA set out the principles to be applied in achieving the purpose of the Act. With respect to the principles contained in sections 6, 7 and 8 of the RMA:

- They are subordinate to the overriding purpose of the Act, as set out in section 5.
- Each plays a part in the overall consideration of whether the purpose of the Act has been achieved in a particular situation.
- They are not an end in themselves, but an accessory to the principal purpose.

With respect to section 6, which contains matters of national importance that shall be recognised and provided for, other than section 6(e) and section 6(g) that relate to Maori values and which are addressed below, it is considered only section 6(a), which addresses the *preservation of the natural character of the coastal environment (including the coastal*

marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development is expressly relevant.

With respect to section 6(a), the natural character of the Mataura River has been impacted by many agricultural, industrial, urban and drainage uses. The FWS/AES report has also concluded that the discharge does not adversely impact on water quality parameters likely to have an aesthetic impact. The use of the Mataura River by the Plant is not considered to be inappropriate in this context. It is also noted that section 6(a) does not extend to the reinstatement or enhancement of the environment relative to its current state.

Section 7 contains other relevant matters to which particular regard must be given. Several of these are relevant to this application; notably section 7(b), the efficient use of natural and physical resources; section 7(c), the maintenance and enhancement of amenity values; section 7(d), intrinsic values of ecosystems; section 7(f), maintenance and enhancement of the quality of the environment; and section 7(h), the protection of the habitat of trout and salmon.

With respect to section 7(b), the economic assessment has identified a number of reasons why the continued use of the Plant represents an efficient use of natural and physical resources. The Plant is existing, and there is significant investment costs in the location and equipment at the site; the Plant has access to a skilled labour force of sufficient scale to ensure that it operates effectively; the Plant is appropriately located to receive livestock that is within the immediate and surrounding area; and the Plant has appropriate infrastructure support including access to road and rail networks.

The continued operation of the Plant in accordance with the proposed consent conditions would maintain amenity values and the quality of the environment, in accordance with sections 7(c) and 7(f). The intrinsic values of the ecosystems which section 7(d) requires particular regard be had, were considered by the various technical assessments when assessing the effects of the proposed activities. Finally, with respect to section 7(h), it is clear that the water quality within the Mataura River downstream of the Plant is suitable for trout.

Maori Relationship/Kaitiakitanga/Treaty Principles

With respect to the sections within Part 2 that relate to tangata whenua, the Mataura River and adjacent land, including the Mataura Falls in the immediate vicinity of the Plant, has high cultural significance for tangata whenua.

Alliance recognises and values the role of Hokonui Runanga as tangata whenua and kaitiaki of the Mataura River and has and continues to engage with Te Ao Marama and Hokonui Runanga in respect of the applications, and how the effects of the activity could be avoided, remedied or mitigated.

The views expressed thus far have fed into Alliance's work assessing the effects of the proposed activities and in determining how the effects of the activities should be managed through the proposed conditions, including its consideration of alternative discharge methods. As have the key directives in Te Tangi a Tauira – the relevant iwi management plan.

It is intended that through this ongoing engagement process, appropriate mechanisms will be identified which provide for sections 6(e), 7(a) and 8 matters in relation to the ongoing operation of the Plant.

13.3.5.3 Summary

After considering all the relevant matters under Part 2 and section 104, granting the resource consents with appropriate conditions would promote the purpose of the Act and would constitute sustainable management of natural and physical resources for the following reasons:

- It allows the use of natural and physical resources in a way which enable people and the community to provide for their social, cultural and economic wellbeing; and
- It safeguards the life-supporting capacity of air, water and soil, and ensures that adverse effects are appropriately avoided, remedied or mitigated.

13.4 SECTION 105

Section 105 of the RMA sets out additional matters which must be considered by a consent authority when considering an application for a discharge permit. Section 105(1) of the RMA states:

> *"If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—*
>
> *(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
>
> *(b) the applicant's reasons for the proposed choice; and*
>
> *(c) any possible alternative methods of discharge, including discharge into any other receiving environment.*

These matters are addressed in detail in Section 10, which outlines why the proposed discharge method represents the best practicable option.

13.5 SECTION 107

Sections 107(1)(a) and (b) of the RMA specify that the consent authority shall not grant a discharge permit allowing the discharge of water / contaminant into water or land if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination

with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:

- The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- Any conspicuous change in the colour or visual clarity;
- Any emission of objectionable odour;
- The rendering of fresh water unsuitable for consumption by farm animals; and
- Any significant adverse effects on aquatic life.

As is outlined in Section 8, neither the discharge of wastewater nor cooling water gives rise to any of these effects in the receiving waters.

14. CONCLUDING STATEMENT

This AEE is in support of applications to 're-consent' the following existing activities such that the Plant can continue to operate and contribute in a major way to the social and economic wellbeing of the surrounding community:

- The take and use of water for cooling and processing purposes;
- The discharge of cooling water; and
- The discharge of wastewater.

The proposed conditions require a substantial staged upgrade of the Plant's wastewater treatment plant to improve the quality of the Plant's discharge to the Mataura River, and a reduction in water use. These will be significant capital investments and will add significant annual costs to the wastewater plant's operation.

Alliance is seeking a 35 year consent term for all replacement consents being sought. A 35 year consent term suitably recognises the existing asset value of the Plant and the significant economic contribution it provides to the Southland Region. The significant capital investment involved in the proposed wastewater treatment plant upgrade will also require, and be contingent on, securing a long consent term in order to enable the upgrades to be progressively implemented, and allow the financial investment to be justified and secured over an appropriate timeframe.

An assessment of the potential effects of the proposal on the environment is provided in Sections 6 to 8 of this AEE, as well as the various technical assessments commissioned by Alliance. By way of summary, it is considered that the project can be undertaken in a manner that appropriately avoids, remedies or mitigates adverse effects on the environment.

With respect to the statutory planning framework that applies to the applications, it is concluded that the development of the project in the manner proposed by Alliance will for the most part align comfortably with the overall management intentions specified in the relevant national and regional planning documents. The proposed activities will not be contrary, or repugnant, to any of the relevant statutory planning documents.

Finally, it is noted that Alliance has consulted with interested / potentially affected parties with respect to these applications. This consultation has informed the various environmental assessments and will continue throughout the resource consent process and during the subsequent operation of the Plant.

1

APPENDIX 1

Proposed consent conditions

2

APPENDIX 2

Assessment of the Effects of Alliance Mataura's Discharges and Water Take on Mataura River and Toetoes Estuary,

Freshwater Solutions and Aquatic Environmental Sciences, 2019.

3

APPENDIX 3

Quantitative Microbial Risk Assessment of the Mataura Plant's wastewater discharge,

Streamlined Environmental, 2019.

4

APPENDIX 4

Determination of mixing zone of treated wastewater from Alliance Mataura discharged into the Mataura River: a mixing modelling approach using contaminant tracers,

Streamlined Environmental, 2019.

5

APPENDIX 5

Mataura River Alliance Discharge: Identification of in-river recreation values,

Rob Greenaway & Associates, 2019.

6

APPENDIX 6

Assessment of Economic Benefits,

Mike Copeland – Brown, Copeland & Co, 2019

7

APPENDIX 7

Mataura Plant Wastewater Treatment and Disposal Alternatives Assessment,

Pattle Delamore Partners, 2019

8

APPENDIX 8

Alliance Mataura Plant – Water Use and Wastewater Management Resilience Assessment

9

APPENDIX 9

Summary AEE document circulated to key stakeholders during consultation

10

APPENDIX 10

Consultation meeting notes

11

APPENDIX 11

Consultation leaflet posted to letter boxes in Mataura Township