a) An assessment of any effects the proposal will have on the Maori cultural values of the Waiaua River and Lake Opunake, and details of how you propose to mitigate any effects. I expect that the assessment/ and the assessment requested in b) below, would necessarily involve engaging with tangata whenua.

b) A more detailed assessment of the proposal against Objective 4.1.1 and Policies 4.1.1 to Policies 4.1.6 of the Regional Freshwater Plan for Taranaki (RFWP).

We have met with Puna Wano-Bryant of Taranaki iwi. We have agreed to present Taranaki iwi with a range of flow scenarios, with additional detail on how they impact on the various values associated with the scheme. This includes how the Waiaua River and its biological communities are likely to be impacted. This will enable Taranaki to provide us with their understanding of how each scenario affects the cultural values. This is something only Taranaki can do, and as such we are unable to provide this information at this time.

These various scenarios are yet to be refined, as we would prefer them to relate to the positions and concerns of those who make a submission. This will ensure that the information provided will directly address the points made by those identified as affected parties.

c) Detailed analysis of the flows in the Waiaua River and how they are affected by your taking. I expect this to include detailed flow duration statistics (i.e. flow duration curves) comparing the natural flow regime with the flow regime that would result from your proposed taking. In order to produce this information, you would need to identify the relationship between the Waiaua River flow and a nearby site with a long flow record. From that relationship you would simulate a long term flow record for the Waiaua.

A synthetic flow record has been developed using the flow relationship with the Punehu Stream (TRC, 2019).

Below are the flow duration statistics (Table 1- 3 & Figures 1 & 2). Data presented are for natural flow (synthesised from the Punehu Stream), scenario 1 (180l/sec residual flow only) and scenario 2 (180l/sec with no abstraction when flows exceed 3x median flow (5.85 cumecs). This assessment has been made independent of any abstraction of water in relation to the Opunake water supply.

Table 1 Flow duration statistics – natural flow (synthetic)

	9	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
10										90.11
9	20.43	11.71	9	7.61	6.63	5.87	5.37	4.98	4.64	4.4
8	4.18	4	3.84	3.71	3.58	3.47	3.37	3.28	3.2	3.13
7	3.07	3	2.94	2.88	2.84	2.79	2.75	2.7	2.66	2.62
6	2.58	2.55	2.52	2.49	2.46	2.43	2.41	2.38	2.35	2.33
5	2.31	2.29	2.26	2.24	2.22	2.2	2.18	2.15	2.13	2.1
4	2.08	2.06	2.04	2.02	1.99	1.97	1.94	1.93	1.91	1.89
3	1.87	1.85	1.83	1.82	1.8	1.79	1.77	1.75	1.73	1.71
2	1.69	1.67	1.66	1.64	1.63	1.61	1.59	1.56	1.54	1.51
1	1.49	1.47	1.45	1.44	1.43	1.42	1.41	1.4	1.38	1.38
0	1.37	1.36	1.35	1.34	1.34	1.33	1.32	1.31	1.29	1.25

Table 2 Flow duration statistics – 180 l/s residual flow (synthetic)

	9	8	7	6	5	4	3	2	1	0
10										86.21
9	16.53	7.81	5.1	3.71	2.73	1.97	1.47	1.08	0.74	0.5
8	0.28	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
7	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
6	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
5	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
4	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
3	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
2	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
1	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
0	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18

Table 3 Flow duration statistics – 180 l/s residual flow with 3x median flow shutdown (synthetic)

	9	8	7	6	5	4	3	2	1	0
10										90.11
9	20.43	11.71	9	7.61	6.63	5.87	1.47	1.08	0.74	0.5
8	0.28	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
7	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
6	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
5	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
4	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
3	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
2	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
1	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
0	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18

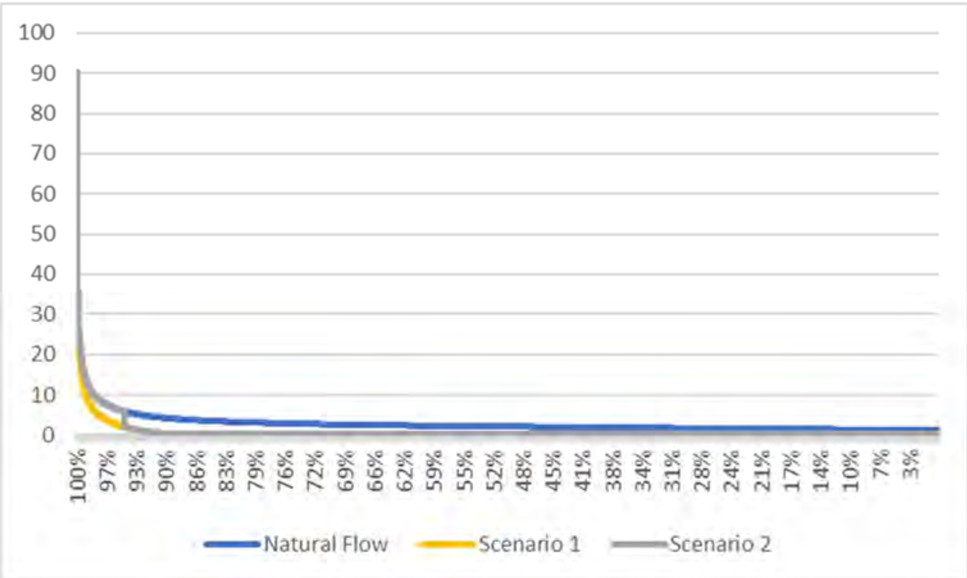

Figure 1 Flow duration curve (all data - 1/01/2013 0:00 to 13/07/2017 23:55)

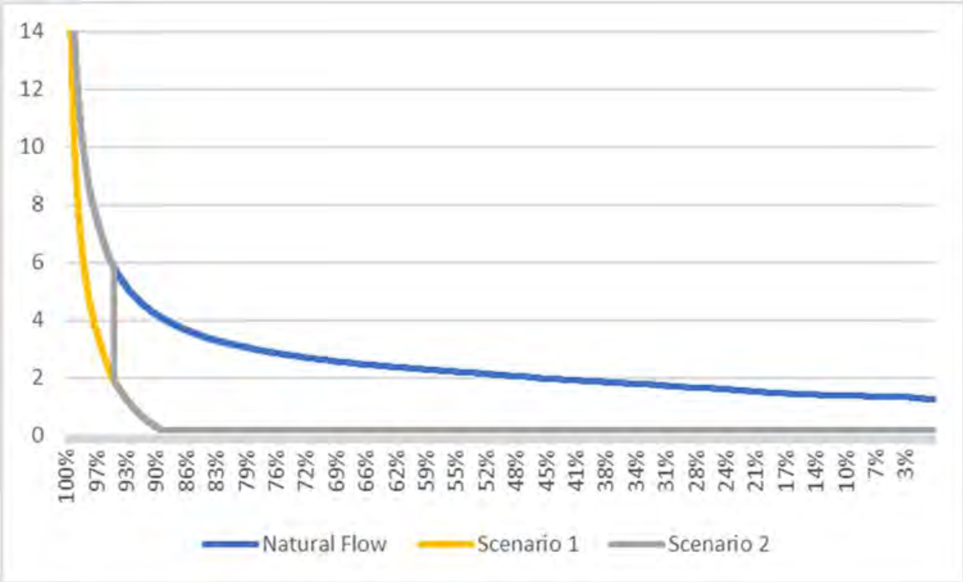

Figure 2 Flow duration curve for flows less than 14 cumecs (all data - 1/01/2013 0:00 to 13/07/2017 23:55)

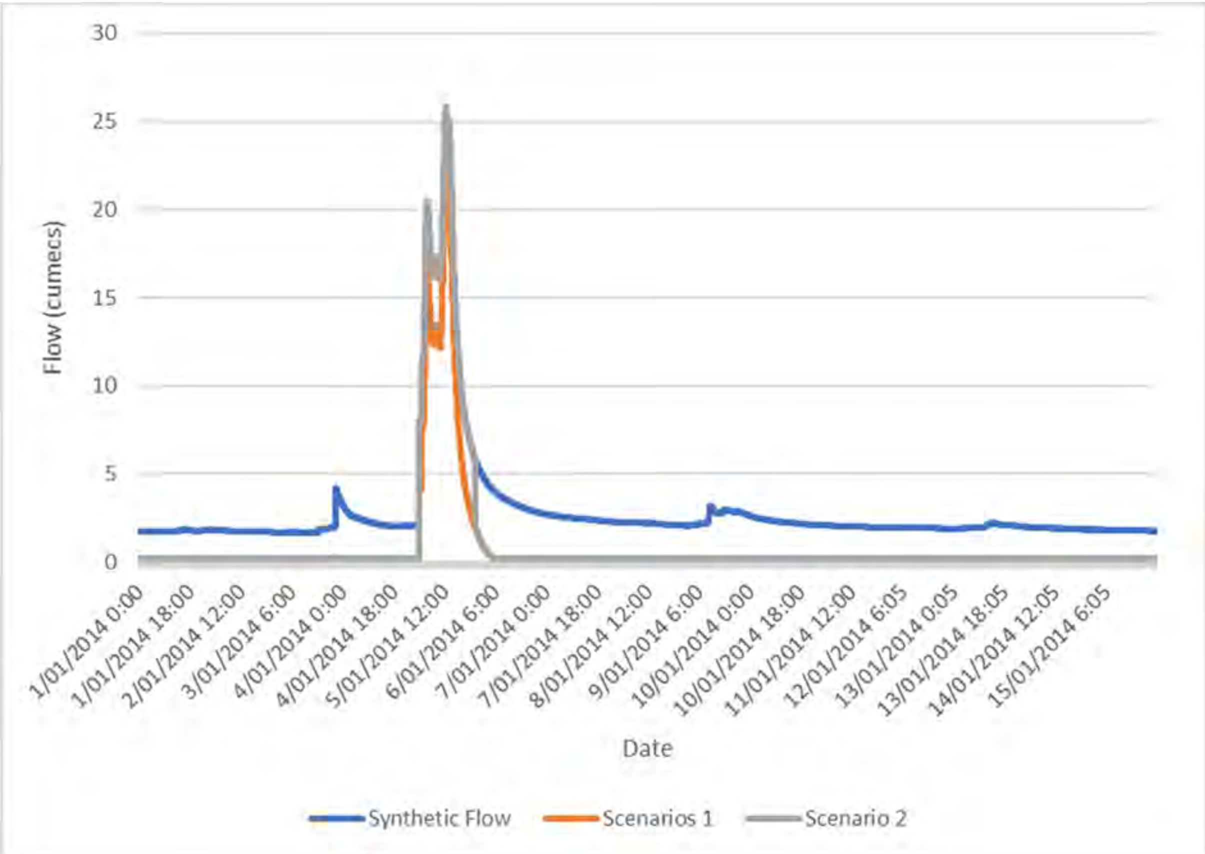

Figure 3 Representative impact on flow

d) An assessment of the environmental effects that result from the changed flow regime caused by your taking.

e) A review and update of the report submitted with the application *Flow requirements for fish passage and instream habitat downstream of the Waiaua hydroelectric power scheme weir (1995)* by a suitably qualified independent expert. The review would need to include the use of updated habitat area curves for fish species known to inhabit the lower Waiaua River.

The environmental effects of water abstraction can be largely grouped into those associated with the minimum flow or the change in flow variation.

Generally, ecologically significant variations in flow are those that affect the flushing of the stream, although there are biological processes that are also influenced by flow variation (e.g. inanga spawning, migration triggers etc). Those flows in excess of three times the median flow is generally considered sufficient to flush fine sediments, and displace invertebrate communities, with some algae scouring also occurring, especially in those streams with a high sand load such as the Waiaua Stream. Flows in excess of seven times the median flow are considered sufficient to mobilise the river bed, moving larger substrates such as cobbles and gravels. For this stage of the consent application, only two scenarios are compared to the 'natural' flow record.

The instream habitat work done previously in the lower Waiaua River quantified the habitat at a flow of 31 l/sec, compared with a MALF of 1319 l/sec. It is unlikely that an accurate assessment of habitat can be made by extrapolating up from such a low flow rate.

As an alternative, the effects of the abstraction on habitat have been assessed using the model developed by Ian Jowett for the Taranaki Regional Council as a part of the Regional Freshwater Plan review. The full discussion document on this model is available from the Council[1]. The results of this assessment are shown in Figure 4.

The data presented in Figure 4 are relative to the amount of benthic invertebrate or fish habitat present at 30-day MALF. The 30-day MALF is the average of the lowest flow that occurred over a 30-day period, averaged over all the calendar years for which data exists. Compared with MALF, which is the average of the instantaneous lowest flows recorded each year, the 30-day MALF is higher. The fish habitat data is for torrentfish and adult brown trout, while the benthic productivity used high MCI scoring taxa. Torrentfish, adult brown trout and high MCI scoring invertebrate taxa generally require the highest flow for their taxonomic group, so in providing for these taxa, the other taxa are also provided for.

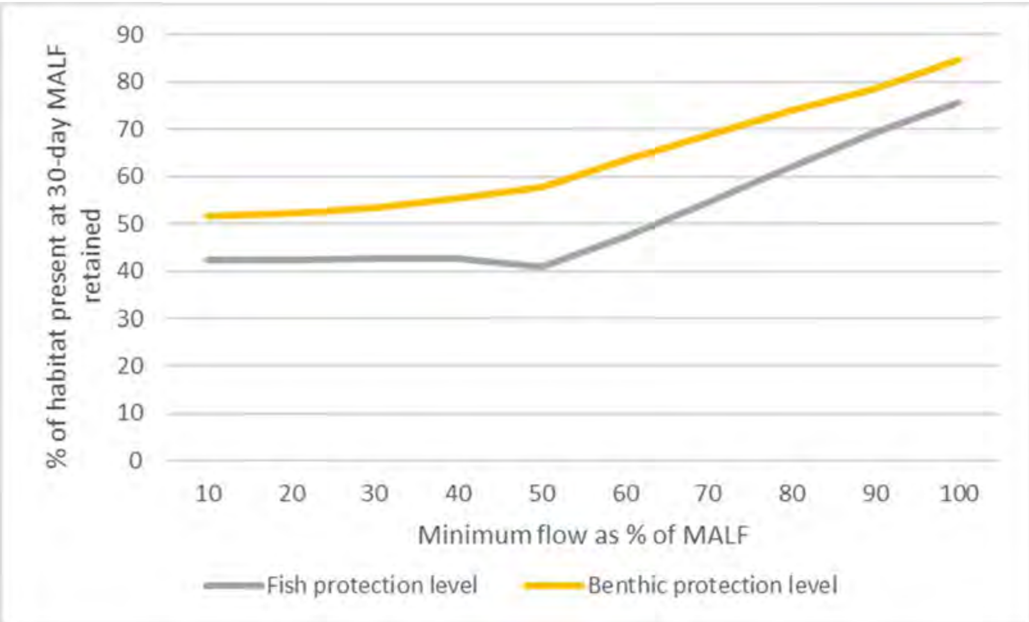

Figure 4 The amount of habitat retained under different minimum flow scenarios, relative to the amount of habitat present at 30-day MALF. Allocation volume used for this calculation is 3.9 cumecs.

[1] FRODO-#2074019 Review of Minimum Flows and Water Allocation in Taranaki

Some example calculations are provided in Table 4, presenting a range of residual flow scenarios, to provide some perspective only.

Table 4 Fish and benthic invertebrate habitat retained under different residual flow scenarios. The % habitat retained is relative to the amount of habitat present at 30-day MALF Allocation volume used for this calculation is 3.9 cumecs. (Figures are rounded to nearest whole number and have been interpolated from data provided by Jowett)

Residual Flow	Residual Flow as % of MALF	Fish protection level (% of habitat present at 30-day MALF)	Benthic protection level (% of habitat present at 30-day MALF)
180	23.69%	43	53
300	39.48%	43	55
400	52.64%	43	59
500	65.80%	51	66
1052.8	80.00%	62	74
1316	100.00%	76	85

Figure 4 and Table 4 show that at the proposed residual flow of 180l/sec, the amount of fish habitat provided is 43% of that present at 30-day MALF. It is slightly higher for benthic invertebrates, at 53%. There is little to no change in the proportion of fish habitat when the residual flow is increased to 400 litres per second, and only a small increase in benthic invertebrate habitat. It is only once residual flows increase to be above 50% MALF that there is an appreciable increase in fish and benthic invertebrate habitat.

It is acknowledged that with the proposed abstraction rate of 3.9 cumecs, the scheme has the potential to 'flatline' the lower river, even under scenario 2. An example of this is shown in Figure 3, where the smaller variations in flow can be completely absorbed by the station. Jowett states in his report that the impacts of low flows begin to manifest after 30 days. The synthetic natural flow record shows that this occurs most years (Figure 5, Table 5). Although scenario 2 (no abstraction when flows are in excess of 3x median flow (5.85 cumecs)) would not impact on the frequency of flushing flows, the positive impact of the higher flow will not be as evident in the lower river, due to how quickly the river returns to the minimum flow as a result of the abstraction. Therefore, it may be necessary to add an additional consent requirement, that will improve the flow variability in the lower river. Example conditions could be:

- When flows have not exceeded 3xmedian for 30 days or more, no abstraction will occur when upstream flows exceed median.
- When flows have not exceeded 3xmedian for 30 days or more, abstraction will cease for four hours per day.
- When flows have not exceeded 3xmedian for 30 days or more, the residual flow will increase to 300 litres per second. Once flow has naturally exceeded 3x median flow, the required residual flow will return to 180 litres/second.

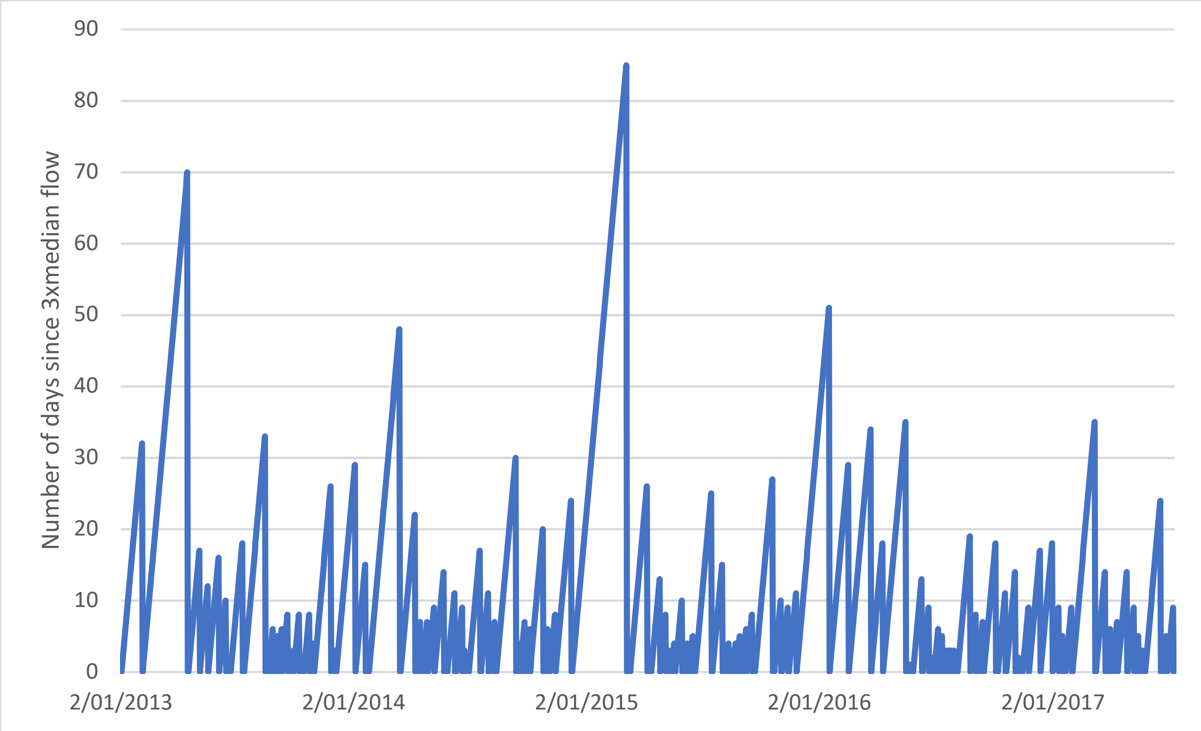

Figure 5 Number of days since flow exceeded 5.85 cumecs in the Waiaua River (synthetic data - 1/01/2013 0:00 to 13/07/2017 23:55)

Table 5 Average of maximum daily flows per year for each scenario. Data is calculated from synthetic flow data (1/01/2013 to 13/07/2017)

Average Number of days per year where max flow was:		Synthetic flow	Scenario 1 180 l/sec residual flow	Scenario 2 180 l/sec residual flow, no abstraction when flow above 3xmedian
	<300	0	288	288
	300-600	0	6	6
	600-900	0	7	7
	900-1319	7	4	4
<MALF	<1319	7	305	305
MALF - Median	1319-1950	129	6	6
Median - 3x median	1950-5850	175	25	0
3x median - 7x median	5850-13650	34	16	34
>7x median	>13650	19	13	19

It is therefore useful to gain some understanding of the ecological values supported by the original consent. Taranaki Fish and Game report that at a residual flow of 180l/sec, the lower Waiaua River is capable of supporting a valued trout fishery, with the fishery consisting primarily of rainbow trout that had been released into Lake Opunake. However, during extended periods of low flow, coupled with warm weather and warm water temperatures, conditions in the lower river can become inhospitable to trout. There can also be issues with sand inundation, due to the flow being insufficient to move the sand sluiced from the canal.

With regards to native fish, the lower Waiaua River has been monitored extensively, with a quantitative survey completed in February 2014[2]. A comparative survey was also undertaken in the Manga Hume Stream on the same day. The results of these surveys are presented in Table 6.

Table 6 Results of fish surveys completed in the Waiaua River and Mangahume Stream, February 2014. Site 1 is the Mangahume Stream just upstream of SH45, Site 2 is the Waiaua River upstream of weir, Site 3 is the Waiaua River downstream of the weir.

Survey method	Site:	Site 1		Site 2		Site 3	
	Area fished: Electric fishing Seine netting	28 200		60 295		80 90	
	Species	No	No. per m²	No	No. per m²	No	No. per m²
Electric fishing	Longfin eel (*Anguilla dieffenbachii*)	-	-	3	0.05	1	0.01
	Juvenile eel (*Anguilla* sp.)	9	0.32	22	0.37	13	0.16
	Redfin bully (*Gobiomorphus huttoni*)	2	0.07	2	0.03	18	0.23
	Juvenile bully (*Gobiomorphus* sp.)	-	-	-	-	45	0.56
	Torrentfish (*Cheimarrichthys fosteri*)	2	0.07	-	-	3	0.04
	Inanga (*Galaxias maculatus*)	-	-	-	-	1	0.01
	Common smelt (*Retropinna retropinna*)	-	-	-	-	-	-
	Brown trout (*Salmo trutta*)	-	-	1	0.02	-	-
	Shrimp (*Paratya curvirostris*)	-	-	-	-	Present	
Seine netting	Inanga (*Galaxias maculatus*)	-	-	-	-	1	0.01
	Common smelt (*Retropinna retropinna*)	39	0.20	-	-	72	0.8
Total number of species		4	-	3	-	6	-
Total number of fish		52	0.23	28	0.47	154	0.91

These fish monitoring results show that the lower Waiaua River supports a fish community that has a similar species richness as the Mangahume Stream. There is some variation in the relative abundance of these species, consistent with the impact on habitat caused by water abstraction. Bullies are known to prefer slow and shallow flows, hence their higher abundance in the Waiaua River downstream of the weir. However, the presence of torrentfish at a density similar to that recorded in the Mangahume Stream indicates that a residual flow of 180 litres per second is sufficient to support this swift water species.

Macroinvertebrate monitoring, undertaken by the Council from 1994 to 2000 recorded a community not significantly different to that recorded in similar streams nearby. The median MCI scores for the two sites monitored downstream of the weir are not significantly different to the median score recorded in the Punehu

[2] Opunake Hydro Limited Monitoring Programme Report 2010-2014. TRC Technical Report 2014–32

Stream at SH45 [3]. Although the abundance of high scoring mayfly and stonefly taxa was lower than may be expected, this could be a reflection of the habitat instability caused by the sand inundation.

Although no quantitative periphyton monitoring has been undertaken in the lower river, some conclusions can be drawn from the macroinvertebrate results. Macroinvertebrate results can reflect algal proliferation, with certain species favouring algae, while others will reduce in abundance as algal biomass increases. The results indicate that there is typically sufficient algal biomass to support taxa commonly associated with algae. However, this is not unusual for a lower river site in a ring plain stream. Moderately sensitive taxa are usually negatively correlated with algal proliferation. Moderate or highly sensitive taxa were present in the majority of samples at times, suggesting that algal proliferation is not typical for the lower river. This is consistent with what has been observed, being a noticeable algal community, but not to the degree where the algae becomes a nuisance. It is likely that the algal biomass is severely depleted during floods, due to the abrasiveness of the sand which is carried in suspension during flood. Overall, the lower river macroinvertebrate and periphyton community is primarily influenced by the sand loading in the river, with the influence of the abstraction being secondary. Provided the abstraction does not reduce the incidence of scouring flows, it's impact would be mainly limited to stabilising the flow following flooding, allowing algae to gain a foothold quicker than would naturally occur.

This information shows that a residual flow of 180 litres per second is sufficient to maintain the life supporting capacity of the river. It is acknowledged however that the amount of life is reduced, due to the reduced amount of habitat available. There are options available that may help mitigate for the loss of habitat, including a variable residual flow (seasonally and/or daily), flushing requirements or inanga spawning considerations, all of which can be further discussed with affected parties.

[3] Freshwater Macroinvertebrate Fauna Biological Monitoring Programme Annual State of the Environment Monitoring Report 2017-2018. Technical Report 2018-61

		Site:	WAA000470	WAA000495
PLATYHELMINTHES (FLATWORMS)	*Cura*	3	-	10
NEMERTEA	Nemertea	3	70	70
NEMATODA	Nematoda	3	80	60
ANNELIDA (WORMS)	Oligochaeta	1	100	100
	Lumbricidae	5	30	20
MOLLUSCA	*Gyraulus*	3	10	10
	Physa	3	30	20
	Potamopyrgus	4	70	40
CRUSTACEA	Cladocera	5	10	
	Ostracoda	1	20	10
	Paracalliope	5	10	10
	Talitridae	5	-	
	Paratya	3	30	90
EPHEMEROPTERA (MAYFLIES)	*Austroclima*	7	20	10
	Coloburiscus	7	50	50
	Deleatidium	8	50	50
	Nesameletus	9	30	20
PLECOPTERA (STONEFLIES)	*Acroperla*	5	40	30
	Megaleptoperla	9	30	20
	Stenoperla	10	10	
	Zelandobius	5	20	30
	Zelandoperla	8	30	30
ODONATA (DRAGONFLIES)	*Xanthocnemis*	4	10	10
HEMIPTERA (BUGS)	*Saldula*	5	-	10
	Sigara	3	-	20
COLEOPTERA (BEETLES)	Elmidae	6	90	100
	Hydraenidae	8	30	60
	Hydrophilidae	5	10	
MEGALOPTERA (DOBSONFLIES)	*Archichauliodes*	7	90	80
TRICHOPTERA (CADDISFLIES)	*Hydropsyche (Aoteapsyche)*	4	90	80
	Costachorema	7	50	40
	Hydrobiosis	5	90	80
	Hydropsyche (Orthopsyche)	9	-	10
	Beraeoptera	8	10	20
	Confluens	5	10	
	Olinga	9	10	10
	Oxyethira	2	60	90
	Paroxyethira	2	10	10
	Pycnocentrodes	5	10	20
	Triplectides	5	10	
DIPTERA (TRUE FLIES)	*Aphrophila*	5	100	100
	Eriopterini	5	40	30
	Limonia	6	10	20
	Chironomus	1	30	10
	Maoridiamesa	3	80	80
	Orthocladiinae	2	100	100
	Tanytarsini	3	70	80
	Ceratopogonidae	3	-	10
	Empididae	3	40	20
	Ephydridae	4	40	60
	Muscidae	3	70	70
	Austrosimulium	3	80	70
	Tabanidae	3	20	40
	Tanyderidae	4	-	20
		No. of samples	10	10
		Median No of taxa	20	21
		Median MCI	81	82.5
		Median SQMCI	3.6	5
		Median EPT (taxa)	5.5	6
		Median %EPT (taxa)	31.5	27

f) As assessment of the danger to downstream users when the intake is closed and/or flushing occurs.

Due to no current resource consent being held for the diversion, it is not possible to manipulate flows to quantify the risk to users of the lower river. It is suggested that the consents include requirements for warning sirens and appropriately placed warning signs. A study of how the station can impact on water levels may also be of value.

g) A detailed assessment of fish passage past the weir, is to be improved and how downstream passage, including adult eel migration from Lake Opunake to the sea can be improved.

For this assessment is considered that fish passage into the canal is not restricted, as smelt have been observed in the canal in abundance. The restriction to the upstream migration of fish is considered to be at the intake tunnels, where the water flows from the river into the canal. It is likely that flow velocities through the tunnels are the primary influence on fish passage, although during low lake levels, water will fall into the intake, which smaller fish will struggle to negotiate.

Previous survey data show that smelt and torrentfish have been recorded upstream of the weir, with torrentfish recorded more frequently, though not in abundance. In addition, the station owner/operator reports observing schools of whitebait upstream of the weir. It is unknown whether these whitebait were juvenile inanga or a climbing species such as banded kokopu or koaro.

These observations suggest that at times, under certain conditions, fish passage is possible through the intake tunnels. Observations made at the scheme found that a high lake level produces the slowest velocities through the intake tunnels and where water enters the intake tunnels, there is minimal change in water level (Photo 1). It is likely it is the high lake conditions that those smelt, torrentfish and unidentified whitebait used when they migrated to upstream of the weir.

Photo 1 The intake screen in the Waiaua River at a high lake level (left) and behind the intake screen (right)

It is therefore proposed that the operating regime is altered, so that the lake level is held high for longer, extending the window that fish have to migrate upstream. Previous operation of the scheme saw generation begin as soon as the lake level reached a certain point, resulting in a very small window of opportunity for fish to migrate upstream. Coupled with this approach, it is recommended that monitoring be undertaken, to determine whether fish are able to migrate past the weir.

If monitoring determines that the change in operating regime does not sufficiently provide passage, then physical enhancements will be installed. It is proposed that this would be through the installation of an additional ramp adjacent to the outlets of the intake tunnels (Figure 6). Further investigation would be necessary to determine the most appropriate ramp. Options to be considered would include (but not be limited to) replicating the existing fish pass ramp or the use of miradrain. This ramp would extend to a point level with the water level at the river intake. A flat culvert pipe, possibly containing baffles, would then link the top of this ramp to the intake, while still allowing for walking access in this area. A 'fish friendly floodgate' may be required to avoid flood flows entering the pipe. This is a much more expensive option, hence it is not the preferred option at this stage. The installation of improved fish passage is a capital expenditure item, so will take time to plan and budget for.

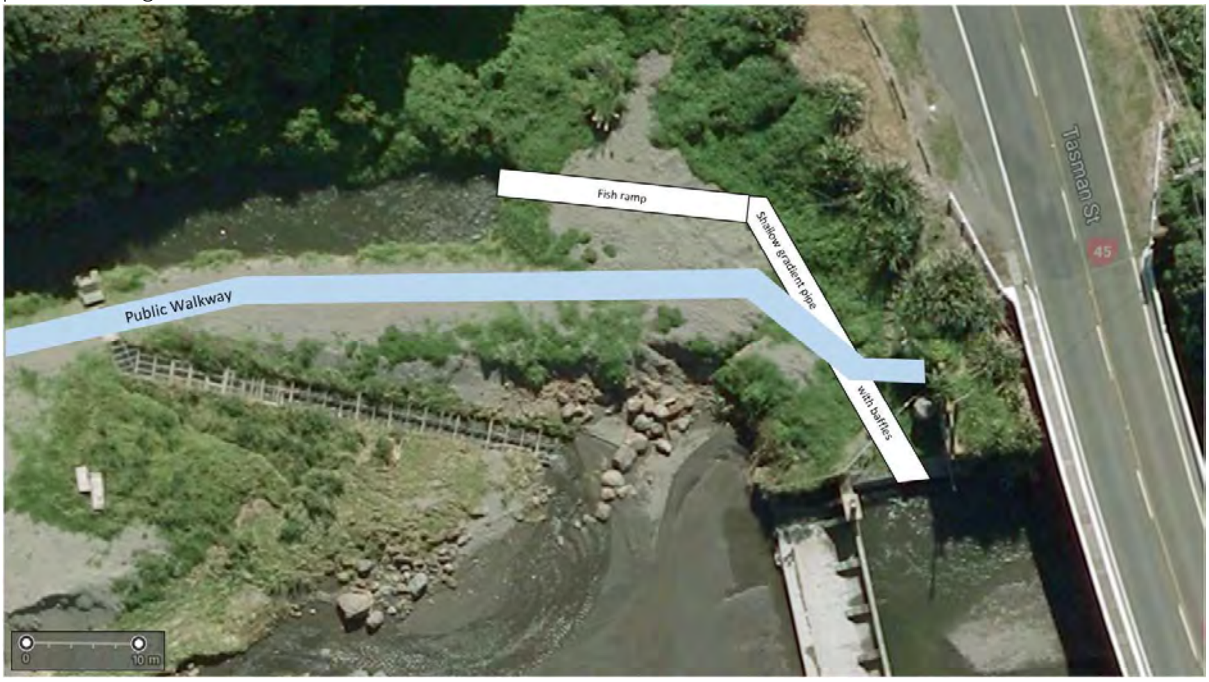

Figure 6 Potential fish passage enhancements to improve passage into the Waiaua River.

With regards to adult eel passage, there has been no evidence to suggest that adult eel congregate at the lake outlet where water is taken for generation. There have been no reported observations of adult eels congregating where water is taken for generation, neither are there reported observations of eels impinged on the intake screen or in the accumulated material from the screen cleaner. There is also no record of eels washing up on Opunake Beach, which would be expected if they have moved through the screens and were killed by the turbine.

At high lake levels, adult eel may migrate over the lake spillway and it is also possible for them to make use of the fish pass, although this would require them to swim against the current for a short distance. It is likely that if there is an issue, it will only affect those eels inhabiting the lake, as those eels that have reared upstream of the weir are likely to migrate downstream during floods, when no water should be entering the canal, bypassing Lake Opunake.

It is recommended that the scheme is monitored to determine whether adult eel is congregating where water is taken for generation. If adult eel are seen to be congregating, then a trap and transfer system can be implemented, similar to that undertaken in Lake Mangamahoe.

h) An investigation into whether gravel aggradation is occurring upstream of the weir/ and its impact on channel shape and erosion. If it is occurring how much can be attributed to the weir, and how much too natural processes?

i) An assessment of (or the potential for) erosion downstream of the weir associated with
the weir, fish pass, canal sluice or spillway.

Although no onsite assessment has been made, it is clear that that the Waiaua River is a dynamic river, with significant bedload movement during flooding. Although there have been recent to the streambed and banks immediately upstream of the weir, this is not the only area of river experiencing such changes. This is shown in FIGURE. Due to the naturally dynamic nature of the river, it is difficult to clearly conclude that the weir is impacting on the upstream channel.

The standard response during a flood is to open a gate on the weir, which encourages substrate movement past the weir. This opening of this gate, which is located on the true left side of the weir, creates a deep channel, indicating that it is moving at least some substrate. Should future monitoring determine that substrate is accumulating upstream of the weir to the point of causing an adverse impact on channel shape (including erosion of river banks), then gravel can be extracted under consent 5692-1.

2011-2012 photography

2016-2018 photography

2011-2012 photography

2016-2018 photography

j) I am aware that you have initiated consultation with the community at large. It would be useful if you also provide us with a summary of the outcomes of that consultation.

Additional Consent - discharge of water to Lake Opunake

This consent will be closely aligned with the consent to abstract water from the Waiaua River. It is already proposed that abstraction from the Waiaua River cease when the flow is at or above 3x median flow. This can be easily achieved by closing the gates following automatic notification from the upstream Regional Council recorder that a flood is on its way down the river. A comparison of the water level recorded at the upstream flow recorder and that recorded at the weir shows that there is a time of travel of approximately 1.5 hours between the two sites (Figure 7).

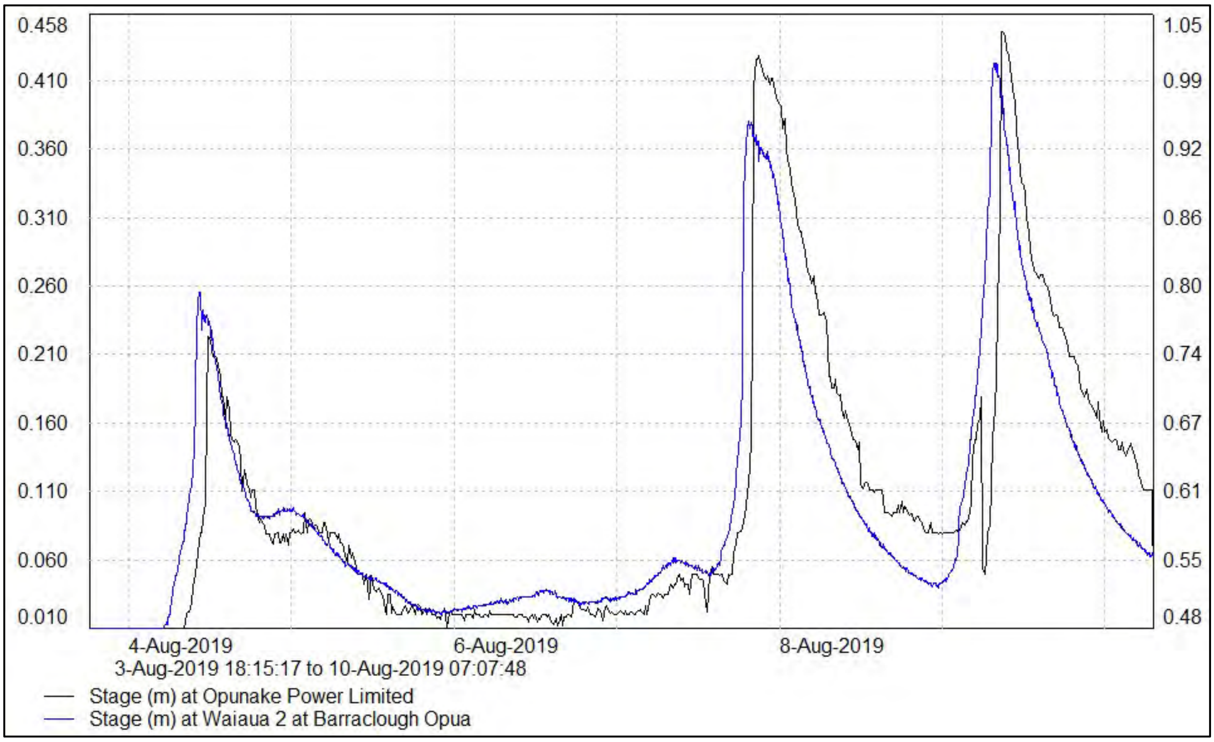

Figure 7 Waiaua River water level data recorded at the TRC monitoring site (Barraclough) and at SH45 (Opunake Power Ltd).

With regards to effects that this discharge may have on the values of Opunake Lake, it is intended to manage the abstraction so that only clean water is taken, with the principal contaminant being tannins and some sand. The impacts of tannins will be minimal, with a short-term reduction in light penetration into the lake, until the river clears and the tannins are flushed through. The impact of any sand in the discharge will be restricted to the head of the lake, where the sand will settle out. Although this may have a smothering effect, it is likely that the lake bed biology in this area has adapted to the influence of sedimentation. It is noted that the head of the lake supports numerous wading birds, including pied stilt, mallard and shovelled duck, paradise duck and Canadian geese. At times there have even been royal spoonbill and godwit observed on the delta at the head of the lake.

Other than complaints regarding discolouration of the lake, caused by the abstraction of water when the Waiaua River was in flood, there have been no complaints about the discharge of this water into the lake. It is worth noting that the discharge of river water to the lake can have a positive influence including the regulation of water temperature, and flushing of the lake, improving recreational bathing water quality. This past year when the scheme was not operating, freshwater recreational bathing water quality monitoring monitoring found that the concentration of E. coli in the lake exceeded the ‘action’ level on four of the 13 sampling occasions.