

Pōrangahau and Te Paerahi Wastewater System Consents

Mott MacDonald Review

Project:	Pōrangahau and Te Paerahi Wastewater		
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Subject:	Pōrangahau and Te Paerahi Wastewater Consent Application & S92 Response Review		

1 Introduction

Central Hawke's Bay District Council (CHBDC) operates the wastewater treatment plants (WWTP) for the Pōrangahau and Te Paerahi communities. The Pōrangahau WWTP currently provides treatment (pond treatment system) and then discharges wastewater directly to the Pōrangahau River. The Te Paerahi WWTP provides treatment (pond treatment system) and then discharges wastewater to adjacent sand dunes via soakage. The resource consents for these discharges expired on 31 May 2021 and the applicant is exercising S124 (RMA) rights to continue the current discharges while they transition to a new year-round irrigation system and consent to operate a new combined scheme for both townships. The consent period being sought is 35 years, and the specific consents include:

- Discharge of contaminants into air: discharge of aerosols and odour to air associated with the receipt, treatment, storage and discharge of wastewater from the new combined scheme WWTP and wastewater storage pond and existing Pōrangahau and Te Paerahi Wastewater Treatment Plants.
- Discharge of contaminants onto or into land: discharge of treated wastewater from the Te Paerahi WWTP to the existing land disposal area, discharge of treated wastewater from the Pōrangahau and Te Paerahi WWTPs at the proposed irrigation site and discharge of treated wastewater from the proposed new combined scheme WWTP which includes UV disinfection, but the exact wastewater treatment process has yet to be selected.
- Discharge of contaminants into water: discharge of treated wastewater from the Pōrangahau WWTP into the Pōrangahau River.

Mott MacDonald New Zealand Limited (Mott MacDonald) has been engaged by Hawke's Bay Regional Council (HBRC) to provide reviews of the following:

- a. RMA planning matters, assessment of environmental effects (AEE) and the approach to the best practicable option (BPO)
- b. The proposed wastewater treatment plant process and options assessment with regard to the BPO
- c. Infiltration and inflow strategy
- d. Proposed resource consent conditions

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An initial review and Section 92 request was made by HBRC and their reviewers on 1 October 2021. S92 responses were provided by the applicant from 8 November 2021 to 8 February 2022.

A site visit was conducted on the 21st of January 2022, taking in the existing treatment plants at Pōrangahau, and Te Paerahi, and the proposed new treatment/discharge site and river receiving environment. Attendees were from Mott MacDonald, Coast and Catchment, PDP, LEI, and CHBDC.

This report covers all relevant wastewater treatment matters from the following documents:

- Consent Application and AEE (CHBDC, 2021:P:D.1):
 - Appendix H - Discharge to Land of Pōrangahau and Te Paerahi Wastewater – AEE: Land Application (LEI, 2021:P:D.10);
 - Appendix I - Pōrangahau and Te Paerahi Wastewater – Water Quality Assessment (Beca, 2021:P:D.25);
 - Appendix M - Pōrangahau and Te Paerahi Community Wastewater – Discharge Conceptual Design (LEI, 2021:P:C.15);
- Supporting Documents:
 - Te Paerahi and Pōrangahau Options Report (Beca, 2020:P:C.10);
 - Best Practicable Option (LEI, 2021:P:C.12);
 - Annex_A-P.D.25-Pōrangahau and Te Paerahi Discharges S92 Response (Beca 2021:P:D.25);
 - Te Paerahi and Pōrangahau WWTP - Outline of Proposed new combined Treatment Plant options (Beca, 2021:P:C.16);
 - Inflow and Infiltration Management Plan - Pōrangahau and Te Paerahi (Beca, July 2021 [rev 06 Sep 2021]);
- CHBDC Section 92 Response (LE-10684-CHBDC-HBRC-Pōrangahau_s92_Response.pdf):
 - Annex A: Letter regarding (Beca 2021:P:D.25) - Pōrangahau and Te Paerahi Wastewater - Water Quality Assessment;
 - Email from Darren de Klerk, 12 Jan 2022, responding to additional question on impact of I&I on treatment and irrigation.
- Cover letter for QMRA (P:D.67): “QMRA for Porangahau and Te Paerahi (P:D.67)”, 4 February 2022.

Planning matters are considered by Sven Exeter separately in the S42A (RMA) officer's report.

2 Response to Section 92 Queries

On 1 October 2021, Mott MacDonald's technical review of the initial application was issued by HBRC. This review sought further information on a number of relevant aspects. Further information was provided by the applicant in a s92 response letter dated 8 November 2021, and some subsequent information up until 8 February 2021. This section reviews the additional information provided in the applicant's response letter in relation to the wastewater matters raised in Mott MacDonald's initial review. The numbering in this section is structured based on the headings and questions in the Section 92 request.

2.1 Wastewater management & timing

Question 23

We note that the 4 and 9 years are proposed to remove the existing discharges from Te Paerahi and Poranghau respectively. Please explain the reasoning for this extended period, when almost no new treatment or storage infrastructure is planned in this period.

The applicant noted that the 4 years for Te Paerahi and 9 years for Pōrangahau are the maximum time periods for the ceasing of all wastewater to these respective environments. They note that the timeframes are conservative, and allow time for the receiving environment to be made available, and also note that the timeframes allow a balance of spending for the community.

Matching spending profiles to community affordability needs is important and should be addressed through the BPO selection process. This appears to contradict other S92 responses (Questions 29, 30, 31, and 32) from the applicant indicating that financial considerations were not made in the establishment of the BPO.

Question 24

For the duration of Stage 1 and Stage 2, treated wastewater from the existing Te Paerahi WWTP will be pumped to the new Discharge Property. There are no proposed changes to the Te Paerahi wastewater quality, other than the addition of UV treatment (at the Discharge Property to manage pathogen concentrations prior to wastewater being applied to the discharge property). There are likely to be significant fouling issues with a UV system if no filtration or screening is included. Please explain how this will be managed.

The applicant responded regarding flow calculations and additional land areas for increased flows – i.e. appears to have inadvertently answered a different question.

An additional update was provided by the applicant in the cover letter accompanying the QMRA (P:D.67). In this the applicant states:

“The QMRA has been very helpful in acknowledging the risk, albeit potentially limited. Regardless, there would remain a risk to the community and District Council believes providing greater certainty for public health necessitates the expenditure, even for the short term.

A UV system will be installed, with the intention that it is operational within 18 months of the consent being granted. Updated consent conditions will be provided to reflect this revised treatment process.”

We agree that this approach to pathogen management is reasonable given the QMRA findings.

Additional information is still required to demonstrate how the UV system(s) will be protected from fouling prior to the installation of the new treatment plant at the Discharge Location (i.e. while pond effluent from Te Paerahi and Pōrangahau is discharged to the existing discharge points, and at the new site).

2.2 Appendix M - Discharge Conceptual Design (LEI, 2021:P:C.15)

Question 25

Table 4.2 notes that the future flows assume a reduction in I&I at some point between now and 2057. Because no population growth is expected in the catchment the result of this is a design flow which is over 60m³/d less than the current known flows. This does not appear to be sufficiently conservative, for the following reasons:

- 1. The draft CHBDC Inflow and Infiltration Management Strategy (Beca, 20 April 2021) provides no certainty that this community will receive I&I reductions in the near future,*
- 2. I&I issues can be very difficult to find and remove,*
- 3. I&I issues will continue to be added to the network over time as infrastructure ages and illegal connections are made,*
- 4. Climate change can be expected to have an increasing impact on I&I peak flows (noting that LEI, 2021:P:D.10 in Section 3.10.2 highlights an increase in summer and autumn rainfall of 2-13% by 2090).*

Please confirm how this will affect flows to the treatment plant(s) if no I&I improvements are realised.

The applicant indicates that this has been responded to earlier, however we have not identified how this has been addressed. The concern about allowance for appropriate I&I improvements remains, and can be addressed in the consent conditions by limiting the flow discharged by the treatment plant, and inclusion of I&I planning clauses as is the case for the existing consents.

Question 26

Please confirm how the future flow curves in Figure 4.1 were derived.

The applicant has noted that reliable CHBDC flow data from between 2008 and 2019 was adjusted by future population growth projection factors as a proxy to estimate future flows. Further information is required:

- Does this include allowances for I&I reductions, when calculating the future *All Flows 2057 ADF*.
- This data set can be used to calculate and include conditions that limit the median and peak flow to the treatment plant, as a means to ensure that I&I in the network is managed for the term of the consent, rather than being used to dilute wastewater concentrations. Please provide the All Flow 2057 Peak Month ADF, and Annual ADF, or justification for other values with workings that could be used as average daily and peak instantaneous consent conditions for flow.

Question 27

*Section 4.3 Wastewater Quality [LEI,2021:P:C.15], notes that the expected effluent quality following the installation of a new WWTP at Stage 3, is as follows: **average quality not exceeding***

- *20 g O/m³ carbonaceous biochemical oxygen demand;*
- *30 g/m³ total suspended solids;*
- *20 g/m³ total nitrogen;*
- *5 g/m³ total phosphorus;*
- *500 MPN/100 mL E.coli (following UV disinfection).*

In the Beca report Outline of Proposed New Combined Treatment Plant Options (P:C.16), the proposed total suspended solids target is lower at 20 g/m³, and a much lower value of 20 g/m³ BOD (rather than the above cBOD) is proposed. Please clarify which target values are proposed.

The applicant notes that the values in P:C.15, Section 4.3 apply, are used in the assessment, and that the land application system will have plenty of capacity to manage organic material and suspended solid applications. Whilst this is noted, it should be highlighted that the consent conditions proposed by the applicant are higher again, see Table 2.2 below.

Table 2.1: Report discharge parameters compared with applicant's proposed consent conditions

Parameter	Unit	Beca 2021:P:C.16 (Median)	LEI, 2021:P:C.15, and :D.10 (Average)	Proposed Combined Site Lower limit (33rd%ile)	Proposed Combined Site Upper Limit (83rd%ile)
BOD ₅	mg/L	20			
cBOD ₅	mg/L		20	25 (4/12 samples)	40 (10/12 samples)
TSS	mg/L	20	30	30 (4/12 samples)	50 (10/12 samples)
TN	mg/L	20	20		
NH ₄ -N	mg/L	-	-	20 (4/12 samples)	40 (10/12 samples)
TP	mg/L	-	5		
DRP	mg/L			5 (4/12 samples)	9 (10/12 samples)
<i>E.coli</i>	cfu/100mL	500	500	500 (4/12 samples)	5,000 (10/12 samples)

The applicant's proposed consent conditions numerical limits are considerably lower than what has been used in the models and reports, in all parameters, for the following reasons:

1. The applicant's proposed consent conditions suggest only 4 and 10 of 12 samples respectively are required to be below the proposed lower limits. This is equivalent to a 33rd percentile, whereas the typical approach is to use a median (50th percentile) as the lower target value, which also aligns with the values used in the modelling. By suggesting the same numerical value, with a lower threshold in this way, it allows the entire dataset of discharge measurements to be higher than what was modelled, and still be within the conditions.
2. Ammonia is proposed as a discharge parameter for nitrogen, when total nitrogen was used in the models. Again, the same numerical value is transposed for the discharge limit between TN and ammonia. In treated wastewater, ammonia will be a small fraction of the TN discharged. If the proposed parameters are retained, then the ammonia in the discharge could be many times higher than what was modelled and still be within consent.
3. In the same way, dissolved reactive phosphorus is used in place of the modelled total phosphorus (TP), allowing discharges to be much higher than the modelled values and remain compliant.
4. In the same way, soluble BOD₅ is used in place of the modelled BOD₅ allowing discharges to be much higher than the modelled values and remain compliant.

If, as stated in the response, the figures in Section 4.3 were used in the assessment (and the other reviewers agree with the AEE approach and that the effects are less than minor), then these same values should also be used for the consent conditions also.

Question 28

We note the proposed staging and timing of activities presented in Table 8.1. It is not clear whether the proposed timeframes are consecutive or intended to occur in parallel. In either case, they appear to be extremely conservative, and cannot be easily aligned with the proposed consent Stages.

Please confirm which of the activities occur in sequence, and which occur in parallel to show alignment with the consent Stages.

The applicant has noted that Stages 1-3 are expected to have some degree of overlap to manage availability of contractors, materials and affordability. Cessation of the Pōrangahau River discharge is planned within 9 years (expected to be by 2030 subject to this consent being granted).

We also note that in response to Question 20 about timing, the applicant noted that *"These timeframes are dependent on consent processing, as well as material and contractor availability."* It is our view that the timeframes offered are conservative, and provide ample time for planning and delivering the upgrades, which can allow for contractor and material availability. These timeframes should be clearly defined in the consent conditions.

2.3 BPO & Options Report

Question 29

The ability to implement change is primarily limited by funding. Council has through their 2021-31 Long Term Plan allocated \$17.6 M over the next 9 years, with the full system to be commissioned by 2030. Where is it described that this is the expected cost of the BPO, and how was this compared with alternatives?

The applicant has noted that financial aspects were largely not involved in the selection process of the BPO. However, as noted below in Section 3.3, this is not in line with the requirements of a BPO, and the assertion by the applicant that costs were assessed through the LTP process is not fitting because only one option was presented in the LTP, with two potential delivery timeframes and compared against a "do nothing" option. Ideally evidence should be provided on the financial impacts when selecting the BPO however in this

case, given the project constraints, and community and iwi input, the preferred option is considered reasonable.

Question 30

Please confirm how financial aspects were addressed in the selection of a BPO.

See comments in Section 3.3, Question 29.

Question 31

The BPO Report includes an Appendix A, “P:C.34 – Porangahau/Te Paerahi Consultation Summary”. This in turn includes a list of 3 Annexes of minutes of the stakeholder engagement meetings. The Annexes are not provided. Section 3.3 of the BPO report describes how a BPO selection committee was used to determine the BPO. At present the link between the community consultation / BPO selection committee and the BPO is not clear. Please provide the above 3 Annexes to present what was discussed at these meetings and how the BPO was arrived at?

The applicant provided the meeting minutes for community meetings in December 2019, March 2020, and an LTP community update in March 2021. Minutes for the hui at Rongomaraeroa Marae were noted to not be intended for the wider community, but a copy of the presentation that was delivered for this hui has been provided.

A high level of community and Mana Whenua engagement has been noted by the applicant, as well as alignment of the selected solution with community preferences. What is not clear is how the financial aspects were assessed in the option analysis stage, including in community consultation. The LTP process does not address this for this AEE and application. See query above for Question 29.

Question 32

Te Paerahi and Porangahau Options Report (Beca, 2020:P:C.10). This Beca Options report does not select a preferred option, but rather identifies three vastly different solutions and notes that these will be considered through the LTP process. Figure 31 on page 67 is a strawman which portrays all three options together. The key notes that [C] = Conveyance, but we wonder whether this should be Combined Plant? Please confirm the definition of C.

The applicant notes that the strawman arrives at the point of a preference to combine treatment plants, and that this is now the confirmed option for which consent has been sought.

What is missing is the step which describes why the Strawman has been selected from the Options stage as the preferred solution. The Strawman document does not describe why this is the preferred option, and no document has been presented which reduces the many options in the Options Report (Beca, 2020:P:C.10) to the Strawman (which the applicant considers is the preferred option and BPO).

It is noted that the timeline of documentation and community meetings also highlights that although broad options were discussed at the second Hui, there is little information provided as to how the preferred option (Strawman) was arrived at.

Table 2.2: Timeline of option development and community engagement

Date	Entry	Description	Comment
16-12-2019	Meeting	Community Engagement Meeting	
11-03-2020	Report	Options Report Rev0.1	This revision not witnessed for review.
18-03-2020	Meeting	Community Hui #2	Broad options from Options Report were discussed. Minutes do not record any decisions or preferences between options.
16-04-2020	Report	Options Report Rev1.0 (Final)	

Date	Entry	Description	Comment
28-05-2020	Report	Strawman Approach	No documented evidence of why this is selected as the preferred option.
26-07-2020	Meeting	Wastewater Hui	Strawman solution presented (no other options, and no cost comparison with other options)
15-10-2020	Report	Options Report Rev2.0 (Updated)	
18-03-2021	Meeting	Wastewater Programme Update	
April 2021	Report	BPO Report (LEI, 2021:P:C.12)	Strawman stated as BPO, with no evidence for why the BPO was selected

Question 33

The appendices for this report are not included, please provide them as they are referred to throughout the Beca 2020:P:C.10 report.

The applicant has provided these appendices. No further comment at this stage.

Question [Additional by Email]

Section 8.3 mentions wastewater sources. It does not however discuss Inflow and Infiltration (I&I) and makes no mention of the high I&I issues that are encountered in the area. The draft CHBDC Inflow and Infiltration Management Strategy (Beca, 20 April 2021) highlights this issue and identifies that action is required.

Further information request: Why has the impact of I&I on treatment and storage, and the resulting cost increases not been addressed in the AEE?

This question was missed from the S92 further information cover letter but was noted in our initial review memo. CHBDC kindly responded by email on 12 January 2022.

The applicant noted that the discharge solution has taken into account current and future flow projections, including I&I. It is the applicant's view that I&I is an operational management of the network consideration and not deemed necessary to address in the AEE.

They note that flow projection modelling has included an allowance for I&I and this has helped to inform the extent of storage required. The treatment system being considered is also appropriate for the anticipated I&I regime as planned in the network specific management plan.

An updated plan was provided (Inflow and Infiltration Management Plan – Porangahau and Te Paerahi), July 2021, which specifically addresses the funding set aside and proposed reduction strategy including a programme plan and methodology.

In that report, CHBDC notes:

The [existing] wastewater resource consents from HBRC for Porangahau and Te Paerahi WWTPs have a limit on the outflow from the treatment systems. There is also a requirement in the wastewater resource consents for Porangahau and Te Paerahi to submit a Stormwater Infiltration Management Plan to HBRC within 3 months of consent conditions being granted. These are listed under conditions 6 and 5, respectively. The consents require such plans to contain the following:

- a) The incidence of stormwater infiltration into the reticulated wastewater system and measures available to reduce such infiltration as far as practicable;*
- b) A strategy for reducing stormwater infiltration into the reticulated wastewater system and an implementation plan for achieving the strategy to be reported as the Stormwater Infiltration Management Plan;*

c) Any proposed works or methods to address sources of stormwater infiltration into the reticulated wastewater system where those sources have been identified as part of the Stormwater Infiltration Management Plan.

It is important that similar conditions are included in the new consent, as managing I&I and reducing the peaking factor will be critical for avoiding direct or surface flows to the river during wet weather.

2.4 Odour and Spray Drift

Question 36

How are biosolids proposed to be handled, dewatered, stabilised, and disposed of? Is CHBDC aware of this requirement? Will solids screening be included with the new WWTP and/or how will waste solids/sludge be managed to minimise odour? How will sludge be managed during decommissioning of the existing ponds?

The applicant has noted that a residual strategy is being prepared that will cover the management of biosolids/sludges from the new and existing WWTPs, and that consents for the operation of the WWTP activities are not being sought at this time. No further comment at this time.

3 Wastewater Treatment

3.1 Existing performance and design parameters

Compliance with the existing discharge consents at both sites is noted to generally be good, with some exceedances of flow conditions in the past.

The future flows for the scheme are presented in the Options Report (Beca, 2020:P:C.10). In particular, it is noted that:

- No growth is expected in the Te Paerahi catchment;
- Approximately 70 additional people are expected for growth in the Pōrangahau catchment;
- I&I appears to be an issue in both catchments.

We note that the assessment period considered in the Options Report is 2048, which represents approximately 25 years from the when the consent is likely to be granted, but the consents are being sought for a period of 35 years. This is remedied in later reports (Concept Design etc), to a design horizon of 2057 in line with the requested consent term.

The assessment of existing flows highlights that Inflow and Infiltration (I&I) are issues within the Pōrangahau network in particular – evidenced by high per capita flows, and weak sewage concentrations. The Options report notes that Te Paerahi does not have significant I&I based on a comparison of Average Daily Flow with typical values. However this is not actually clear, because:

- The catchment has strong seasonal shifts, so ADF for an annual assessment is unlikely to be a good indicator for peaking factors (two seasonal assessments may have been a better measure, accounting for the population changes),
- Many of the sewage characteristics (organics and solids) tend towards weak concentrations when compared with typical values,
- Pond effluent flows have been used (rather than influent) which are likely to suppress peak flows.

In terms of future flows, the initial Options Report (PC10) uses existing flows, which have considerable I&I issues. These are therefore included in future flow projections. It notes *“We do not have an information that the infiltration will be reduced in the future, therefore we propose to use the Future Flows Actual for the basis of design to allow for a hydraulic capacity on the wet days.”*

The later report outlining the proposed combined treatment plant (Beca, 2021:P:C.16) notes that the future flows used in the assessment from that point include 20% I&I reduction allowance.

It is standard practice that an allowance for I&I reduction is included in the calculation of future flows. But this also needs to translate into maximum flow consent conditions at the treatment plant to ensure that it is realised.

3.2 Options Considered

The options report (PC10) presents a range of plausible treatment solutions, and builds upon work that has been carried out as early as 2010 in this space. The treatment solutions cover a reasonable range of options and do not appear to overlook any significant potential options.

The approach taken through community engagement, and option assessment has ensured that the needs of the community have been addressed in developing the BPO. The options have also been assessed against impact on the various receiving environment options.

We agree that the basis of removing discharges from the Te Paerahi site, is clearly a requirement for mana whenua, and that discharges at this site should therefore be removed as an option. However, Section 8.3 (PC10) Option DS1 still considered discharge to the two existing receiving environments. This is later removed as an option but perhaps the Te Paerahi DS1 option could have been discounted earlier in the process.

We are generally in agreement with the options that have been considered throughout the Options Report (PC10) and concept design report (PC16).

It is not clear however, how the transition was made from the long list of options to the Strawman presented in Figure 31 (PC10).

3.3 Best Practicable Option Process

The Resource Management Act (1991) defines the BPO as follows:

best practicable option, in relation to a discharge of a contaminant or an emission of noise, means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to -

- (a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and
- (b) the financial implications, and the effects on the environment, of that option when compared with other options; and
- (c) the current state of technical knowledge and the likelihood that the option can be successfully applied

In the BPO report (PC12), Section 3.5 notes that a multi-criteria analysis (MCA) is typically undertaken to evaluate the myriad of options available when considering storage, treatment and conveyance options together. The report dismisses the need for one in this instance as the “community are considered well educated on wastewater issues, having been involved in the previous consenting process”.

It is also noted that the previous consenting process (for two separate consent renewals) “included much of the option assessment and evaluation as undertaken for the existing consenting with the greatest limitation then being cost and funding”, and in the past the community “provided strong guidance as to preferred outcomes, reducing the need for an MCA”.

It appears that as a result of the above statements, the AEE presents no evidence that the options were considered qualitatively or quantitatively to determine the BPO. An MCA is not absolutely necessary, but

some form of option selection should be applied. Additionally, no costing information is presented to ensure that “financial implications” are regarded in the assessment of the BPO.

When queried about this with informal questions, the response was as follows:

Financial aspects were largely not involved in the selection process of the BPO. Early engagement with the community provided clear direction towards a land discharge regime (this direction was made clear in the last consent iteration and therefore the concept of land application was a very clear message from the community). A continued surface water discharge or an alternative ocean outfall was not an option, therefore a land discharge was selected. With the selection of a land discharge regime came the nomination of a preferred discharge property. This selection of land to use was post BPO selection, and the choice of land was a technical/commercial decision. Aspects of the selected property and discussions with the landowner then determined the proposed system.

Community engagement for this application continued from where it was left following the previous reconsenting process for the existing discharges. A summary of this previous process is outlined within LEI (2021:P:C.34) (Appendix A of the LEI (2021:P:C.12) BPO Report). At the time the Pōrangahau Environmental Management Team (PEMT) was established to develop a long term solution for wastewater discharges from the communities. This group developed a range of options for the discharges, one being land, however for several reasons were not pursued at the time. Consent conditions relating to the development of a long-term discharge solution were included into these existing discharge consents. Council picked up the conclusions and recommendations from this previous reconsenting process as a basis for developing the future system and is what is in the resource consent being applied for.

Cost determination focused on pricing of various iterations for community reticulation and land options. These costings were subject to much debate and were presented through the Council’s LTP process. The choice of a preferred option, including its cost, was reflected in the LTP decision with the option that is before the Regional Council being preferred.

In our view, to suggest that the LTP process addresses this, as the range of options considered in the Options Selection process are not presented in the LTP is not fitting or standard practice. The [LTP \(2021-2031\)](#) suggests just three options, which include other treatment solutions in the region all bundled together (i.e. not just related to this consent application). In terms of this consent application, this relates to (1) the BPO presented in the AEE delivered over 15 years, (2) the BPO delivered over 10 years, and (3) minimal undefined upgrades to maintain current levels of performance. The financial impacts of a range of feasible solutions are therefore not presented and used in the selection of the BPO.

Ideally a more detailed and robust financial impacts assessment should have been undertaken when selecting the BPO. However we consider that the applicant has developed a reasonable solution for minimising adverse effects on the chosen receiving environment, taking into consideration the discharge options, current technological solutions, and likelihood of successful application.

3.4 Proposed Treatment Solution

In response to the S92 request, the applicant has confirmed that UV treatment will be applied to all wastewater flows irrigated at the Discharge Property for all stages. Some upgrades to the Pōrangahau and Te Paerahi WWTPs had been proposed. These were initially discounted due to the limited time they would be used before being switched over to the new irrigation system. The applicant noted at the site visit that the money should be better spent towards the longer-term disinfection solution. This has since been reversed in the cover letter to the QMRA report, which noted that installation of UV disinfection on the Pōrangahau River discharge would be initiated in the first 18 months of the consent.

3.5 Inflow and Infiltration Considerations

The Options Report (Beca, 2020:P:C.10) provides an assessment of current and future flows. As noted above, this indicates that there is a significant Inflow and Infiltration (I&I) issue within the two networks.

For Pōrangahau (Table 7, PC10) ADF is noted to be 144 m³/d, while the maximum flow (assumed to be a peak wet weather flow) is 2,250 m³/d, indicating a peaking factor of greater than 15. Ageing networks with peaking factors greater than 5 (based on daily flows) should typically be considered for investigation and I&I improvement work. It should be noted that these flows are based on pond discharge (rather than influent), and so will be impacted by rain captured by the pond, but this should not significantly modify this concern.

For Te Paerahi, Table 10 (PC10) an ADF of 74 and maximum flow of 407, indicate a peaking factor of 5.5, which is less problematic, but still elevated.

The I&I issue is corroborated by the relatively weak influent flow concentrations presented for Pōrangahau noted in Table 8 (PC10).

It is noted in the Outline of Proposed New Combined Treatment Plant Options (Beca 2021:P:C.16) that population data and flow data were updated since the development of the options report, and that a 20% allowance for I&I flow reductions has been included in the flow analysis. ADF for 2057 for combined WWTP summer peak is noted to be 653 m³/d and on average 567 m³/d. Assuming a 3 month summer peak period, so 91 days x 653 m³/d, plus 274 days x 567 m³/d = 214,781 m³. So as an example, annual flow not to exceed 215,000 m³.

The applicant is requested to provide an analysis of historical and expected future flows to provide a maximum “average” flow (either as ADF or annual flow) and a maximum peak instantaneous flow, such that growth is catered for, but I&I must be managed for the term of the consent.

3.6 Network Overflows

Two new pumping stations and rising mains are to be installed as part of this scheme, transferring raw wastewater from the existing catchments to the new treatment and irrigation site. The applicant’s proposed consent conditions do not include any conditions to monitor, manage, and mitigate pump station overflows into the receiving environment from these pump stations. Given that these are part of this scheme, they should ideally be included in this consent application suite and be reconsidered by the applicant (refer to S91 RMA) should such discharges be foreseeable and not covered under emergency provisions.

4 Proposed Consent Conditions

An initial review of Version 1 of the proposed consent conditions is included below. Further discussions on the conditions will be required as the above comments are addressed.

Table 4.1: Review of proposed consent conditions

Condition	Applicant Proposed Text	Comment / Suggested Change
3 - 6		<p>These conditions require a better definition of the stages, and could be presented in a clearer way, such as a simple table which aligns:</p> <ul style="list-style-type: none"> • Stages, • Years after consent granted, • Discharge location(s) and flow limits, • Storage requirements. <p>The years from consent granting to achieve each stage should be fixed in the consent, as the proposed timeframes are already conservative.</p>

Condition	Applicant Proposed Text	Comment / Suggested Change
8	The consent holder shall nominate a person who is responsible for the maintenance of the wastewater treatment system(s) and the return of information (as required by conditions of this consent). The consent holder shall advise the Council (Manager Compliance) who this person is within one month of the commencement date of this consent and within ten working days of any change occurring.	Include words to the effect that the nominated person shall be a <i>“suitably qualified and experienced wastewater plant operator. This operator shall oversee the operation and management of the wastewater treatment system and perform the operational and maintenance responsibilities specified in [any plans which outline these requirements].</i>
9	Installation of flow meters appears to be immediate.	Suggest including a timeframe within which the flow meters must be installed from time of consent. Need to strengthen this condition to emphasise that the location must include all flows discharged to the environment (e.g. bypasses or other flows must be included).
10	Within three months following the installation of the flow meters, and every five years thereafter for the duration of Consents, the Consent Holder must have the flow meters, required by Condition 9, verified in accordance with the manufacturer’s specifications. The Consent Holder must provide to the Council’s Regulatory Manager, an in-situ flow meter verification certificate confirming the validity of the meters within one month of the verification being completed.	Verification and calibration is typically carried out annually. Suggest rewording. Why is verification and not calibration being sought? Example could be: <i>The Consent Holder must have the flow meters required by Condition 9 calibrated annually by an authorised and certified contractor which confirms that the flow meter is accurate to within +/- 5% or better. This calibration must be completed with the meter in-situ to ensure that the calibration takes into account any variability due to its location and installation. The calibration certificate must be provided to the Council by [time to align with reporting] each year following installation.</i>
11	“Within three months of the commencement of these Consents, and three months following the construction and installation of a flow meter at the new WWTP...”	These are unlikely to align, as the new WWTP does not need to function until 4 years after commencement of the consent. Revise timing.
12	The Consent Holder must ensure that the physical infrastructure of the pond system for the existing Porangahau and Te Paerahi WWTPs, as well as the future combined WWTP is inspected every month. Any damage to pond embankments, or signs of pond seepage must be identified, noted, and fixed as soon as practicably possible.	Suggest expanding list to include mechanical, structural and electrical elements which are more likely to be part of the new plant. E.g.: “Any damage to the pond embankments, structural elements, mechanical elements, electrical and control systems, or any failure that could cause the seepage or overflow of wastewater, must be identified, noted, and fixed as soon as practicably possible.”
17	“From the commencement of these Consents, the Consent Holder must take samples of treated wastewater from the sampling port(s) (installed in accordance with Condition 18), once per month in any month that a discharge from any of the WWTPs or storage facilities occurs. The sample must be analysed for:...”	Write point (a) in full and abbreviated for all. Also include expected units. 5-day carbonaceous biochemical oxygen demand (cBOD5), mg/L; Total suspended solids (TSS), mg/L; Total Kjeldahl nitrogen (TKN), mgN/L. etc
18	From the commencement of these Consents, the Consent Holder must install and maintain a sampling port in the pipeline to the discharge from the WWTP(s), or provide a suitable location, where effluent is readily accessible for sampling.	Preference to identify the exact location of the sampling point for existing sites. And for all sites note that this location of the sampling port must include all bypasses that would be discharged to the environment at the discharge location, and should be located to ensure that the collected sample is representative of the installed discharge flowmeter.
23	“No later than six months after the commencement of this Consent, the Consent Holder must submit to the Council’s Regulatory Manager for technical certification an Operation and Management Plan (OMP) detailing (but not limited to) the following items:...”	O&M Plan (or somewhere suitable) should include links to activities around inflow and infiltration activities. Conditions similar to this are included in the existing consents. E.g.: <i>Within 3 months of the date of commencement of this consent, the consent holder shall prepare and forward to the Council a Stormwater Inflow and Infiltration Management Plan. The report shall be revised every 5 years and shall address the following:</i>

Condition	Applicant Proposed Text	Comment / Suggested Change
		<p>a) <i>The incidence of stormwater infiltration into the reticulated wastewater system and measures available to reduce such infiltration as far as practicable;</i></p> <p>b) <i>A strategy for reducing stormwater infiltration into the reticulated wastewater system and an implementation plan for achieving the strategy to be reported as the Stormwater Infiltration Management Plan;</i></p> <p>c) <i>Any proposed works or methods to address sources of stormwater infiltration into the reticulated wastewater system where those sources have been identified as part of the Stormwater Infiltration Management Plan.</i></p>
36	<p>"The effluent discharged from the WWTP shall comply with the following standards up until the establishment of the combined WWTP servicing both communities:".</p>	<p>If the new combined treatment plant is not installed until Stage 3, does this mean that the existing pond treated wastewater will be transferred to the new land discharge with these parameters between 4 and 9 years?</p>
36.i.	<p>These standards are deemed to have been breached if:</p> <p>i. more than 16 samples taken over any 12 month period in accordance with Condition 17 have an cBOD5 concentration exceeding 30 mg/L or more than 5 have an cBOD5 concentration exceeding 60 mg/L;</p>	<p>The number of samples doesn't align with the 12 samples required to be collected per year.</p>
40	<p>The rate of wastewater discharged from the pond shall not exceed 1.5 l/s for more than 50 % of the time over any 12 month period, nor shall it exceed 4.8 l/s for more than 5 % of the time over any 12 month period, as determined by daily flow records collected in accordance with Condition 9.</p>	<p>Matches existing consent</p>
44	<p>Other than discharges associated with necessary maintenance works, the discharge shall not, from a point approximately 200 m upstream of the point of discharge into the Pōrangahau River to a point 200 m downstream of the point of discharge into the Pōrangahau River, give rise to any of the following effects in the Pōrangahau River:</p> <p>a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials.</p> <p>b) Any conspicuous change in the colour or visual clarity.</p> <p>c) Any emission of objectionable odour</p> <p>d) The rendering of fresh water unsuitable for consumption by farm animals.</p> <p>e) Any significant adverse effects on aquatic life.</p>	<p>Remove "Other than discharges associated with necessary maintenance works " as these effects should still be avoided.</p>
45	<p>The consent holder shall ensure samples are taken from...</p>	<p>The samples should be collected from all three sites. Separate the locations from the sample parameters.</p>
47	<p>The Pōrangahau WWTP system and any discharge shall not result in any offensive or objectionable odour to the extent that it causes an adverse effect beyond the area designated for wastewater management purposes in the Central Hawke's Bay District Plan. For the avoidance of doubt, this condition includes any emission of offensive or objectionable odour from the oxidation pond and soakage area beyond the boundary of the subject property.</p>	<p>What is the soakage area referred to in this clause? Should this be discharge channel?</p>

Condition	Applicant Proposed Text	Comment / Suggested Change
48	Discharge parameters	<p>These need further investigation and modification as noted in this report to include:</p> <ol style="list-style-type: none"> 1. Median and 93rd percentile rather than the percentiles stated, 2. cBOD to match modelling, 3. Total nitrogen parameter to match modelling, 4. Total phosphorus to match modelling, 5. Values which reflect improvement on current discharges and alignment with modelling in AEE. <p>See Table 4.2 below to note increases compared to current consent conditions.</p>
59	The Consent Holder must ensure that the physical infrastructure of the land treatment system and the land treatment area are inspected every week when operational, and that relevant parts of the systems are also inspected whenever any alarms associated with the systems are activated.	Inspection should include the treatment plant also. Add in reporting of identified issues – see similar conditions from above.
62	“The Consent Holder must measure and record the static water level of all bores identified in Condition 60 prior to purging and sampling. Samples collected from the bores and shall be analysed for the following parameters:...”	Add: Records shall be reported included in the Annual Monitoring Report as required by Condition 29.
65	“The Consent Holder must monitor the following parameters at the sites identified in Condition 63:...”	Add: Records shall be reported included in the Annual Monitoring Report as required by Condition 29.
New	New condition regarding maximum flow to new treatment plant.	A condition is required that stipulates the maximum flow to the new treatment plant. A suggested approach to this is covered in the review above, and could be a simple as 215,000m ³ per annum.
New	New condition regarding pump station overflows.	Add condition(s) about the two new network pump stations – they must be designed with capacity and safeguards to ensure that no overflows occur, including during power outages. If in the case of a complete operational failure of the pump station, an overflow does occur, the pump station designs shall include an overflow design that manages this in a controlled manner and direction. The event shall be treated as an emergency situation, and reported to the regulator within an agreed timeframe or as soon as practicable (exact wording of the condition to be discussed). Refer to comment below regarding S91 RMA.
New	Secondary treatment required.	Condition stating that the new treatment plant is to include secondary treatment. See S92 Q18.

Consent parameters are copied from the Options Report (Beca, 2020:P:C.10), the draft consent conditions (v1) provided with the application, and updates provided with Section 92 responses, and are presented in Table 4.2. The red text highlights where parameters have changed from previous consent conditions for those sites, or been added for the new discharge location.

Table 4.2: Comparison of consent conditions for each site: existing and proposed

Site / Parameter	Unit	Current			Proposed		
		50%ile	90%ile	95%ile	50%ile	90%ile	95%ile
Te Paerahi							
ADF	m ³ /d	87		190	87		190
Inst. flow	L/s						

Site / Parameter	Unit	Current			Proposed		
		50%ile	90%ile	95%ile	50%ile	90%ile	95%ile
cBOD ₅	mg/L	30	60		30	60	
TSS	mg/L	60	140		60	140	
pH	-	6.5-9.0			6.5-9.0		
Pōrangahau		50%ile	90%ile	95%ile	50%ile	90%ile	95%ile
ADF	m ³ /d	130		415	200		400
Inst. flow	L/s	1.5		4.8	1.5		4.8
cBOD ₅	mg/L	30	60		30	60	
TSS	mg/L	50	90		50	90	
pH	-	6.5-9.0			6.5-9.0		
Combined					Lower	Upper	95%ile
ADF	m ³ /d				NONE		NONE
Inst. flow	L/s				NONE		NONE
cBOD ₅	mg/L				25 (4/12)	40 (10/12)	
TSS	mg/L				30 (4/12)	50 (10/12)	
NH ₄ -N	mg/L				20 (4/12)	40 (10/12)	
DRP	mg/L				5 (4/12)	9 (10/12)	
<i>E.coli</i>	cfu/100mL				500 (4/12)	5,000 (10/12)	
pH	-				6.5-9.0		

5 Conclusions and Recommendations

This review has highlighted the following areas that require further clarification:

1. Consideration of financial impacts as part of determining the BPO is a requirement of the RMA and the assessment undertaken did not follow standard practice. Whilst the proposed solution has been canvassed with Mana Whenua and the community, and appears technically suitable, ideally the applicant would have assessed the financial impacts to ensure that the costs are appropriate and selected solution can be considered the BPO. Despite this, the preferred option is reasonable from a wastewater treatment technical perspective.
2. Additional information is required (S92 Q24) to demonstrate how the UV system will be protected from fouling prior to the installation of the new treatment plant at the Discharge Location (i.e. while pond effluent from Te Paerahi and Pōrangahau is discharged at the new site).
3. The applicant has noted in S92 Q26, that reliable CHBDC flow data from between 2008 and 2019 was adjusted by future population growth projection factors as a proxy to estimate future flows. Further information is required:
 - a. Does this include allowances for I&I reductions, when calculating the future All Flows 2057 ADF.
 - b. This data set can be used to calculate and include conditions that limit the median and peak flow to the treatment plant, as a means to ensure that I&I in the network is managed for the term of the consent, rather than being used to dilute wastewater concentrations. Please provide the All Flow 2057 Peak Month ADF, and Annual ADF, or justification for other values with workings that could be used as maximum ADF (or maximum annual) and peak instantaneous consent conditions for flow.
4. Two new pumping stations and rising mains are to be installed as part of this scheme, transferring raw wastewater from the existing catchments to the new treatment and irrigation site. The draft consent conditions do not include any conditions to monitor, manage, and mitigate pump station overflows into the

receiving environment from these pump stations. Given that these are part of this scheme, they should ideally be included in the consent application suite (refer to S91 RMA).

The following areas remain unresolved, but can be addressed through consent conditions:

1. Inflow and Infiltration (I&I) has been discussed in a number of areas in the application and S92 Question Responses. Earlier options documents in the application perpetuate the current high I&I issues when calculating future flows. Later documentation (Concept Design) makes allowance for a 20% reduction in I&I in the future. But this is not the final design of the system, and there is currently nothing in the consent conditions that ensures management of I&I within the catchments. Inclusion of a condition that limits flows to the treatment plant, and require I&I planning (as with previous consents) should be introduced. Clauses should consider including the following aspects:
 - a. The incidence of stormwater infiltration into the reticulated wastewater system and measures available to reduce such infiltration as far as practicable.
 - b. A strategy for reducing stormwater infiltration into the reticulated wastewater system and an implementation plan for achieving the strategy to be reported as the Stormwater Infiltration Management Plan.
 - c. Any proposed works or methods to address sources of stormwater infiltration into the reticulated wastewater system where those sources have been identified as part of the Stormwater Infiltration Management Plan.
 - d. Limits to average daily flows (or annual flow) and peak instantaneous flows.
2. The draft consent conditions are considerably lower than what has been used in the models and reports, in all parameters. If the other reviewers agree with the AEE approach and that the effects are less than minor, then the values used in modelling the discharges to the river and new land discharge location should also be used for the consent conditions also. In particular the following changes are noted:
 - a. The draft consent conditions suggest only 4 and 10 of 12 samples respectively are required to be below the proposed lower limits. This is equivalent to a 33rd percentile, whereas the typical approach is to use a median (50th percentile) as the lower target value, which also aligns with the values used in the modelling. By suggesting the same numerical value, with a lower threshold in this way, it allows the entire dataset of discharge measurements to be higher than what was modelled, and still be within the conditions.
 - b. Ammonia is proposed as discharge parameter for nitrogen, when total nitrogen was used in the models. Again, the same numerical value is transposed for the discharge limit between TN and ammonia. In treated wastewater, ammonia will be a small fraction of the TN discharged. If the proposed parameters are retained then the discharge could be many times higher than what was modelled and still be within consent.
 - c. In the same way, dissolved reactive phosphorus is used in place of the modelled total phosphorus (TP), allowing discharges to be much higher than the modelled values and remain compliant.
 - d. In the same way, soluble BOD₅ is used in place of the modelled BOD₅ allowing discharges to be much higher than the modelled values and remain compliant.
3. Regarding S92 Q20 and Q28, on the timing of the stages. The applicant noted that *“These timeframes are dependent on consent processing, as well as material and contractor availability.”* It is our view that the timeframes offered are conservative, and provide ample time for planning and delivering the upgrades, which can allow for contractor and material availability. These timeframes should be clearly defined in the consent conditions (i.e. 3-6). However, due to the applicant potentially requiring other consents (pump station overflows etc) these processes need to be factored into programming.
4. A new condition is required to cover the installation of UV disinfection at the Pōrangahau River discharge in the first 18 months of the consent, as per the CHBDC cover letter to the QMRA report.