CENTRAL HAWKE'S BAY DISTRICT COUNCIL

TAKAPAU WASTEWATER TREATMENT PLANT DISCHARGE

RESOURCE CONSENT APPLICATION AND AEE

April 2021

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Takapau Wastewater Treatment Plant Discharge Resource Consent Application and AEE

Central Hawke's Bay District Council

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1 EXECUTIVE SUMMARY

1.1 Setting

This resource consent application is part of a larger project based on a vision for the way Central Hawke's Bay manages its wastewater in future. This resource consent application provides a critical and significant step in achieving the long-term aspirational goal of removing the Takapau community's wastewater discharge to the Makaretu River. It is part of a wider programme of actions which aims to reduce direct discharges of wastewater to water across the Central Hawke's Bay District (the District).

Central Hawke's Bay District Council (CHBDC) is responsible for the management of wastewater from the community of Takapau. This resource consent application seeks to change the existing wastewater management systems at the Takapau Wastewater Treatment Plant (WWTP). Currently the Takapau WWTP has a pond treatment system with treated wastewater being discharged via a wetland drain to the Makaretu River.

During the previous consent process, iwi gave a strong direction that discharge to the Makaretu River should be ceased. CHBDC have subsequently entered into discussions and consultation with the community to progress changes to the treatment and discharge systems. The community reiterated the desire to avoid wastewater in the Makaretu River. This was reflected in an undertaking by CHBDC in the current consent to investigation alternatives (see Condition 22 of existing discharge consent conditions).

Discharge options were examined. Discharge to land emerged as the preferred means to cease the current discharges. Investigations were undertaken to determine the suitability of land within 10 km of the treatment plant to receive a wastewater discharge. Feedback was sought from the community and iwi regarding land areas that should be avoided. The result has been a proposed system that adopts a predominately land based discharge regime.

The implementation of the proposed discharge regime for Takapau's wastewater is to be staged. This allows for a rapid reduction in the amount of treated wastewater discharged via the current discharge system to the Makaretu River, while managing the costs to the Council and providing time for procurement and construction to occur. A summary of the proposed stages is as follows:

- **Stage 0** allows for the current discharge to occur for up to three years while the subsequent stages are enacted;

- **Stage 1 (within 3 years)** involves the provision of 2,000 m^3 of storage within the treatment system and development of a minimum 5 ha of irrigation, allowing for irrigation of approximately 60 % of the **current** average annual wastewater discharge volume to irrigation and 40 % to the high rate discharge system when river flows exceed half median flow.

  The discharge regime assumes that currently occurring wastewater flows occurs, up to 2,000 m^3 of storage is available in the treatment pond and discharge to the HRLP system can occur only when river flows are above half median;

- **Stage 2 (within 5 years)** involves development of an additional 15 ha and up to 25 ha of irrigation. A new storage pond is to be built adjacent to the existing treatment system with a capacity of 18,000 m^3. The changes allow for irrigation of approximately 90 % of the **future (2048)** average annual wastewater discharge volume to irrigation and 10 % to the high rate discharge system when river flows exceed median flow.

1.2 Structure of the Application

This report is in support of the resource consent applications for discharge of wastewater from the Takapau WWTP. After setting out a description of the current wastewater system, this report details the long-term discharge solution proposed for the WWTP, and the resource consent requirements for this proposal.

The preparation of these consent applications has been informed by work undertaken over the last two years and brings together a collective approach to wastewater management throughout the District.

The following report serves as a summary bringing together a range of reporting. Rather than repeating, this document provides extensive referencing of supporting documents. It is intended to provide a summary and direct connections to the relevant reports and text in meeting the requirements of Section 88 and Schedule 4 of the Resource Management Act (RMA).

A reference list is provided in Section 12, and in order to manage the bulk of reproduction and the overwhelming extent of documentation, only key reports are included with this document in the package of consent application documents. Related documents not included are supplied electronically and can be obtained upon request from CHBDC. A diagram showing the relationships between all of the reports that directly relate to the production of this application is presented in Figure A0 in Appendix A.

1.3 Resource Consent Requirements

This application provides a full assessment of effects seeking the following consents:

- Treated wastewater **Discharge to Land** relating to a low rate land application system (irrigation).
- Treated wastewater **Discharge to Land** where it may enter water relating to a continuation of the existing surface water discharge and the future intermittent indirect surface water discharge via a high rate land passage system.
- **Discharge of aerosols and odour to air** associated with the receipt, treatment, storage and discharge of wastewater from the Takapau Wastewater Treatment Plant and land application system (irrigation).
- **Use of production land** within the Tukituki River catchment that does not comply with Rule TT2 of Plan Change 6 to Hawke's Bay Regional Resource Management Plan.

A **term of 35 years** is sought for the discharge to land, water and air, and land use consent, bundled as a non-complying activity.

This application provides a full assessment of effects commensurate with the bundled **non-complying activity status** for the WWTP discharges and farm operation.

In the interests of continuing community engagement, CHBDC requests this application is publicly notified.

1.4 Consultation

CHBDC has connected with the community in a number of forums over the course of the current consent. Since 2019 a more directed programme of consultation was undertaken including:

- 17th December 2019: Community Meeting (Intro) at Takapau Hall
- 27th July 2020: Community Meeting (BPO) at Takapau Hall
- August 2020 – Long term plan pre-engagement with opportunities for community to interact on options through webinars and online interactive feedback tools (COVID-19 constrained);
- February 2021 – District wide newsletter update on proposed changes wastewater changes, including that at Takapau;

- 15th February 2021: Site Meeting with Iwi (Jo Heperi & Dr Roger Maaka)
- 16th February 2021: Community Meeting (Cancelled due to Covid)
- 24th March 2021: LTP Workshop at Takapau Hall with focus on Takapau wastewater project
- 1st March 2021: Notification of Long Term Plan
- 31st March 2021: Submissions closed for Long Term Plan
- 12/13th April 2021: Hearings for Long Term Plan
- 2020-2021 – ongoing discussions with landowners around potential land discharge sites.

Discussions and feedback from each meeting have informed the progression of the investigations leading to a series of options for inclusion in CHBDC's Long Term Plan.

Additional separate consultation with iwi has been initiated. There has been opportunity to meet with tangata whenua through community engagement which has occurred as noted in the consultation summary provided as Appendix B. However, it has been CHBDC's preference to directly engage local iwi to prepare a Cultural Impact Assessment (CIA) (rather than using a third party), and to provide an opportunity to take the wastewater discharge options to the wider iwi and hapu whānau to comment outside of formal consultation. A CIA is forthcoming but was not available at the time of preparing this consent documentation.

1.5 Assessment of Environmental Effects

Overall, the effects of the wastewater discharges from the Takapau wastewater treatment plant on the local receiving environment, namely the soil, groundwater, Makaretu River and Tukituki River catchment, will be less than minor.

Overall, it is concluded that there are no adverse environmental effects from the proposed discharge of treated wastewater to land at the Site that cannot be satisfactorily avoided, remedied or mitigated, such that any adverse effects are low (and significantly better for surface water than the existing direct discharge.

1.6 Statutory Assessment

This report is prepared in accordance with s88 and the Fourth Schedule of the Resource Management Act 1991 (RMA). Appendix J provides the assessment of the activity against the objectives and policies of the relevant statutory plans and regulations addressing the Schedule 4(2)(2) and 104(1)(b) matters.

The proposal has been assessed against relevant legislation and planning documents in Section 5 and Appendix J of this application, and is found to be in accordance with the identified statutory requirements and consistent with relevant plan provisions relating to surface water and groundwater quality, ecology, air quality and land management.

With regard to cultural values, CHBDC have been engaging with the local tangata whenua. Iwi have been involved with the development of the wider strategy solutions and have been engaged to provide a CIA. At the time of submission of this resource consent application the CIA is yet to be received, and therefore it is difficult to accurately assess the relevant objectives and policies relating to matters of tangata whenua. CHBDC will continue to engage with mana whenua throughout the planned upgrade works.

Overall, it is concluded that there are no adverse environmental effects from the proposed discharge of treated wastewater to land at the Site, and to the Makaretu River via the HRLP, that cannot be satisfactorily avoided, remedied or mitigated, such that any adverse effects are less than minor (and significantly better for surface water than the existing direct discharge).

The proposal is consistent with Part II of the RMA and with the objectives and policies of the NPS-FM, RPS and RRMP. The proposal has considered and addressed the relevant provisions of the NES-F and NES-DW.

Overall, it is therefore considered appropriate to grant consent pursuant to section 104B and 108 of the RMA.

2 CONSENTING OVERVIEW

2.1 Summary of Takapau Discharges

At Takapau, wastewater is conveyed from the community to an oxidation pond system (TWWTP) on Burnside Road, approximately 2 km northeast of Takapau (Beca, 2020: T:C.10a). Treated wastewater from the TWWTP is discharged to an overland flow path referred to as the wetland, adjacent to the Makaretu River Bridge on the opposite (east) side of Burnside Road.

Over the course of the current consents, regular testing has occurred which has been used to predict future flows and wastewater quality. A detailed evaluation of the existing systems, alongside flow and quality characteristics is provided in the Takapau Options Report (Beca, 2020: T:C.10a).

Following new population growth projections, future wastewater flows and quality were revised (Beca, 2021: T:B.31c). The future predicted flows that will be used for design of the long-term wastewater discharge solution are:

- At 2019 the average daily flow leaving the TWWP is 180 m^3/d and the average annual discharge volume is 65,700 m^3/y; and
- At 2048 the average daily flow leaving the TWWP is 317 m^3/d and the average annual discharge volume is 115,705 m^3/y.

Over the course of the proposed term that this discharge consent application seeks (35 years), it is programmed that the existing discharge to the wetland will be upgraded to create a high rate land passage (HRLP) within a better managed discharge route for discharge to flow to the Makaretu River. Within five years the use of the HRLP will reduce as water is used in preference for a low rate land application system. This will be established on land adjacent to the TWWP using irrigation (most likely centre pivot) for agronomic benefit. To assist with reducing the volume discharge to the Makaretu River and optimising the irrigation system, storage is to be created to enable the discharge to be withheld when conditions for application via the low rate or HRLP systems is not suitable.

2.2 Historic and Existing Resource Consents

CHBDC currently holds consent DP180115A to discharge treated municipal (domestic) wastewater from the Takapau oxidation pond into or onto land (wetland) in circumstances which result in that contaminant entering water. Consent DP180124A is for the discharge of contaminants from the oxidation pond to air. The current consents are due to expire 30 October 2021.

2.3 Resource Consenting Requirements and Activity Status

Below is the activity status and Hawke's Bay Regional Resource Management Plan (RRMP) and Regional Coastal Environment Plan (RCEP) provisions that relate to the proposed activities consent is being applied for.

Activity	Plan/Status	Rule
Treated wastewater Discharge to Land relating to the low rate land application system (irrigation).	RRMP- Discretionary Activity	Rule 52 – Non-compliance with other Rules – Discharge to Land/Water
Treated wastewater Discharge to Land where it may enter Water relating to a continuation of the existing surface water discharge and the future	RRMP – Restricted Discretionary Activity	Rule 36 Existing high discharge volume sewage systems (Restricted Discretionary)

Activity	Plan/Status	Rule
intermittent indirect surface water discharge via a high rate land passage system.		Rule 52 – Non-compliance with other Rules – Discharge to Land/Water
Discharge of aerosols and odour to air associated with the receipt, treatment, storage and discharge of wastewater from the Takapau Wastewater Treatment Plant and land application system (irrigation).	RRMP – Discretionary Activity	Rule 28 – Miscellaneous industrial & trade premises – Discharge to Air
The use of production land within the Tukituki River catchment that does not comply with Rule TT2.	RRMP – Non-Complying Activity	Rule TT2A Production land use

This application provides a full assessment of effects seeking **a term of 35 years** for the discharge to land, water and air bundled as a non-complying activity.

2.4 Permitted Activity Considerations

The following permitted activity table is provided to assist with clarifying the extent of the proposed works and activities for which consent is not needed.

Rule - RRMP	Comment
Rule *7 Vegetation clearance and soil disturbance (Permitted)*	Any vegetation clearance and soil disturbance required for the proposed works will need to be assessed against the permitted standards of Rule 7. However, thrusting, boring, trenching or mole ploughing associated with cable or pipe laying or a **network utility operation** is excluded from this rule.
Rule 21 Waste & other matter, excluding industrial & trade premises (Permitted) The discharge of contaminants into air arising from the storage, use, transfer, treatment or disposal of waste and other matter, excluding: - discharges into air from any industrial or trade premises - discharges into air addressed by other Rules in this Plan - discharges into air from moveable sources	The wastewater treatment plant is captured in the definition of industrial or trade premises, and subsequently any discharges to air are excluded from consideration under Rule 21.
Rule 31 Discharge of water (Permitted) The discharge of water (excluding drainage water) into water.	The discharge of water to water from any dewatering activities will need to be assessed against the permitted standards of this rule. However, there are no dewatering activities proposed as part of this consent application.
Rule 37 New sewage systems (Permitted) Except as provided for in Rule 35 or Rule 36, the discharge of contaminants (including greywater) onto or into land, and any ancillary discharge of contaminants into air, from a new sewage system	*New* sewage systems and discharges need to be assessed against the permitted standards of this rule. The proposed land discharge area and discharge volumes exceed the conditions in this Rule. Hence resource consent is being sought as a

Rule - RRMP	Comment
	discretionary activity under Rule 52 (refer to section 2.3)
Rule 42 Diversion and discharge of stormwater (Permitted)	There are no stormwater discharges from the site into constructed open drainage system or a piped stormwater drainage system.
Rule 49 Discharges to land that may enter water (Permitted) The discharge of contaminants onto or into land, in circumstances which may result in those contaminants (or any other contaminant emanating as a result of natural processes from those contaminants) entering water.	The discharge to land from the leakage of the existing unlined pond is provided for under this permitted activity rule. The technical assessments regarding hydrogeology and surface water quality provide evidence of meeting the permitted activity conditions of this rule.

2.5 Other (Including Future) Consents and Approvals

The development of the new wastewater discharge system at Takapau will require design, procurement and construction of facilities over a period of time. This includes the installation of a pump wetwell, pumping facilities, tertiary treatment facilities, control shed and a storage pond. The exact design of these facilities is dependent on the approval of the consents sought as part of this application.

It is anticipated that the outcomes of the consenting process for the discharges (as sought in this application) will help inform designs and ultimately the need for any consents, approvals, and designations (or variations). At this stage future consents include:

- Building consents for structures (such as a pump shed);
- Alteration to the designations/notice of requirements – or depending on the design – a variation to the current designation;
- Outline Plan of Works; and
- Various survey requirements, including the closure of a paper road.

Further to not needing consents now, is many of the future and dependent approvals are from the territorial authority (Central Hawke's Bay District Council) and this would be a separate process, including administration, to the consents sought in this application being considered by the Regional Council.

3 PROJECT BACKGROUND

3.1 Development of a District Wide Wastewater Strategy

CHBDC is committed to the health, safety, and wellbeing of the Central Hawke's Bay community. In September 2020 around 2 years of community consultation and technical investigations culminated in the delivery of a district wide Wastewater Strategy (CHBDC, 2020:A:O.3, #theBIGWasteWaterStory). The overarching goal of the strategy is to:

> *The Wastewater Strategy developed and set out in this report outlines a process to achieve our vision for resilient and sustainable wastewater management for the next 50 years. The Strategy's aim is to ensure that wastewater systems in the district are developed to be managed efficiently, effectively and sustainably, with one eye on the present and one eye on the future. It will serve as a guide to inform the Council's asset management and planning processes surrounding wastewater.*

The Wastewater Strategy aligns with Council's THRIVE objectives (https://www.chbdc.govt.nz/our-council/about/project-thrive/). The Strategy provides a cohesive and long-term vision for wastewater management across the district's six reticulated communities (Waipawa, Waipukurau, Otane, Takapau, Porangahau and Te Paerahi). The Strategy outlines 5 lynchpin projects for wastewater management in the district. Development of long term wastewater solutions for Takapau is Project 3.

The long-term planning for Takapau follows the process outlined by the strategy. This includes the use of a series of subsequent phases as follows:

- Phase A: Engagement;
- Phase B: Data gathering;
- Phase C: Optioneering/Concept;
- Phase D: Consent;
- Phase E: Design;
- Phase F: Procure;
- Phase G Construct; and
- Phase H: Commission and Operate.

Following this phasing structure enables the Takapau project to be developed, consented and implemented in a logical and incremental manner. The phases are represented in the reporting codes for all documentation associated with the consent application. Each report has a prefix representing the community (Takapau = T), followed by the phase reference (Phase A to D) and then a unique report code. Figure A0, Appendix A lists the reports associated with this consent application and shows how they relate to this phasing structure.

This consent enables the development of a wastewater management system which meets Council's wider infrastructure strategy of d*urable infrastructure which outlines principles of "dig once" and "no bandaids", "Smart Growth" and "Environmentally Responsible"*.

3.2 Long Term Plan

In order to develop the alternative discharge solution, funding is required. The use of a staged programme is proposed to assist with managing funding to assure the projected solution can be achieved. However, it should be noted that the key change is the setting up of the land treatment system. WWTP pond improvements, river discharge improvements, development of storage and expansion of the land treatment system will follow within 5 years.

The ability to implement change is primarily limited by funding. Council staff and elected members have committed to making changes as mentioned above, but funding requires approval through an annual planning process. This is currently concluding with the 2021-31 Long Term Plan close to adoption. The funding sought is $3m over the next 5 years of the Long Term Plan, with the full system to be commissioned by 2026.

3.3 Best Practicable Option

The RMA consenting process has a requirement to demonstrate that a Best Practical Option (BPO) has been considered and is being sought. This requires an evaluation of alternatives and justification provided as to why one option is preferred over another. This is detailed in Section 8.

It should be noted that the existing consent has a requirement to:

Condition 22

The consent holder shall undertake an investigation and comprehensive assessment of alternative treatment and disposal options, including assessment of the feasibility of land based disposal (in full or part) of the treated wastewater. This assessment shall generally follow the programme of investigations outlined in the document referenced in condition 1(c), but shall also include an assessment and consideration of the current state of existing infrastructure, including any evidence that the existing oxidation pond is leaking to ground or undersized for projected inflows. This report shall be provided to the Council (Manager Compliance) prior to ***30 April 2021****.*

The undertaking the requirements of this consent condition have largely been addressed by the process that has led to this consent application. In effect, this application document is the result of *"…an investigation and comprehensive assessment of alternative treatment and disposal options, including the feasibility of land based disposal (in full or part)…".* It is therefore considered that this application satisfies the requirements of Condition 22 of the current resource consent to discharge to the Makaretu River. Further detail examining options is presented in Section 8.

4 RECEIVING ENVIRONMENT

4.1 Locality and surrounding land use

The TWWTP serves the Takapau community, located towards the western extent of the Central Hawke's Bay district and around 20 km along SH2 from Waipukurau. The area is located on the Ruataniwha Plains. The plains lie between the axial Ruahine ranges to the west and tertiary aged argillite, sandstone and limestone ridges to the east. The landforms in the vicinity of the WWTP reflect the drainage of water from the western ranges across the plains and are dominated by flood plain and older river terraces.

There are two key sites for the discharge from TWWTP being, the site to receive irrigation for agronomic benefit and the HRLP system. A detailed evaluation of the receiving environment for the discharge is given in supporting reports including:

- Evaluation of Soils to Receive Takapau Wastewater (LEI, 2020: T:B.15).
- Water Quality Assessment – Makaretu River (Beca, 2020: T:B.24).
- Takapau Wastewater Treatment Plant – Hydrogeological Assessment (Beca, 2021: T:B.14).
- Existing farming system memo (LEI, 2021: T:B.13).

It is recommended that these reports are reviewed for additional detail. A summary of key receiving environment parameters is given here.

4.2 Tukituki River Catchment

A detailed description of the Tukituki River catchment is provided in Beca (2020: T:B.24).

In summary, the Maharakeke Stream is a tributary of the Makaretu River, draining 8,545 ha within the larger Tukituki River catchment (HBRC, 2015). The Maharakeke is one of 17 sub-catchments within the Tukituki, located east of Takapau. This stream flows into the Makaretu 500 m before the Makaretu River flows into the Tukipo River and then into the Tukituki, all within the span of 2 km.

The Maharakeke and the Makaretu sub-catchments sit within the HBRC Regional Resource Management Plan, Plan Change 6 designated Tukituki Catchment Management Zone 3 – Ruataniwha South.

The Makaretu River runs along the discharge site's northern extent and is a sub-catchment of the Tukituki River, draining an area of 7,938 ha. As mentioned in the technical report, regular flow monitoring does not occur for the Makaretu River.

Land use in the Ruataniwha South sub-catchment is predominantly sheep and beef farming with a small amount of forestry near the Ruahine Ranges where headwaters initiate. The Ruataniwha South sub-catchments typically feature warm temperatures, high solar radiation, and moderate to low annual water deficits. Median annual total rainfall in the sub-catchment trends from ~1,600 mm in the Ruahine foothills to <800 mm west of Waipukurau (Chappell, 2013, pp.44).

The Ruataniwha plains are characterised by flat plains, flood plains and gently undulating plains of alluvial origins. Intermediate river terraces of around 10,000 years old are a feature across the wider Ruataniwha Plains, while low terraces generally follow the course of the River systems (Forbes *et al*., 2011).
Geology in the area is greywacke basement overtopped by late Quaternary alluvium and colluvium consisting of unconsolidated to poorly consolidated mud, sand, gravel and peat. Localised areas of limestone are present to the south in the Maharakeke sub-catchment toward the eastern hills (Heron, 2014).

4.3 Makaretu River Hydrology

A detailed description of the Makaretu River hydrology is provided in Beca (2020: T:B.24).

In summary, the flow in the Makaretu River is a generally low-flow system that reacts quickly to strong rainfall events. HBRC have spot flow gauge records of the Makaretu River at Speedy Road Bridge, approximately 9 km downstream of the treated wastewater discharge. The median flow is 1.4 m^3/s, the highest flow recorded is 54.9 m^3/s. Table 1 in the Surface Water & Ecology AEE (T:D.25) gives the summary statistics based on HBRC flow monitoring of the Makaretu River[1].

The section of the Makaretu River around the treated wastewater discharge is a relatively shallow braided river with a gravel substrate. The width of the river gravel plain is approximately 50 m at the point of discharge. Historical imagery from Google Earth indicates that the main branch of the river shifts across the braid plain at a sub-annual timescale.

4.4 Natural Wetlands

HBRC maintains a database of natural wetlands. There are no wetland features identified within the site and the HRLP area is not a natural wetland.

4.5 Water Quality and Public Health Risks

Water quality in the Makaretu River is analysed in detail in Beca (2020: T:B.24). In summary, water quality issues include elevated nutrient levels (phosphorus) along with below target macroinvertebrate communities (MCI scores <120). The median values of Total Phosphorus (TP) and Dissolved Reactive Phosphorus (DRP) at a monitoring location 50 m upstream from the Takapau WWTP discharge point are above their respective ANZECC (2018) and PC6 trigger values which indicates a consistent contribution of these nutrients exists in the upstream catchment (ANZECC, 2018).

Issues in the wider Tukituki catchment are understood to be nutrient enrichment and associated periphyton growth, with a general degradation from upstream to downstream in the wider Tukituki catchment (Ausseil, 2008). Macroinvertebrate communities also follow a pattern of degradation further downstream.

4.6 Geology and Hydrogeology

A detailed description of the geology and hydrogeology is provided in Beca (2020: T:B.14) appended as Appendix I.

In summary, the area is situated in the southern Ruataniwha Plains, in the area between Ruahine and Raukawa Ranges. The WWTP is situated approximately 220 m above mean sea level (MSL), in an alluvial terrace of the Makaretu River.

The general physical geography of the area is characterised by plains of alluvial origins. Intermediate river terraces composed of Pleistocene-aged alluvium (Q2a) are present across the wider Ruataniwha Plains, while the low terraces are composed of Holocene-aged alluvium (Q1a) generally follow the course of the Makaretu River (Lee *et al*, 2011).

Recharge of the aquifer system occurs mainly by precipitation in the Ruahine Range to the west, especially during winter, and from losing rivers across the plains. Hawke's Bay Regional Council (HBRC) has an extensive groundwater monitoring network through existing bores in the area.

Ten existing HBRC monitoring bores were used in the hydrogeological assessment (Beca, 2021: T.B.14) in the area and indicate a general groundwater flow from west to east, approximately parallel to the Makaretu River.

[1] Correlated flow data provided by Hawke's Bay Regional Council

There is no clear correlation between seasonal range and depth, and the maximum and minimum water levels at individual bores can occur at different periods in the year (i.e. the summer low level across all bores does not occur consistently in the same month).

4.7 Land Application Site

A detailed discussion of the Site that is proposed to receive low rate wastewater application is given in the Site Investigation report (LEI, 2020: T:B.15) and is summarised in the Assessment of Effects to Land (LEI, 2021: T:D.10). Key receiving environment parameters are given in Table 4.1.

Table 4.1: Land Application Site Information

	High rate discharge (HRLP)	Low rate discharge (Land Application/Irrigation Site)
Location	Burnside Road	45 Burnside Road, Takapau
Area	0.1 ha	42.4 ha
Current land use	TWWTP discharge	Mixed pastoral and cropping
Surrounding land use	Pastoral farming including irrigated pasture and crops	
Landform	Low terrace adjacent to river	Elevated terrace adjacent to SH 2 dropping to lower terrace adjacent to river
Soil type(s)	Ashburton Sandy Loam	Ashburton Sandy Loam (13 ha) – lower terrace; Tikokino Shallow and Stony Silt Loam (10 ha) – elevated terrace; Ruataniwha Silt Loam (7 ha) – elevated terrace; Tikokino Silt Loam (7 ha) – elevated terrace; Takapau Silt Loam (4 ha) – elevated terrace; and Oronoko Silt Loam (2 ha) – terrace edge.
Soil unsaturated hydraulic conductivity	NA	2 mm/h to 21 mm/h (design rate is 5 mm/h) Design irrigation rate 29 mm/h
Nearest surface water body	Makaretu River, at boundary	Makaretu River, 20 to 540 m away
Average annual rainfall	705 mm	
Average annual potential evapotranspiration	1,286 mm	
Wind conditions	Dominant wind direction (5%-8%) for all wind strengths is from the south-west, with winds from the north-east and west also being frequent	

4.8 Natural Hazards

4.8.1 Fault lines

Being situated within a tectonically active region of New Zealand, it is unsurprising that the application site is surrounded by a series of faultlines. The nearest active faultline is the Takapau faultline running in a north-south direction with this ceasing at the Takapau township one kilometre south of the application site (GNS, 2021).

Additionally, the application area is located between the Ruataniwha and Oruawharo faults, both of which are north-south running, active reverse faults at a distance of 3 km to the west and 4 km to the east respectively (GNS, 2021).

Finally, the Waikopiro faultline, also running in a north-south direction, is located 500 m east of the property, however this faultline is classified as being inactive (GNS, 2021).

4.8.2 Flooding

Situated next to the Makaretu River, a proportion of the discharge area is at risk of flooding during storm events (HBRC, 1:100 year flood plan). The area at risk of flooding encompasses 12 ha and is confined to the lower terrace within the northern extent of the owned land parcel. Figure 4.1 represents the flood risk region for the application site. Discussions with the farmer identified that the lower terrace has not been fully or partially inundated in the 37 years of Site occupation.

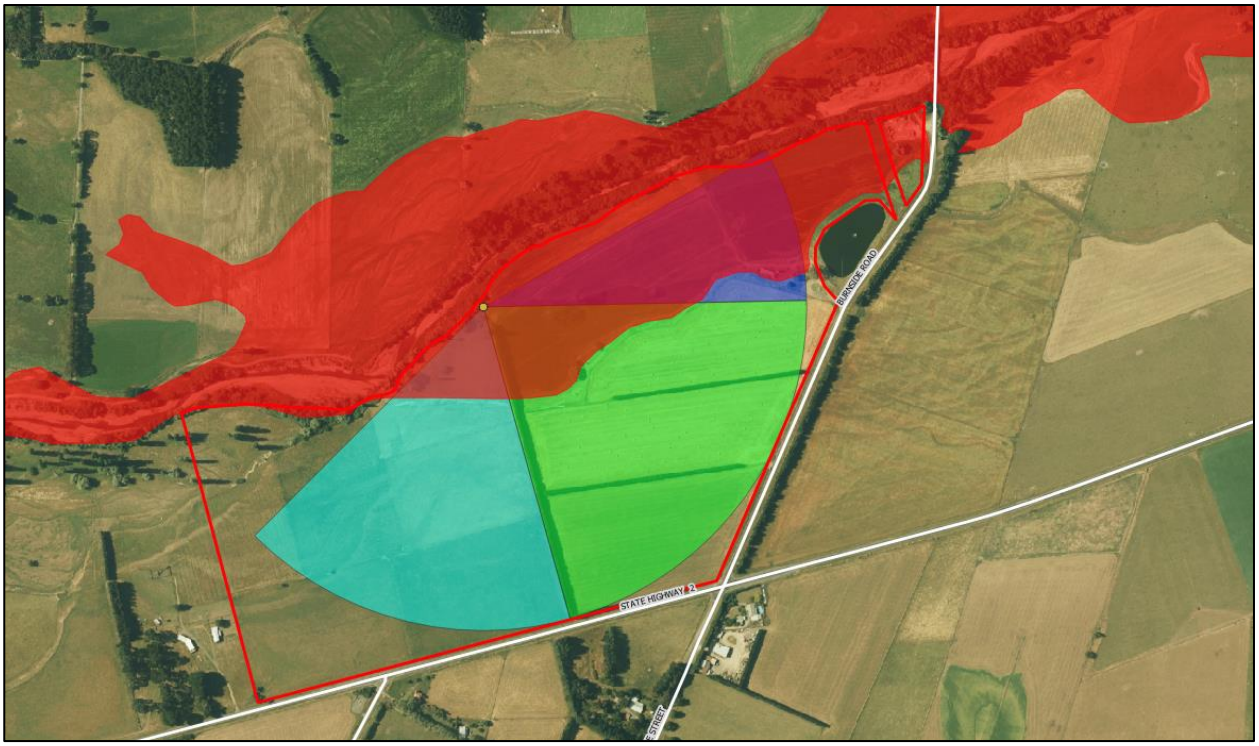

Figure 4.1: Flood Risk Region of Proposed Discharge Site

It is noted that the proposed storage pond is to be located on this lower terrace. While there are design considerations for siting a pond on a flood terrace, they are easily able to be addressed.

5 STATUTORY CONTEXT

A Statutory Evaluation for Takapau WWTP has been prepared (Beca, 2021: T:D.90) and is included in Appendix J. The relevant statutory provisions for the WWTP are summarised below.

5.1 Section 9 of the Resource Management Act 1991 (RMA)

Section 9 of the RMA describes certain restrictions on land use. This includes activities that contravene Regional Rules (RMA s9(2)a)) such as the discharges described in Chapter 6 of this report. Activities that contravene regional rules cannot be undertaken unless expressly allowed for by resource consent, as such resource consent is being sought to allow for the activities associated with this proposal.

5.2 Section 15 of the Resource Management Act 1991 (RMA)

Section 15 of the RMA describes restrictions on the discharge of contaminants into the environment. No person may discharge any contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water (s15(1)(b)). The discharge of contaminants cannot be undertaken unless it is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan or a resource consent. As such resource consent is being sought to allow for the discharge activities associated with this proposal.

5.3 Section 104 of the Resource Management Act 1991 (RMA)

Before making a decision on a discretionary activity pursuant to Section 104B of the RMA, Council must consider the proposal in terms of Section 104 of the RMA. In addition to an assessment of the actual and potential effects of the proposal, the following provisions must be given regard to under section 104 as stated below:

Section 104 - 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

(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.

Consistent with s104 (a), the actual and potential effects on the environment of the proposed activity for Takapau have been assessed in Section 9 of this report.

Consistent with s104 (b), Appendix J identifies the relevant provisions of the documents referred to in Section 104(1)(b) of the RMA that apply to the various activities involved in the proposal; these being the National Policy Statement for Freshwater Management, RPS and Regional Plan as they apply to the freshwater/land environment. The documents listed in section 104(1)(b) have been assessed in Appendix J.

5.4 Section 105 Matters relevant to certain applications

Section 105 of the RMA refers to certain applications (discharges and coastal consents) that require information in addition to the matters set out in section 104(1). Section 105 states:

1) 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; - **provided in Section 6 and Section 4 respectively***; and*

(b) the applicant's reasons for the proposed choice; - **provided in Section 8** *and*

(c) any possible alternative methods of discharge, including discharge into any other receiving environment. **– provided in Section 8**.

The section 105 matters have been addressed in the relevant chapters noted above.

5.5 Section 107 Restrictions on grant of certain discharge permits

Section 107 of the RMA sets out certain restrictions on specific discharge consents including discharge of contaminants to land and/or water (Takapau WWTP).

(1) Except as provided in subsection (2), a consent authority shall not grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A allowing—

(a) the discharge of a contaminant or water into water; **provided in Section 9.5** *or*

(b) a discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; – **provided in Section 9.3** *or*

(ba) the dumping in the coastal marine area from any ship, aircraft, or offshore installation of any waste or other matter that is a contaminant, — **N/A**

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:

(c) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials: - **N/A**

(d) any conspicuous change in the colour or visual clarity: - **N/A**

(e) any emission of objectionable odour: - **provided in Section 9.7**

(f) the rendering of fresh water unsuitable for consumption by farm animals: - **N/A**

(g) any significant adverse effects on aquatic life. – **provided in Section 9.6**

The relevant matters set out in section 107 have been addressed in the chapters noted above.

5.6 Part 2 Assessment

Part 2 matters of the RMA are relevant to the proposal and are addressed in Appendix J. This includes Section 6 – Matters of National Importance, Section 7- Other Matters and Section 8 – Treaty of Waitangi.

5.7 National Policy Statement – Freshwater Management (NPS-FM)

The National Policy Statement for Freshwater Management 2020 (NPS-FM) came into force on the 3rd September 2020 and supports improved freshwater management in New Zealand by directing Regional Councils to establish objectives and set limits for fresh water in their regional plans.

The intent of the NPS-FM includes prioritisation of the management of the natural and physical resources and has a particular focus on the concept of Te Mana o Te Wai. Te Mana o Te Wai refers to the

fundamental importance of water and recognises that protecting the health of freshwater protects the health and wellbeing of the wider environment.

5.8 National Environmental Standards for Freshwater (NES–F)

The National Environmental Standards for Freshwater 2020 (NES-F) regulates the undertaking of activities that pose risks to freshwater and freshwater ecosystems and rules specifically relate to works in, or adjacent to, wetlands, structures in waterbodies that may impact on fish passage and the diversion or reclamation of water bodies. The works meet the definition of specified infrastructure in the NPS-FM (Subpart 3 Section 3.21(1)) as the WWTP is a lifeline utility (as defined in the Civil Defence Emergency Management Act 2002).

Artificially constructed wetland has been defined in the *Interpretation guidance on the wetlands definition in the NPS-FM and Freshwater NES (Exposure draft 7April 2021).* Examples of 'constructed wetlands' have been provided in the guidance document and include areas of wetland habitat in or around bodies of water created for, or in connection with, any of the following purposes: effluent treatment and disposal systems.

The relevant provisions of the NES - F have been considered for Takapau and are included in the Statutory Evaluation (Appendix J).

5.9 National Environmental Standards for Sources of Human Drinking Water 2007 (NES-DW)

The National Environmental Standard for Sources of Human Drinking Water 2007 (NES- DW) sets requirements for protecting sources of human drinking water from becoming contaminated. Contaminants such as microorganisms can pose a risk to human health when they enter drinking water supplies and that water is then consumed. The NES-DW requires regional councils to ensure that effects of activities on drinking water sources are considered in decisions on resource consents and regional plans.

Regulation 12 of the NES-DW sets out that when considering a resource consent application, a consent authority must consider whether the activity may lead to an event occurring that may have a significant adverse effect on the quality of the water at any abstraction point; or as a consequence of an event (for example, an unusually heavy rainfall) have a significant adverse effect on the quality of the water at any abstraction point.

The relevant provisions of the NES -DW have been considered for Takapau and are included in the Statutory Evaluation (Appendix J).

5.10 Regional Resource Management Plan

The relevant provisions of the Regional Resource Management Plan (RRMP), which includes air discharge activities, have been considered and are included in the Statutory Evaluation (Appendix J).

6 DESCRIPTION OF ACTIVITIES

6.1 Discharge Context

The current discharge from the TWWTP is via a wetland to the Makaretu River. Changes proposed will see the extent of the surface water discharge significantly reduced with irrigation to adjacent land being used as the primary receptor for the wastewater. The management of both the irrigation and river discharge will be assisted with the use of storage.

6.2 Township

In 2019, Takapau had a population of 620 people, with this expected to grow to 790 people by 2028, and 1,093 by 2,048 (Beca, 2021: T:B.31c). This high growth population projection scenario was produced in July 2020 by Squillions Ltd and has since been adopted for the Long Term Plan by CHBDC. Table 6.1 summarises the projected growth scenario for Takapau. The adoption of a high growth scenario enables a level of conservatism to be applied to the discharge design.

Table 6.1: Takapau Population Projection (2019-2048) (Beca, 2021: T:B:31c)

	Actual	Projected					
	2019	2028	Change 2019-2031	% Change	2048	Change 2019-2048	% Change
Population	620	790	170	27.4	1,093	473	76.3

6.3 Description

The TWWTP is located on the west side of Burnside Road, around 2 km from Takapau (Figure 6.1 below).

The existing discharge is via a constructed wetland located adjacent to the Makaretu River Bridge on Burnside Road. The discharge site abuts the Makaretu River. The proposed discharge system that this application for consent refers to will include a high rate land passage discharge which will remain at this location (Table 6.2).

The farmland to receive irrigated wastewater was identified through the community consultation workshops. The property, referred to as the Site, is located adjacent to the existing TWWP. Desktop investigations determined the land as being well suited to wastewater irrigation (Zone B, LEI, 2020: T:B.15). This site has been settled through discussion with landowners.

The relevant land titles associated with this resource consent application are listed in Table 6.2 below.

Table 6.2: Land Parcel Legal Descriptions

Landowner*	CHBDC	Drummond	Dalby (leased by Drummond)	Dalby (not intended to be used)	Ellis
Purpose	WWTP	Irrigation	Irrigation	Not irrigated	HRLP
Site Address	53 Burnside Road, Takapau	45 Burnside Road, Takapau	4292 SH2, Takapau	4292 SH2, Takapau	Burnside Road, Takapau
Legal Description	LOT 1 DP 17032	PT LOT 1 DP 15623	LOT 1 DP 16445	LOT 2 DP 313211	Part of LOT 3 DP 9943
Certificate of Title	JS/1142	J3/1143 J3/1142	51946 51947	51946 51947	V3/838 W2/810
Map Reference	1886630 E, 5565537 N	1886360 E, 5565330 N	1885963 E, 5565134 N	1885521 E, 5565032 N	1886769 E 5565743 N
Area (ha)	0.9	23.5	18.9	18.3	0.1053

* Landowner approval for the respective properties is provided in Appendix C.

Table 6.3 summarises the existing land use of the properties described in Table 6.2 which are to be irrigated.

Table 6.3: Site Summary Details of Properties to be Irrigated

Site & Surrounding Land Use	Cropping (maize, barley, oats & peas) and pastoral farming
Site Characteristics	Series of four flat river terraces. No significant limitations for wastewater applications.
Slope	Relatively flat terrain (<10˚), steep slope between lower and upper terraces. Very gentle slope away from the Makaretu River.
Soil Type	A mixture of recent, pallic and brown soils.
General Soil Characteristics	Shallow depth near the Makaretu River, moderate/deep on higher terraces. Well to poorly draining depending on location.

6.4 Existing Activity

Currently wastewater is conveyed from the Takapau community to an oxidation pond system (TWWTP) on Burnside Road, approximately 2 km northeast of Takapau (Beca, 2020: T:C.10a). Treated wastewater from the TWWTP is discharged to an overland flow path referred to as the wetland, adjacent to the Makaretu River Bridge on the other (east) side of Burnside Road (Figure 6.1).

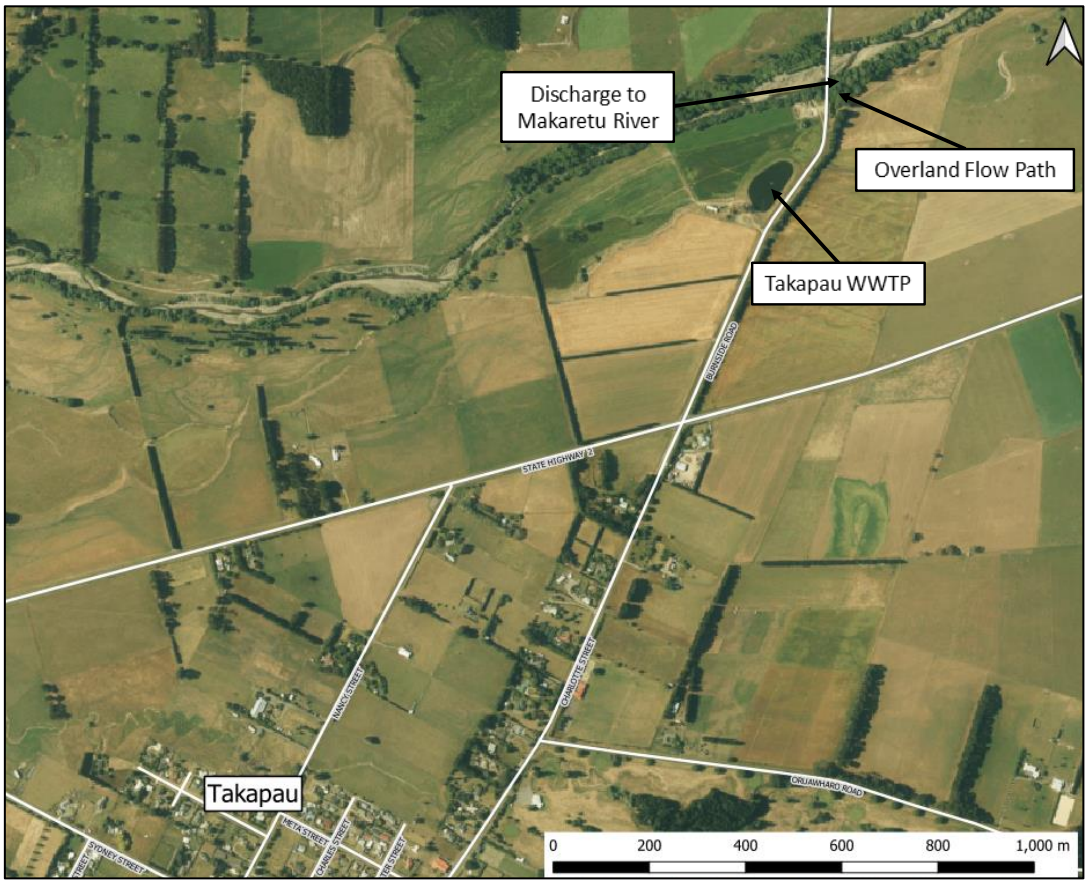

Figure 6.1: Takapau WWTP Location

Over the course of the current consents, regular testing has occurred which has been used to predict future flows and wastewater quality. A detailed evaluation of the existing systems, alongside flow and quality characteristics is provided in the Takapau Options Report (Beca, 2020: T:C.10a).

6.4.1 Wastewater Flow Rates

Following new population growth projections, future wastewater flows and quality were revised and are described in the letter 'Growth Impact Assessment – Small WWTPs' (Beca, 2021: T:B.31c). The future predicted flows will be used for design of the long-term wastewater discharge solution. Table 6.4 summarises the wastewater flows adopted for future discharge design.

Table 6.4: Daily Flow Record adjusted for 2048 predicted flows (after Beca, 2021: T:B.31c)

Year	2019	2028	2048
Population	620	790	1,093
Projection Type	Actual	Actual	Actual
Dry Weather Inflow (ADWF) (m^3/d)	67	85	118
Average Daily Flow (m^3/d)	180	229	317
99%ile Flow (m^3/d)	595	653	756
Maximum Flow (m^3/d)	750	807	910

The flows described in Table 3.1 correspond to an average annual flow of:

- At 2019 average annual volume discharged is 65,700 m^3; and
- At 2048 average annual volume discharged is 115,705 m^3.

6.4.2 Influent Quality

A detailed analysis of the wastewater influent quality is given in the Beca report (Beca, 2020: T:C.10a, Section 4.4). Table 6.5 summarises the influent data used for the discharge design.

Table 6.5: Future (2048) loads to Takapau WWTP

Parameter	Load per Capita4 (g/p/day)	Future (2048) Load (kg/d)	Future (2048) Load Actual (kg/d)*
COD	193	105	94
Unfiltered cBOD	76	41	37
TSS	74	40	36
VSS	-	-	28
ISS	-	-	8
TKN	13.2	7.2	6
Ammonia	7.7	4.2	4
TP	2.1	1.1	1
SRP	-	-	-

*The future loads based on actual sample concentrations have been disregarded owing to the low sample size

The majority of parameters for the Takapau plant appear to fall under, or within, the expected averages for typical wastewater (Beca, 2020: T:C.10a).

6.4.3 Discharge Quality

A detailed analysis of the treated wastewater quality is given in the Beca report (Beca, 2020:T:C.10a, Section 3.4). Table 6.6 summarises the treated wastewater quality data used for the discharge design (LEI, 2021: T:C.15).

Table 6.6: Key Wastewater Parameters, Takapau WWTP (Jan 1999 to Aug 2020)

Parameter	Units	n	Mean	Median	95th Percentile	Range
$ScBOD_5$	g O_2/m^3	354	32	28	72	1 to 98
TSS	g/m^3	238	72	70	140	2.5 to 433
TN*	g/m^3	20	15.6	15.4	24.3	5.8 to 26.8
Ammoniacal N*	g/m^3	20	4.6	0.09	19.9	0.005 to 20.9
DIN*	g/m^3	21	7.6	7.4	19.95	0 to 21
TP*	g/m^3	20	3.9	3.9	5.3	1.9 to 5.9

Parameter	Units	n	Mean	Median	95th Percentile	Range
DRP	g/m^3	20	2.7	2.5	3.797	1.3 to 3.93
Faecal Coliforms	cfu/100 mL	356	14,695 (geomean)	15,900	140,000	74 to 410,000
*E. coli**	cfu/100 mL	20	13,178 (geomean)	18,000	72,950	100 to 110,000

* Sampling to these analytes began in February 2019

6.4.4 Consent Compliance History

The system has compliance challenges around discharge volumes, and at times suspended solids. The Takapau Options Report (Beca, 2020: T.B.10a) details compliance history of the current discharge.

6.5 Proposed Activity

An extensive process that has included technical reporting and community consultations has been undertaken to identify:

- The available options for a long term discharge;
- Following identification of land discharge as the preferred option, a location for discharge; and
- A suitable discharge regime.

The Conceptual Design Report (Appendix K, LEI, 2021: T.C.15) details of the process to determine the discharge regime and the regime design. The discharge system described reflects a reasonable and appropriate balance between the social, cultural, environmental and economic considerations.

A detailed discussion of the treatment system, and how the wastewater design parameters were determined, is set out in the Takapau Options Report (Beca, 2020: T:C.10a). The discharge environment has been evaluated to determine key design objectives such as:

- Makaretu River water quality and values;
- Groundwater interaction with surface water; and
- The ability of the soil and plant system to assimilate water and nutrients from wastewater.

The development of the discharge system for Takapau's wastewater is proposed to be staged. This allows for a rapid reduction in the amount of treated wastewater discharged via the current discharge system to the Makaretu River, while managing the costs to the Council and the time for procurement and construction to occur. A summary of the proposed stages is as follows:

- **Stage 0** allows for the current discharge to occur for up to three years while the subsequent stages are enacted;

- **Stage 1 (within 3 years)** involves the provision of 2,000 m^3 of storage within the treatment system and development of a minimum 5 ha of irrigation, allowing for irrigation of approximately 60 % of the **current** average annual wastewater discharge volume to irrigation and 40 % to the high rate discharge system when river flows exceed half median flow.

  The discharge regime assumes that currently occurring wastewater flows occurs, up to 2,000 m^3 of storage is available in the treatment pond and discharge to the HRLP system can occur only when river flows are above half median;

- **Stage 2 (within 5 years)** involves development of an additional 15 ha and up to 25 ha of irrigation. A new storage pond is to be built adjacent to the existing treatment system with a capacity of 18,000 m^3. The changes allow for irrigation of approximately 90 % of the **future (2048)** average annual wastewater discharge volume to irrigation and 10 % to the high rate discharge system when river flows exceed median flow.

Key parameters for each of these stages for which effects are assessed are summarised in Table 6.7 below.

Table 6.7: Discharge and Management Summary

Parameter	Current (Stage 0)	Stage 1	Stage 2
Storage volume (m^3)	None	2,000	18,000
Average annual outflow from TWWTP (m^3)	~ 60,000	~ 60,000	~ 93,000
High Rate Land Passage			
HRLP Maximum application rate per event (m^3)	750	200	200
HRLP Volume per year (m^3)	~ 60,000	~ 20,900	~ 8,600
HRLP N mass loading from wastewater (kg/y)	857	316	130
HRLP P mass loading from wastewater (kg/y)	221	81	33
Irrigation			
Irrigation regime	Nil	Deferred, non-deficit	Deferred, non-deficit
Landform	Nil	Lower terrace	Upper and lower terraces
Total area – including non irrigated (ha)	42.4	42.4	42.4
Wastewater irrigated area (ha)	0	5	20
Irrigation event application (mm/event)	0	up to 20	up to 20
Average annual irrigation volume (m^3/y)	0	36,300	83,500
Average annual application depth (mm)	0	480	360
Wastewater Nitrogen load (kg N/ha/y)	0	140	84
Wastewater Phosphorus load (kg P/ha/y)[3]	0	60	34
Upper Terrace			
Farm Management current/proposed	Rotational cropping, cut and carry	Rotational cropping, cut and carry	Rotational cropping, cut and carry
Vegetation current/proposed	Cropping (e.g. barley, peas, oats, maize, turnips, ryegrass)	Cropping (e.g. barley, oats, maize, ryegrass)	Cropping (e.g. barley, oats, maize, ryegrass)
Lower Terrace			
Farm Management current/proposed	Low intensity grazing	Low intensity grazing	Low intensity grazing
Vegetation current/proposed	Ryegrass pasture	Ryegrass pasture	Ryegrass pasture

In summary, the discharge system is proposed to consist of the following components:

- 2,000 m^3 of storage at the WWTP for Stage 1;
- 18,000 m^3 of storage in a new pond for Stage 2;
- Irrigation pump station located at the WWTP built during Stage 1;
- 660 m rising main to irrigation system;

- A maximum 460 m centre pivot boom; and
- Wet well and pumping to:
    - High rate land passage system (all stages);
    - 5 ha at Stage 1; and
    - 25 ha additional area at Stage 2.

6.5.1 Land Management

Management of the farmed site to be irrigated is discussed in the Conceptual Design report (LEI, 2021: T:C.15). The Site is currently operated as a mixed pastoral grazing and cropping unit. Following the commencement of wastewater irrigation it is proposed that the current land use will be retained, albeit with the imposition of withholding periods before and after irrigation for activities such as grazing, cutting, cultivation or harvest (LEI, 2021: T:C.15).

The Site is well suited to the cultivation of a wide range of crops (e.g. maize, oats, barley, etc). It is intended that no crops for direct human consumption will be grown on an area that is being irrigated with wastewater.

The wastewater alone does not supply sufficient nutrients for most crops, including pasture, and so the analysis of effects assumes that additional sources of nitrogen and phosphorus will be applied, up to a maximum of 250 kg N/ha/y and 80 kg P/ha/y. These values have been used to create Overseer™ scenarios (LEI, 2021: T:C.14a). Nutrient loss predicted by Overseer™ is given in Table 6.8. Losses via the HRLP system are direct losses with no attenuation in the soil system over which the discharge passes.

Table 6.8: Nutrient Loss Summary

	HRLP / Wetland		Farm		Totals	
	N (kg/y)	P (kg/y)	N (kg/y)	P (kg/y)	N (kg/y)	P (kg/y)
Current (Stage 0)	857	221	2,097	10	2,954	231
Stage 1	316	81	2,530	20	2,846	101
Stage 2	130	33	2,530	20	2,660	53

Note that farming losses are the same for Stages 1 and 2. This is due to the use of other sources of water and the supply of agronomic rates of nutrients to support the cropping regime operated by the land owners.

6.6 Mitigation of Environmental Effects

The proposed system is anticipated to have effects that are less than minor, and arguably further mitigation measures are not needed. To justify this position knowledge of the performance of the proposed system once operational is needed. This is achieved through diligent management, requiring monitoring and reporting.

The proposed system of irrigation and avoiding surface water discharges during low flow conditions in the Makaretu River has the potential to significantly reduce effects beyond the current minimal effects. Proposed consent conditions (as provided in Appendix E) are intended to provide guidance and a check on the system performance and ensure residual adverse effects are no different to those currently experienced, or anticipated.

There are four activities requiring consent: land, in direct water and air discharge, and land use for farming.

The following measures have been identified that will help mitigate potential adverse effects. It is anticipated that these measures will be implemented and reflected through consent conditions.

For discharge to land:

- That groundwater levels and quality in the six new piezometers near the WWTP be measured quarterly; and
- Discharge at a rate not exceeding the soil's un-saturated hydraulic conductivity.

For discharge to land which may enter water:

- Implementing Stages 1 and 2 (storage and irrigation) for the WWTP;
- The diversion of treated wastewater to land as irrigation;
- Avoiding indirect surface water discharges (HRLP discharge) during low flow conditions in the Makaretu River (limited to river flows above median flow);
- The inclusion of minimum stream flow discharge conditions (half-median for stage one and median for stage two); and
- The use of a graduated wastewater discharge volume for the indirect surface water discharge which provides for a greater daily volume to be discharged under higher river flows.

For discharge to air (odour and aerosols):

- Maintain aerobic conditions in the treatment and storage ponds;
- UV treatment of wastewater to reduce pathogen levels;
- Adoption of separation distances to sensitive receptors;
- Chosen irrigation site is located in a down-wind position from the township based on the predominant wind direction;
- The selection of an irrigation system (system pressure and nozzle size) to limit spray drift; and
- Automatic shut-down of irrigation when wind speed and/or wind direction are inappropriate for sensitive receptors.

For land use for Farming;

- Development of a Farm Environmental Management Plan based on the conditions of consent;
- Selection of a site that is appropriate for irrigation having the appropriate soil characteristics;
- Rates of application to be appropriately managed relative to hydraulic conductivity of the soil;
- Managing any stock and cropping activities after irrigation (to avoid soil damage and maintain vegetative cover); and
- No irrigating during rainfall or prolonged wetness.

While each activity will ultimately require its own suite of consent conditions, there are general conditions and conditions in common. For simplicity, attached in Appendix E is a set of draft conditions bundled together. The intention is to use these as a starting point from which the needed consent conditions can be developed.

7 CONSULTATION

7.1 General

This section provides a brief account of consultation undertaken with regard to wastewater management.

7.2 Iwi Engagement

Early iwi engagement was seen as critical for this project. Iwi were consulted through numerous channels, including formal and informal meetings and commissioning of the Tangata Whenua Worldviews report (How, 2020:A:B.42). The overarching direction given to Council was to avoid direct discharges to surface water as these were seen to be culturally abhorrent.

A Cultural Impact Assessment (CIA) has been commissioned for the site. This is to build on the Maori World View report and assess issues specific to Takapau. This report is in the process of being finalised and will be made available as soon as it comes to hand.

In the absence of this CIA, it is clear that the proposal seeks to apply significant portions of the wastewater directly to land, while the remaining portion passes in directly to the river via the HRLP system.

7.3 Public Engagement

Consultation with the community has involved meetings, preparation of newsletters and online communication through the Councils portal. While the consultation programme was significantly impacted by the COVID-19 Levels 2-4 limitations, community meetings were held on 17 December 2019 and 27 July 2020.

Council have been working on a district wide wastewater strategy (#Big Wastewater Story) that requires considerable funding. A series of engagement documents to support the Long Term Plan were released in February 2021. This included a district wide update on proposed changes wastewater changes, including that at Takapau. A media release was distributed on the 8th October 2020 to support the council adoption of the wastewater strategy and advise the community as such.

Discussions and feedback from each meeting have informed the progress of the investigations leading to a series of options for inclusion in CHBDC's Long Term Plan.

7.4 District Health Board

Hawke's Bay District Health Board (HBDHB) public health staff have been recently consulted. The wider district wastewater strategy has been communicated, along with the plan for Takapau.

7.5 HBRC

HBRC staff have been involved in early district wide discussions and the engagement group that lead to the formulation of the Wastewater Strategy (CHBDC:A:O.3, #theBIGWasteWaterStory). They have also been invited in community presentations and participated in one of the recent community meetings.

Senior CHBDC staff have been regularly meeting with HBRC staff and advising of progress for developing alternative long term wastewater solutions and their consenting requirements.

7.6 Summary

CHBDC has connected with the community and iwi in a number of forums over the course of the current consent. Since 2019 a more directed programme of consultation was undertaken including:

- 17th December 2019: Community Meeting (Intro) at Takapau Hall

- 27th July 2020: Community Meeting (BPO) at Takapau Hall
- August 2020 – Long term plan pre-engagement with opportunities for community to interact on options through webinars and online interactive feedback tools (COVID-19 constrained);
- February 2021 – District wide newsletter update on proposed changes wastewater changes, including that at Takapau;
- 15th February 2021: Site Meeting with Iwi (Jo Heperi & Dr Roger Maaka)
- 16th February 2021: Community Meeting (Cancelled due to Covid)
- 24th March 2021: LTP Workshop at Takapau Hall with focus on Takapau wastewater project
- 1st March 2021: Notification of Long Term Plan
- 31st March 2021: Submissions closed for Long Term Plan
- 12/13th April 2021: Hearings for Long Term Plan2020-2021 – ongoing discussions with landowners around potential land discharge sites.

Discussions and feedback from each meeting have informed the progress of the investigations leading to a series of options for inclusion in CHBDCs Long Term Plan.

8 CONSIDERATION OF ALTERNATIVES

8.1 General

A brief summary of the alternatives considered is given here. Alternatives for treatment and discharge were identified in the Takapau Options Report (Beca, 2020: T:C.10a). A detailed discussion is provided in the Best Practicable Option (BPO) report (LEI, 2021: T:C.12) on alternatives considered and the process taken to evaluate them.

It is noted that the analysis in this section while aimed at developing a long term solution, also addresses requirements of the current resource consent, Condition 22.

Figure 8.1 presents a simplified flowchart of the selection process used by CHBDC to nominate a suitable BPO for the Takapau WWTP discharge.

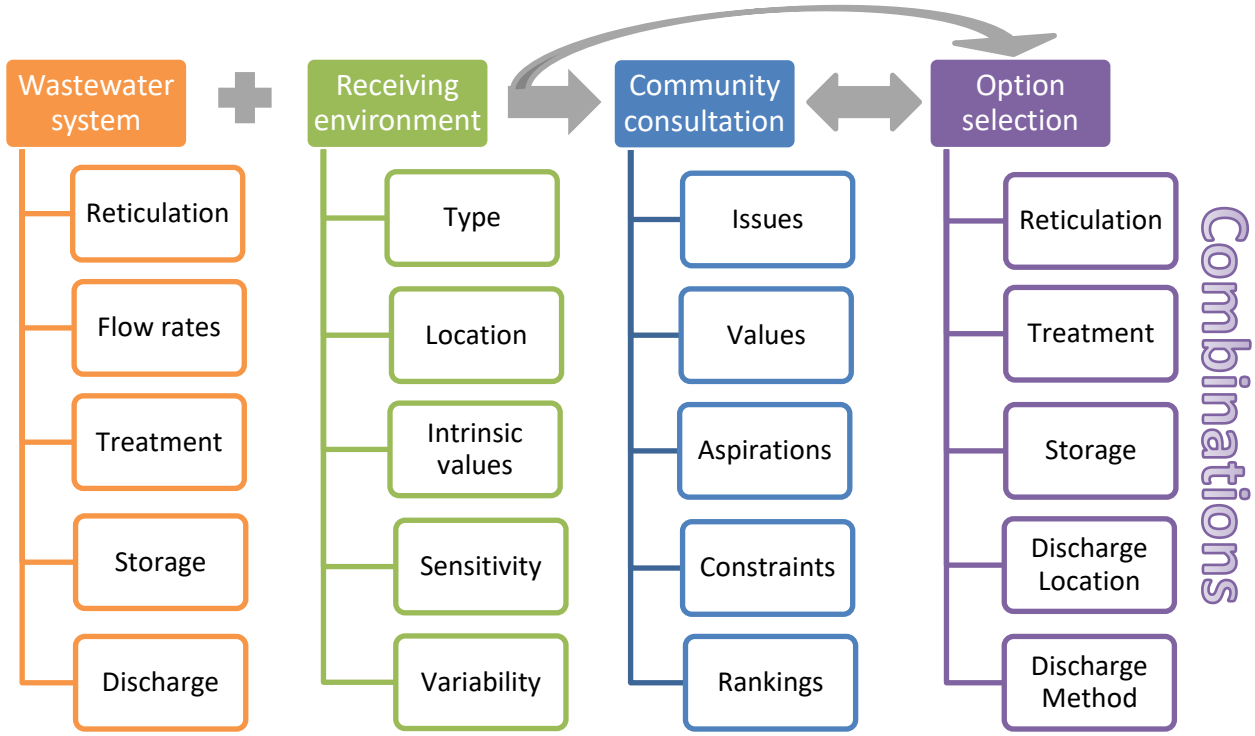

Figure 8.1: BPO Selection Process Overview

A summary of the key outcomes are as follows.

8.2 Alternative Wastewater Treatment

A range of potential treatment options were identified as suitable for adoption for Takapau's wastewater, including:

- **Treatment**
  1. No changes;
  2. Pond Enhancements
  3. Activated Sludge Treatment or Fixed Film Process
  4. Tertiary Treatment
  5. Chemical Precipitation
  6. Disinfection

It was determined that the treatment options for Takapau should be:

- Achieve treatment quality appropriate for the discharge environment;
- Suitable for the location (rural, low input);
- Future-proof;
- Cost effective.

8.3 Alternative Receiving Environments

Potential receiving environments for the TWWP discharge were identified as:

- **Discharge System:**
  1. Status quo (River);
  2. Land;
  3. Groundwater; or
  4. Combination.

Following consultation the discharge options were further refined to include:

- **Discharge**
  1. River – Status quo discharge regime;
  2. Land irrigation – non deficit;
  3. Land irrigation – deficit;
  4. Land irrigation – rapid infiltration basin; and
  5. Deep bore injection

Discharge to groundwater (i.e. by deep bore injection) was discounted for financial, social and cultural reasons. The ability to discharge to the river at times when it is less sensitive was considered (i.e. using river flow triggers). Direction through consultation was that a discharge environment that could avoid surface water discharge and get some beneficial use of the wastewater was preferred. Options which focussed on a low rate discharge to land were pursed to meet the communities expectations.

8.4 Alternative Discharge Locations

CHBDC has investigated the use of land within 10 km of the TWWTP for application of wastewater (LEI, 2020: T:B.15, Figure 1). It has been determined that suitable and feasible land opportunities are available near to the WWTP.

8.5 Combined Land and Water Discharge Options

A continuum of options is theoretically available, in combination with storage, for combined land and water discharge systems. The proposed system transitions from a 100 % only discharge (to the river via an overland flow path) to a combined land and water discharge system with progressive reduction in the amount of wastewater discharge to the river via a HRLP system, and that discharge only occurring above certain river flow parameters.

8.6 Alternative River Discharge Regimes

As with land and water options, there is a continuum of options available for surface water discharges, in combination with storage, for varying the timing and volumes of discharges to the river. A revised regime could be developed to time the discharge so that water quality in the Makaretu River was not impacted by the wastewater discharge. Storing all wastewater for discharging only during large flood events that occur a few times a year imposes unrealistically large and expensive storage on the community. It also perversely means that the very large discharge volumes required to be released during such storm events may have greater adverse effects than smaller volumes discharged more often during less elevated river flow conditions.

A continuation of the current discharge for a short term will enable investment to be directed towards a long-term solution which removes a significant portion of wastewater discharge from the Makaretu River.

8.7 Consultation Outcomes

Consistently the community aspiration was for cessation of the river discharge. A further direction from consultation is to investigate options which enable the beneficial use of the wastewater i.e. as irrigation. A key outcome of consultation was a directive to "get moving". During early consultation, the community was clear that they wanted to see significant progress towards a solution before CHBDC came back to them to engage.

8.8 Financial Implications

The long-term solution will impose a significant cost on the small rating base of the Central Hawke's Bay. Key to the successful implementation of a long solution is security of funding.

8.9 Developing a Best Practicable Option

As part of the future consent application, an analysis of whether the selected discharge method and its location is the best practicable option (BPO) as defined by the Resource Management Act 1991 (RMA), is required. Details of the process undertaken to determine the BPO is given in the Best Practicable Option report (LEI, 2021: T:C.12).

A thorough BPO selection process has been undertaken by CHBDC using technical advisors, affected parties (landowners and iwi) and the Takapau community through a series of consultations. These consultations aimed to understand the concerns, aspirations, and design constraints from the respective parties to assess potential discharge and treatment options. For each aspect of the wastewater system, a series of options have been considered, where these were narrowed down through community engagement and technical advice and refined based around BPO principles to arrive at a concept considered the BPO.

For the discharge of Takapau's wastewater, the BPO is considered to be the discharge of wastewater to land under a non-deficit irrigation system, whilst maintaining a discharge to the Makaretu River under certain circumstances when soil conditions are not suitable to receive wastewater, and when the storage pond is at capacity. No additional treatment has been included due to the adequate condition of the existing treatment system, however CHBDC may wish to incorporate further treatment such as filtration, aeration or disinfection infrastructure to further improve wastewater quality. The site where land application is to commence is 45 Burnside Road, located directly to the west of the TWWTP.

The respective aspects of the BPO include:

- A combined wastewater discharge primarily to land under a non-deficit irrigation system and then secondly to the river via a high rate land passage system when soil conditions are not suitable and then thirdly storage when neither land or river conditions are suitable;
- A new storage pond of 5,000 to 18,000 m^3 to enable discharge to be withheld if discharge to land or HRLP is not possible is proposed for construction;
- No additional treatment to the current treatment system, however additional treatment such as filtration, aeration or disinfection systems may be installed to further improve water quality, however this isn't a strict necessity; and
- The desired land discharge site is 45 Burnside Road directly west of the TWWTP.

Each of these aspects are considered to be the BPO for Takapau's wastewater system because:

- All components of the BPO have been selected in order to function effectively as an integrated wastewater management and discharge system;
- The implementation of a combined land and river discharge regime is affordable to the Takapau community in comparison to other initial discharge options;
- A significant portion of wastewater flows are to be applied to land instead of the river, inline with community and iwi aspirations of reducing the river discharge component;
- Wastewater is able to be beneficially returned to the land to increase pasture productivity rather than lost under a river discharge, rapid infiltration basin or deep bore injection system;
- Environmental impacts are expected to be reduced as wastewater can be further treated by the soil and plant system, prior to reaching groundwater, reducing the risks due to nitrogen and phosphorus loads or contamination of waterways;
- A non-deficit system enables higher volumes of wastewater to be applied to land than a deficit system, reducing the necessity for larger storage volumes;
- The Takapau WWTP is considered to already have adequate treatment infrastructure for the community's size, meaning further treatment is not strictly essential although may be desired;
- The BPO will allow for future flows in response to projected population growth for Takapau;
- Each aspect of the BPO provides a cost effective and efficient use of CHBDC's finances to manage the community's wastewater while protecting and enhancing environmental aspects; and
- The nominated discharge site is as close as possible to the TWWTP and is considered to be the best possible discharge site for the nominated discharge regime with regards to proximity, landowner interest and site conditions.

The BPO described forms the foundation for refining the details of the design, operation, and implementation timing of each aspect of the treatment, storage, and discharge systems. Many of these details are intended to be developed and described in the Conceptual Design report. The BPO needed to be developed and confirmed to provide certainty of the key aspects of the future systems before such a conceptual design process could commence.

This BPO is considered to satisfy the RMA requirement that a nominated discharge is the BPO for the system and its locality.

9 ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

9.1 Receiving Environment

There are two immediate receiving environments. Firstly, the initial environment of the land application area, specifically the soil and plant system of the Site and area around the WWTP. If the treated wastewater is not retained or renovated in the soil it may travel to shallow groundwater, or by overland flow to local surface water (Makaretu River). Secondly, when land application is not used the HRLP system receives treated wastewater prior to it entering the Makaretu River.

Wastewater constituents entering groundwater can be expected to eventually travel to surface water as a diffuse discharge or can be extracted from groundwater through water takes if bores intersect the area influenced by the discharge.

It should be noted existing reporting as discussed earlier in this report indicates that the water quality of the Makaretu River is slightly nutrient enriched with respect to phosphorus, as shown by the elevated TP and DRP concentrations upstream of the discharge point. Upstream nutrient concentrations of TP and DRP are already elevated above the HBRC RRMP PC6 and ANZECC physical and chemical stressor guidelines prior to the point of discharge.

9.2 Positive Effects

Positive effects can be considered in two regards with respect to this application. Firstly, the wastewater treatment and discharge system provides for the health and wellbeing of the Takapau community; and without it there is the potential for localised effects from poorly functioning onsite wastewater facilities leading to public health effects.

Secondly, the reduction in direct discharge to the Makaretu River is driven strongly by the local community and, regional and national directives. The potential benefits in a reduction of discharge to surface water are an improvement in water quality and habitat value, improvements in the cultural health of the water ways and the communities relationship (amenity and recreational) with the waterway.

The use of discharge to land is a key mitigation measure for the avoidance of adverse effect due to direct discharge of wastewater into surface water bodies. In addition, the application of wastewater to land at a rate which allows for filtration, absorption and beneficial use of wastewater components (nutrients, contaminants and water) provides mitigation and avoidance of adverse effects to groundwater. The adoption of an irrigation method with a low application rate and long return period as proposed by the assessed discharge regime achieves the beneficial use (for plants and soil biota) and retention (by soil storage) of wastewater components, thereby minimising their release into the groundwater or surface water environment.

9.3 Effects on Soils

The effects of the application of wastewater to the soil and plant system are given in Appendix G, the Assessment of Effects to Land (LEI, 2021: T:D.10). The activities that may produce actual or potential effects to soil that need to be considered relate to:

- Discharge to land of treated wastewater for land treatment;
- Land use intensification due to irrigation of farmland; and
- Discharge to air from the WWTP and land discharge of treated wastewater.

The treated wastewater to be irrigated onto the land application site will have the following properties of potential environmental concern:

- Organic material, expressed as carbonaceous biochemical oxygen demand ($CBOD_5$);
- Cations (Sodium, potassium, calcium and magnesium);
- Nitrogen (N as ammoniacal nitrogen (NH_4-N) and nitrite/nitrate nitrogen (NO_x-N));
- Total phosphorus (TP); and
- Water.

The proposed loading rate of the wastewater discharge to land will enable soil remediation and plant uptake of applied contaminants including:

- Filtration and incorporation of any suspended solids;
- Assimilation of organic material;
- Plant uptake, microbe use, and soil occlusion of nitrogen and phosphorus, and gaseous loss of nitrogen;
- Cation adsorption; and
- Filtration and attrition of pathogens.

The methods that have been adopted to avoid adverse effects to soils of the Site are:

- The selection of a site with soils are dominated by gravelly subsoils (lower terrace) and free draining Allophanic soils (upper terrace);
- Application rates per event which are more than 3 times less than the soil unsaturated hydraulic conductivity when applications are at the maximum proposed 20 mm per event;
- Managing stock and cropping activities to enable with holding periods before and after irrigation to avoid soil damage and maintain adequate vegetative cover; and
- Withholding of irrigation when rainfall or prolonged wetness occurs.

In summary, there will be no effects to the soil and landform that are not capable of satisfactory avoidance, remediation or mitigation. The individual effects concluded from the assessments completed are all less than minor.

9.4 Effects on Groundwater Quality

A hydrogeological assessment was conducted to describe the groundwater characteristics at and around the site, and to assess the potential movement of infiltrated wastewater in groundwater. This assessment is provided in Appendix I (Beca, 2021 T:B.14).

In summary, the hydrogeological conceptual model indicates the groundwater flow around Takapau WWTP is from west to east generally parallel to the Makaretu River. Near the WWTP, the Makaretu River is interpreted to be a losing stream (subsurface flow is from the river to groundwater) based on regional and local groundwater levels. The two most significant potential receptors, being the Makaretu River and the Source Protection Zone (SPZ) around the Takapau public supply bore, are both upgradient of the site, suggesting that any infiltrated wastewater from the WWTP site will not travel towards these locations. There are no directly down-gradient receptors identified.

Wastewater irrigation is expected to increase the drainage from the Site by 190 % and 250 % at Stages 1 and 2 respectively. Table 6.8 provided a nutrient loss summary for Stages 1 to 3 for the combined wastewater irrigation and farming activity i.e. including fertiliser application and cultivation effects. Nutrient loss from the farm is expected to enter groundwater.

As noted above, there are no down gradient receptors and so, if effects due to drainage occur they are expected to impact surface water. **The effects to groundwater are expected to be less than minor.**

9.5 Effects on River Water Quality

The Makaretu River is the receiving environment for discharge from the HRLP. In addition, diffuse discharge to surface water due to land application is expected to enter surface water much lower in the catchment. The Tukituki River is considered to be the receiving environment for the diffuse discharge from land.

9.5.1 Effects to Makaretu River

The current and future water quality effects associated with the Takapau WWTP discharge on the Makaretu River are analysed in detail in the Beca (2021, T:D.25) report, Appendix H.

The existing TWWTP discharge has been shown to marginally increase concentrations of nutrients and microbiological contaminants in the Makaretu River downstream of the discharge point under the existing discharge. Increased downstream concentrations are relatively minor downstream of the discharge during median flow levels, but effects are likely to be moderate in low-flow scenarios.

Median concentrations of total phosphorus and dissolved reactive phosphorus were found to be elevated above relevant guidelines upstream of the oxidation pond discharge. The most notable predicted effects of the are an increase in E. coli and faecal coliforms at low flows, which exceed relevant water quality guidelines downstream of the oxidation pond discharge in the existing discharge mass balance analysis (Beca, 2021: T:D.25).

Future development stages were assessed and indicate that, overall, the diversion of treated wastewater to land as irrigation and the inclusion of minimum stream flow discharge conditions (half-median for Stage One and median for Stage Two) are predicted to result in significant reductions in the discharge effects to the Makaretu River.

Given the direct HRLP discharge to the Makaretu River will only be periodic and limited to higher than minimum river flows, adverse effects of the proposed discharge on the water quality of the Makaretu River are **predicted to be negligible**. The mass load of total nitrogen and total phosphorus is also predicted to reduce at each development stage. Phosphorus load contributions in particular shows a notable improvement in a catchment where high phosphorus concentrations have been identified.

In summary, the proposed development is considered to be consistent with Tukituki Catchment Management Plan water quality objectives. By removing a significant amount of nutrients from the catchment, the development will contribute towards improving the downstream water quality and ecology of the Makaretu River and Tukituki catchment.

9.5.2 Effects to Tukituki River Catchment

Beca (2021: T:D.25) states that the existing TWWTP contributes a mass-load of 2.95 and 0.23 T/yr of total nitrogen and total phosphorus respectively. This amounts to 0.39 % and 1.33 % of the total Tukituki Catchment Management Zone 3 loads as measured by HBRC at the Tapairu Road monitoring location. Phosphorus (total and dissolved) is identified as a contaminant of concern in the Makaretu River upstream of the discharge. Measured and modelled concentrations of phosphorus exhibit minor increases downstream of the discharge under normal flow conditions.

Overall, given the HRLP discharge will be periodic and limited to river flows above median flow, adverse effects of the proposed discharge on the water quality of the Makaretu River are predicted to **be negligible**. Including diffuse discharge from land, the mass load of total nitrogen and total phosphorus is

also predicted to reduce at each development stage. Nitrogen loads reduce from the baseline 2.95 T/yr to 2.81 T/yr in Stage 1 and 2.63 T/yr in Stage 2. Phosphorus load contributions in particular reduce from 0.23 T/yr (baseline) to 0.09 T/yr in Stage 1 to 0.05 T/yr in Stage 2. Table 9.1 summarises the mass loads at each stage and Figure 9.1 shows them graphically. This is a notable improvement in a catchment where high phosphorus concentrations have been noted historically.

Table 9.1: Total Nitrogen and Total Phosphorus mass load calculations for each development stage with comparisons to Tukituki at Tapairu and Tukituki at Red Bridge HBRC monitoring locations (Beca, 2021: T:D.25)

Discharge Scenario	Total Nitrogen	% of Tapairu	% of Red Bridge	Total Phosphorous	% of Tapairu	% of Red Bridge
Stage 0 (current)	2.95 T/yr	0.39	0.29	0.23 T/yr	1.33	0.61
Stage 1	2.81 T/yr	0.37	0.28	0.09 T/yr	0.52	0.24
Stage 2	2.63 T/yr	0.35	0.26	0.05 T/yr	0.26	0.12

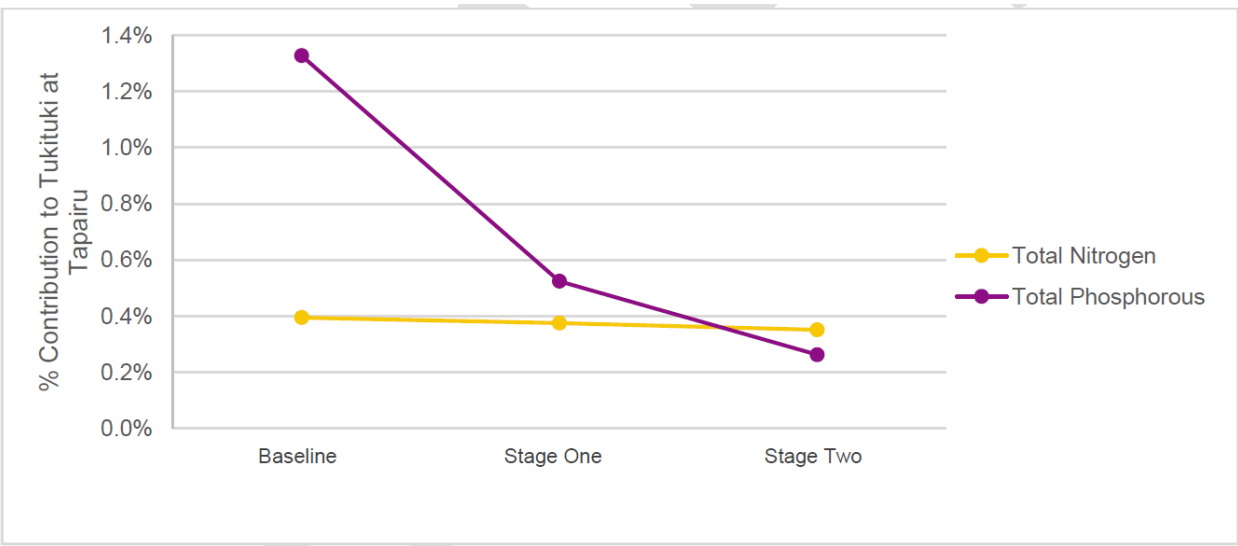

Figure 9.1: Downstream contaminant mass load percentage contribution to Tapairu Bridge HBRC Monitoring Location for each development stage (Beca, 2021: T:D.25)

Overall, the expected effects of the Stage 2 component on surface water is considered to be less than minor.

9.6 Effects on River Ecology

There is an extensive record of testing (Beca, 2021: T:D.25) to assess the effects of the current discharge on river ecology. While not directly assessed in T:D.25, additional consideration should be given to macroinvertebrate and periphyton indicators in regard to the future discharge scenarios. It is noted that macroinvertebrate communities were observed under the current discharge regime to be similar upstream and downstream of the WWTP and MCI scores were generally above 100, indicative of good water quality habitats. Furthermore, periphyton biomass was well below the HBRC RRMP Plan Change 6 (2014) limit of 120 mg/m^2 at all three sites.

Water quality parameters measured over the last decade indicate the Makaretu River is in a relatively good condition both upstream and downstream of the Takapau WWTP discharge. There is no evidence of the discharge causing any significant adverse effect on concentrations of key in-stream water quality determinants when upstream and downstream monitoring locations are compared. Furthermore, the most recent 2019 summer biological monitoring data indicates an improvement in QMCI results downstream of the discharge and does not show an effect of the Takapau WWTP treated wastewater on the macroinvertebrate community or on algal growth in the Makaretu River.

With these considerations in mind, and with regard to the wholesale improvement in the future discharge at both stages One and Two, it is likely that the reduced nitrogen and phosphorus loads discharged to the River will positively contribute towards reduced level of periphyton downstream and improved habitat and water quality for macroinvertebrate communities.

Based on the current discharge having minimal to no observable effect, a reduction in surface water discharges will have an even lesser impact, and therefore it could be concluded the **effects on river ecology are less than minor.**

9.7 Effects on Air Quality

Odours from the WWTP are generally of low intensity and readily dissipate within the site's boundaries. Where odours become apparent these usually indicate significant failures of treatment processes and performance. The WWTP operators will have become aware of the treatment problems and are generally able to remedy the treatment processes long before there is any risk of generating offensive or objectionable odours beyond the site boundaries.

Additionally, the WWTP site is relatively isolated from high sensitivity receptors, with no dwellings located within 400 m of its boundaries. The outer extent of the Takapau township is within 1,500 m of the plant, however it is likely odours outside of the normal range for odour strengths and types are not expected to be greater than typical odours created by surrounding rural activities.

The nearest dwelling to the general irrigation area is around 120 m away.

The mitigation methods to avoid adverse effects to air quality due to discharges from the irrigation of wastewater are:

- Maintain aerobic conditions in the treatment and storage ponds;
- UV treatment of wastewater to reduce pathogen levels;
- Adoption of separation distances, being:
    - 20 m from property boundaries;
    - 150 m from the nearest residential buildings, public place and amenity area where people congregate, or education facility;
    - 50 m separation distance from the sites of cultural significance known to exist at the time of developing the concept design;
    - 50 m from rare habitats, threatened habitats or at-risk habitats; and
    - 20m from surface water including the Makaretu River.
- The irrigation Site is located in a down-wind position from the township based on the predominant wind directions;
- The selection of an irrigation system (system pressure and nozzle size) to produce droplets greater than 200 µm in size to limit spray drift; and
- Automatic shut-down of irrigation when wind speed reaches an average of 4 m/s in the direction of dwellings within 300 m of the irrigation wetted radius (noting that the wetted radius can be shortened by using less sprinklers on the pivot boom), and shut-down of irrigation when wind speed reaches an average of 12 m/s in any direction.

9.8 Effects on Cultural and Heritage Values

The Maori World view report (How, 2020:A:B.42) provides an interpretation of wastewater management. Clearly discharges of wastes need to be mitigated, with transformations from tapu to noa. This inevitably requires passage through Papatuanuku, a practice that currently occurs.

A CIA is being finalised, which will assess both the aspects of land application as well as the proposed much reduced discharge indirectly to the Makaretu River. In the absence of the CIA, it is clear that the

proposal which would see the majority of the wastewater irrigated to land, with the remaining portion passing over a HRLP system. This seeks to address the direction given by tangata whenua in the initial engagement.

9.9 Effects on Natural Hazards

The operation of the current Takapau discharge will not have an impact on natural hazards, however, natural hazards may impact on the system. Should there be an event, such as earthquake or flood, then many other infrastructure components in the immediate area will be compromised and the effects of this operation being compromised (and effects) will be largely insignificant.

The most significant impact may be that of flooding, and for two reasons. Firstly the lower terrace is with the HBRC identified 1:100 flood plain. Despite no recent records suggesting it has flooded, there is nonetheless the potential for inundation of a section of the irrigation area. Should this area flood there are easily applied mitigation measures that will allow the area to be quickly remediated. Further, there will remain a large area that can continue to be used which will not be flooded. Further, if river conditions remain high, then discharge through the HRLP system can be used while the irrigation area is being remediated.

A secondary consideration is the impact on the new proposed storage pond. This is to be located in the flood channel. There are numerous control measures to ensure sufficient protection is applied, and these will be further addressed as part of the detailed design and land designation process.

9.10 Summary of Effects on the Environment

Overall, the effects of the wastewater discharges from the Takapau wastewater treatment plant on the local receiving environment, being the soil, groundwater and surface water (Makaretu River), will be less than minor.

10 EVALUATION AGAINST RELEVANT STATUTORY PROVISIONS

The Statutory Evaluation (Beca, 2021: T:D.90) provided in Appendix J provides a thorough assessment of all planning provisions, including Part 2 of the RMA.

The following provides a summary of that evaluation including the relevant NPS, NES, RPS and RRMP provisions.

10.1 NPS - FM

The concept of Te Mana o te Wai within the NPS-FM indicates the importance of restoring and preserving the balance between water, the wider environment and the community, and to all aspects of freshwater management. The proposal is not expected to impact the health of freshwater, and in fact is expected to assist with improving its health.

The relevant provisions of the NPS - FM have been considered for Takapau and are included in the Statutory Evaluation (Appendix J). In summary, the proposed treated wastewater discharge will transition from discharging to the Makaretu River to a predominately land based irrigation system within a farm property adjacent to the existing TWWTP. Where irrigation cannot occur, discharge to surface water is via a HRLP providing a form of land contact prior to the river discharge. This will ultimately only occur during higher river flows. This prioritises the health of the Makaretu River by avoiding direct discharges to the river (Objective1(a)).

The hydrogeological assessment report (T:B.14) has identified that the Makaretu River and the Source Protection Zone (SPZ) around the Takapau public supply bore, are upgradient of the Takapau WWTP site, suggesting that any infiltrated wastewater from the discharge site will not travel towards these locations. In addition the groundwater bores located within 2 km of the WWTP are not considered to be directly downgradient and infiltrated wastewater is not expected to travel towards these receptors. This is consistent with (Objective 1(b)).

This proposal also forms part of and provides for a lifeline utility (WWTP) for the community of Takapau (Objective 1(c)). The proposal forms part of the staging of a long-term solution that will provide for the social and cultural wellbeing of the community into the future through improved wastewater treatment and management. The continued operation of the TWWTP provides an essential facility for sewage discharge for the Takapau township providing for the health and needs of the Takapau community.

10.2 National Environmental Standard for Freshwater 2020 (NES-F)

The proposed works meet the definition of specified infrastructure in the NPS-FM (Subpart 3 Section 3.21(1)) as the WWTP is a lifeline utility (as defined in the Civil Defence Emergency Management Act 2002).

NES-F regulations 46 and 47 apply to the maintenance and operation of specified infrastructure within 100 m of a natural wetland. Guidance on the definition of natural wetland' has recently been provided in the *Interpretation guidance on the wetlands definition in the NPS-FM and Freshwater NES* (Exposure draft 7 April 2021).

The guidance document clarifies the definition of 'Artificially constructed wetlands' which are excluded from the provisions of the NES-F. Examples of 'constructed wetlands' have been provided in the guidance document and include areas of wetland habitat in or around bodies of water created for, or in connection with, any of the following purposes: effluent treatment and disposal systems.

The HRLP used for the discharge of treated effluent referred to in this document meets the definition of artificially constructed wetlands. Therefore, the existing discharge and proposed works are not located within 100 m of natural wetlands and the regulations under the NES-F do not apply.

10.3 National Environmental Standard for Sources of Human Drinking Water 2007 (NES-DW)

The proposed works are subject to the provisions NES-DW as the nature of the discharge (being treated wastewater) has the potential to contaminate registered sources of drinking water to greater than 501 people.

Regulations 7, 8 and 10 of the NES-DW apply to activities specifically upstream of an abstraction point. As noted previously, the hydrogeological assessment report (T:B.14) has identified that the Takapau WWTP site is **down gradient** from the Source Protection Zone (SPZ) around the Takapau public supply bore, and infiltrated wastewater is not expected to migrate towards the SPZ.

Regulation 12 applies to an activity that has the potential to affect a registered drinking-water supply which the proposed activity in this instance applies (discharge of treated wastewater to land that enters groundwater). When considering a resource consent application, a consent authority must consider whether the activity could lead to an event occurring that may have a significant adverse effect on the quality of the water at any abstraction point or, as a consequence of an event (for example, an unusually heavy rainfall) have a significant adverse effect on the quality of the water at any abstraction point.

If the consent authority considers that the above circumstances could occur, then a condition on the consent must be imposed. As noted in section 6.6 – Mitigation of Environmental Effects and in the proposed conditions of consent (Appendix E), there are numerous mitigation measures that will be imposed as conditions of consent that will address Regulation 12 of the NES-DW.

10.4 Hawkes Bay Regional Resource Management Plan (RRMP)

The RRMP incorporates the provisions of the Regional Policy Statement (RPS). The relevant objectives and policies have been assessed in the Statutory Evaluation (Beca, 2021:P:D.90) report. The objectives and policies of the RPS assessed include;

- Integrated Land Use and Freshwater Management;
- Managing the Built Environment;
- Surface Water Resources;
- Maintenance and Enhancement of Physical Infrastructure; and
- Recognition of Matters Significant to Iwi and Hapu.

The Land, Air Quality, Groundwater Quality and Surface Water Quality objectives and policies of the RRMP have been assessed.

Overall, given the HRLP discharge will be periodic and limited to median river flows, overall adverse effects of the proposed discharge on the water quality of the Makaretu River are predicted to be less than minor. The associated RRMP environmental guidelines for land (Policy67), air (Policy 69), groundwater (Policy 75) and surface water quality (Policy 71) are mostly being met. The effect of the proposal is considered consistent with these policies.

For the future stages of land based discharges, the community derived wastewater will be sustainably reused through irrigation, enabling nutrients once derived from the land that would previously be discharged directly to the Makaretu River, to be beneficially returned to the land, increasing pasture growth and farm productivity. At times when discharge to land is not possible and storage is fully utilised, the discharge to the HRLP will not cause any relevant water quality guidelines to be exceeded in the Makaretu River.

The proposed discharges are broadly consistent with the RRMP objectives and policies, and will contribute towards, achieving the RRMP objectives and policies including PC6 objectives (OBJ TT1 and OBJ TT2) through the diversion of treated wastewater from the river to adjacent farmland and will contribute towards improved water quality and ecology outcomes for the Makaretu River and wider Tukituki Catchment.

10.5 Section104D Particular restrictions for non-complying activities

Section 104D sets out the 'Gateway Test' for consent authorities to grant resource consent for non-complying activities (this consent application). Section 104D 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*

The application needs to pass one of the two tests, either; the adverse effects on the environment will be minor, or the proposal is not contrary to objectives and policies of the RRMP.

The Statutory Evaluation (Beca, 2021:P:D.90) report has determined that the proposal is largely consistent with the objectives and policies. The pending CIA will provide additional information and enable confirmation regarding the Tangata Whenua objectives and policies. It will likely assist in demonstrating that the Section 104D(1)(b) 'test' is met.

In terms of the effects gateway as required by Section 104D(1)(a), it has been determined that the overall effects of the proposal are considered **less than minor**. There are also significant positive effects associated with the reduction of the direct discharge to the Makaretu River (refer to section 9.2) which is consistent with the local community and, regional and national directives. The benefits of reducing the discharge to the Makaretu River provides an improvement in water quality and habitat value within the river, while also improving the cultural health of the water way and the relationship (amenity and recreational) with the Makaretu River.

In regard to land based effects and the impact to soils the Assessment of Effects to Land (LEI, 2021: T:D.10) report identifies measures that will be implemented (outlined in section 9.3) that will manage the land based activities to protect the soil and land from adverse effects. These measures include selection of a site that is appropriate for irrigation having the appropriate soil characteristics, rates of application to be appropriately managed relative to hydraulic conductivity of the soil, managing any stock and cropping activities after irrigation (to avoid soil damage and maintain vegetative cover) and no irrigating during rainfall or prolonged wetness. With these measures in place, the overall assessment determined that the land-based effects are less than minor.

Based on the findings of the technical assessments provided in the AEE (appendices to this application), the adverse effects of the proposal on the environment will be minor (negligible to less than minor) and therefore satisfies the s104D(1)(a) gateway, allowing Council to grant resource consent for this non-complying activity.

10.6 Notification

The process for determining notification of resource consents by Councils is set out in section 95 of the RMA. The premise of notification is to provide affected parties and stake holders the opportunity to comment and input into the proposed activity and how the proposed activity may affect them.

The notification test set out in section 95 includes determining whether public notification is mandatory, precluded or required in certain circumstances. If a resource consent is not publicly notified there is then a determination as to whether the consent should be limited notified to those parties required to be notified (i.e. customary rights groups and/or customary marine title groups) or those parties deemed affected, or if there are special circumstances to warrant limited notification.

It is preferable for the application to be **publicly notified** as the works involve community infrastructure i.e. holds public interest in terms of investment, and there is an indirect discharge to the Makaretu River (which holds public and cultural interests). Further, CHBDC's general consenting approach has been to publicly notify consents to allow community interests to be considered through due process.

11 CONCLUSIONS

The TWWTP currently holds consent DP180115A and DP180124A to discharge wastewater onto land resulting in contaminants entering the Makaretu River and to air. The current consents are due to expire 30 October 2021.

A BPO selection process has been undertaken by CHBDC using technical advisors, affected parties (landowners and iwi) and the Takapau community through a series of consultations. For each aspect of the wastewater system, a series of options have been considered, narrowed down through community engagement and technical advice and refined based around BPO principles to arrive at a concept considered the BPO.

The BPO arrived at was further refined to enable a conceptual design for consenting to be developed. Key components of the proposed wastewater discharge system include:

- The existing discharge to the wetland will be upgraded to create a high rate land passage (HRLP) within a better managed discharge route for discharge to flow to the Makaretu River.
- Within five years the use of the HRLP will reduce as water is used in preference for a low rate land application system. This will be established on land adjacent to the TWWP using irrigation (most likely centre pivot) for agronomic benefit.
- To assist with reducing the volume discharge to the Makaretu River and optimising the irrigation system, storage is to be created to enable the discharge to be withheld when conditions for application via the low rate or HRLP systems is not suitable.

The development of the discharge system for Takapau's wastewater is proposed to be staged. This allows for a rapid reduction in the amount of treated wastewater discharged via the current discharge system to the Makaretu River, while managing the costs to the Council and the time for procurement and construction to occur. A summary of the proposed stages is as follows:

- **Stage 0** allows for the current discharge to occur for up to three years while the subsequent stages are enacted;
- **Stage 1** involves the provision of 2,000 m^3 of storage within the treatment system and development of a minimum 5 ha of irrigation, allowing for irrigation of approximately 60 % of the **current** average annual wastewater discharge volume to irrigation and 40 % to the high rate discharge system when river flows exceed half median flow.
- **Stage 2** involves development of an additional 15 ha and up to 25 ha of irrigation. A new storage pond is to be built adjacent to the existing treatment system with a capacity of 18,000 m^3. The changes allow for irrigation of approximately 90% of the **future (2048)** average annual wastewater discharge volume to irrigation and 10 % to the high rate discharge system when river flows exceed median flow.

Effects due to the discharge have been considered for:

- Soils;
- Groundwater;
- Surface water; and
- Air.

Overall, it is concluded that there are no adverse environmental effects from the proposed discharge of treated wastewater to land at the Site, and to the Makaretu River via the HRLP, that cannot be satisfactorily avoided, remedied or mitigated, such that any adverse effects are low (and significantly better for surface water than the existing direct discharge.

The proposal is consistent with Part II of the RMA and with the objectives and policies of the NPS-FM, RPS and RRMP. The proposal has considered and addressed the relevant provisions of the NES-F and NES-DW. Overall, it is therefore considered appropriate to grant consent pursuant to section 104B and 108 of the RMA.

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APPENDIX A

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APPENDIX B

Community Engagement Summary

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APPENDIX C

Property Owner Approvals

CENTRAL HAWKE'S BAY DISTRICT COUNCIL

APPENDIX D

Records of Title

CENTRAL HAWKE'S BAY DISTRICT COUNCIL

APPENDIX E

Proposed Consent Conditions

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APPENDIX F

Schedule IV Checklist

CENTRAL HAWKE'S BAY DISTRICT COUNCIL

APPENDIX G

Discharge to Land of Takapau Wastewater
Assessment of Environmental Effects: Land T:D.10

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APPENDIX H

Surface Water & Ecology AEE T:D.25

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APPENDIX I

Takapau Wastewater Treatment Plant – Hydrogeological Assessment T:B.14

CENTRAL HAWKE'S BAY DISTRICT COUNCIL

APPENDIX J

Planning and Rules Evaluation T:D.90

CENTRAL HAWKE'S BAY DISTRICT COUNCIL

APPENDIX K

Takapau Community Wastewater Discharge Conceptual Design (T:C.15)

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