REPORT

Tonkin+Taylor

Morey Street Flood Detention Dams and Wetland

Resource Consent Application and Assessment of Environmental Effects

Prepared for
Rotorua Lakes Council
Prepared by
Tonkin & Taylor Ltd
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Schedule 4 Requirements

Schedule 4 of the RMA sets out the information required in an application for a resource consent. All relevant matters required to be included have been addressed in the assessments and descriptions in this AEE. The following table provides a summary of the information required in Schedule 4 and a quick reference to its location in this report.

Schedule 4 Item	Location within report
A description of the activity	3
A description of the site at which the activity is to occur	2
The full name and address of each owner or occupier of the site	1.3
A description of any other activities that are part of the proposal to which the application relates	3
A description of any other resource consents required for the proposal to which the application relates	4
An assessment of the activity against the matters set out in Part 2	6.1.1
An assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b). This must include: • Any relevant objectives, policies, or rules in a document • Any relevant requirements, conditions, or permissions in any rules in a document • Any other relevant requirements in a document (for example, in a national environmental standard or other regulations)	 6.1.6 - 6.1.8 6.1.6 - 6.1.8 6.1.5
An assessment of the activity's effects on the environment that includes the following information: • If it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity. • An assessment of the actual or potential effect on the environment of the activity. • If the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use. • If the activity includes the discharge of any contaminant, a description of— – The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and – Any possible alternative methods of discharge, including discharge into any other receiving environment. • A description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect.	 N/A 5 N/A N/A 5
• Identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted. • If the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved.	7 5

Schedule 4 Item	Location within report
• If the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).	N/A
An assessment of the activity's effects on the environment that addresses the following matters:	
• Any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects.	5
• Any physical effect on the locality, including any landscape and visual effects.	5
• Any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity.	5
• Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations.	5
• Any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants.	5
• Any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.	5

1 Introduction

1.1 Overview of proposed works

Rotorua Lakes Council ("RLC") has acquired Central Government funding for critical stormwater infrastructure to help to accelerate proposed housing development and mitigate existing flooding issues within Rotorua City. Part of this funding is proposed to be used for the construction of two flood detention dams ("Morey St West Dam" and "Morey St East Dam") in Ōwhata, Rotorua.

A wetland is also proposed north of the Morey St East Dam to treat stormwater from some of the future development area.

This Assessment of Effects on the Environment ("AEE") report has been prepared on behalf of RLC to support a resource consent application to authorise the construction of Morey St West Dam and Morey St East Dam and the associated damming of surface runoff to meet the following objectives:

- Detain and attenuate stormwater flows from the upstream catchment area to reduce existing downstream flooding;
- Cater for projected future increases in rainfall intensity due to climate change; and
- Attenuate increases in stormwater runoff from new development areas proposed upstream.

It has also been prepared to support the authorisation of the construction of a wetland north of the Morey St East Dam, and associated damming of stormwater. The wetland is proposed to treat stormwater from some of the future development area.

Discharges to and from the Morey St West Dam and Morey St East Dam and the wetland will be consented separately as part of the future development of the land.

This report has been prepared in fulfilment of section 88 of the Resource Management Act 1991 (RMA), and in accordance with Tonkin & Taylor Ltd's (T+T) letter of engagement dated 21 December 2021.

1.2 Background

The Eastside Community Wellness Plan has been developed to provide a framework for future development and growth within Eastside Rotorua. The proposed stormwater infrastructure (dams and wetland) facilitates the residential development proposed in this area in accordance with the Eastside Community Wellness Plan and provides mitigation for increases in stormwater runoff.

Many properties within the Kaipakau catchment downstream of the proposed dams, are prone to flooding in relatively common storm events. The watercourse, hereafter referred as the ("Kaipakau watercourse") is characterised by a modified channel (straight channel with wooden retaining in parts etc), which in flood events can overtop. In less frequent storm events, such as the 1 in 100 year event, flood modelling shows that private properties are inundated.

RLC would like to reduce the likelihood of flooding from the Kaipakau watercourse on these properties and neighbourhoods and also facilitate housing development upstream.

1.3 Applicant and property details

Table 1.1: Applicant and property details

Applicant	Rotorua Lakes Council
Owner of application site	Ngāti Whakaue Tribal Lands Incorporated
Site address / map reference (approximate)	Morey St West Dam – 5773010 (N) 1888942 (E) Morey St East Dam – 5773053 (N) 1889630 (E)
Legal description and record of title	Morey St West Dam: – Lot 2 DP 393239 (CT – 373350) Morey St East Dam: – Lot 500 DP 548246 (CT – 997351); and – Fee Simple 1/1, Part Puketawhero A2A2 Block (CT – SA16B/1093)
District Council / Plans	Rotorua Lakes Council District Plan
Regional Council / Plans	Rotorua Regional Natural Resources Plan
Address for service during consent processing	Tonkin & Taylor Limited Attention: Hayley Jones Phone: 07 577 7302 Email: hjones@tonkintaylor.co.nz
Address for service during consent implementation and invoicing	Rotorua Lakes Council Attention: Greg Manzano Phone: 07 351 8204 Email: Greg.Manzano@rotorualc.nz

We attach copies of the application forms in **Appendix A**, a copy of the relevant Record of Title in **Appendix B**.

1.4 Overview of resource consent requirements

1.4.1 Regional Natural Resources Plan

Resource consent is required from Bay of Plenty Regional Council under the following provisions of the Regional Natural Resources Plan;

- Rule LM R3 – Earthworks within an ephemeral watercourse[1] exceeding 500 m^3 (restricted discretionary activity);
- Rule LM R4 – Earthworks on land exceeding 5,000 m^3 (discretionary activity);
- Rule WQ R17 – The damming of surface runoff for the dams and wetland where greater than 5,000 m^3 of surface water runoff is impounded and the dam spillway invert exceeds 2.5 m in height (restricted discretionary activity).

Overall, resource consent is required from Bay of Plenty Regional Council under the Regional Natural Resources Plan as a discretionary activity.

[1] For Morey St West Dam.

1.4.2 Rotorua District Plan

Resource consent is required from Rotorua Lakes Council under the following provisions of the Rotorua District Plan;

- Rule EW-R1.2 – Earthworks exceeding 100 m^3 in a Residential Zone (restricted discretionary activity);
- Rule WHDA-R7 – Stormwater Management reserves, facilities and overland flowpaths within Wharenui Road Development Area (restricted discretionary activity);
- Rule NR2 – Construction noise which may exceed construction noise levels stated in NZS 6803:1999 at some properties (restricted discretionary activity).

Overall, resource consent is required from Rotorua Lakes Council under the Rotorua District Plan as a restricted discretionary activity.

1.5 Consent duration

Regional resource consent is sought for a duration of 35 years for the damming of the surface water runoff, and 5 years for the earthworks.

The district council consents will have an indefinite term.

2 Environmental setting

2.1 Site location

The site is located to the south of Morey Street, Ōwhata, Rotorua.

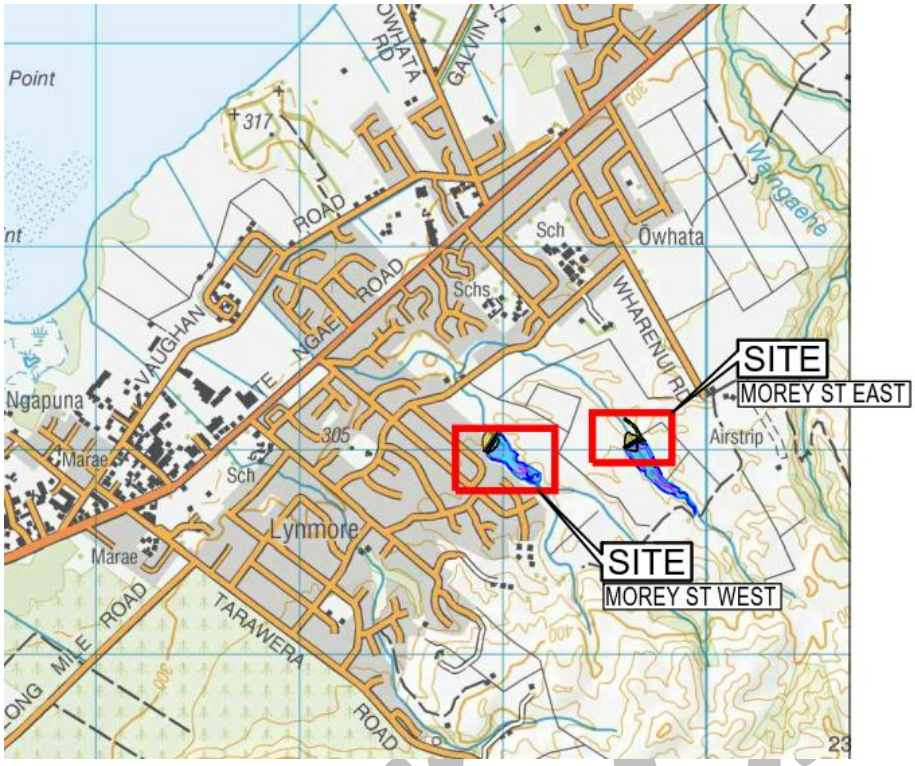

Figure 2.1: Site plan

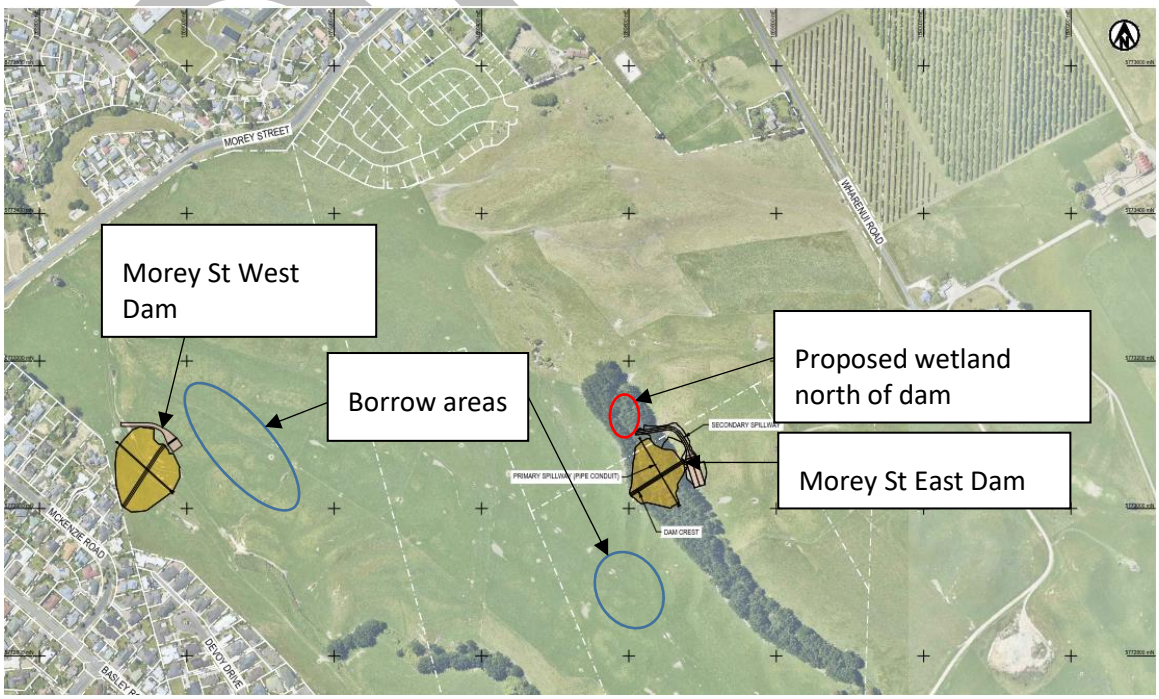

Figure 2.2: Location plan (Note: trees showing in location of Morey St East Dam are no longer present)

2.2 Site description

There are three gullies located within the site. The Morey St West Dam is proposed near the bottom of the western gully, and the Morey St East Dam and wetland is proposed within the eastern gully.

There are no permanent streams on site. The proposal involves the damming of the gully and surface runoff only. Morey St West contains an ephemeral watercourse, and Morey St East lacks a watercourse.

The sites largely comprise grazed farmland and exotic vegetation within the gullies.

There are no recorded archaeological sites on, or within proximity to the site.

3 Description of proposed works

3.1 Proposed works – dams

The works involve the construction of two earth fill embankment dams to provide for stormwater detention. Drawings of the Morey St West Dam and Morey St East Dam are attached at **Appendix C** and design reports attached at **Appendix D**. Both dams will be empty most of the time and remain as a grassed valley (except in significant rain events when stormwater will begin to pond behind the dams and slowly drain through the primary spillway). This design is in accordance with the Wharenui Road Area Stormwater Management Reserve Criteria within the Rotorua District Plan. The Criteria stipulates that dams shall be designed to only retain peak stormwater flows during rainfall events and shall be dry when not in use. The locations of the dams are also in general accordance with the indicative 'online attenuation areas' shown within the Wharenui Road Area Development Plan under the Rotorua District Plan.

The Morey St West Dam embankment comprises a gently sloping 4(H):1(v) slope with an approximate crest level of 317.9 m RL. The crest is approximately 10 m above existing ground level at the base of the gully. The primary spillway comprises a pipe culvert under the dam with an upstream drop manhole inlet (scruffy dome) and will convey low flows. Flood flows greater than the 100 year Annual Recurrence Interval (ARI) (with climate change allowances) will be conveyed through the auxiliary spillway which will comprise a concrete lined channel.

The Morey St East Dam embankment comprises a gently sloping 3(H):1(V) slope with an approximate crest level of 335 m RL. The crest is approximately 15.5 m above existing ground level at the base of the gully. The primary spillway comprises a pipe culvert under the dam with an upstream drop manhole inlet (scruffy dome) and will convey low flows. Flood flows greater than the 100 year ARI (with climate change allowances) will be conveyed through the auxiliary spillway.

Near the bottom of the auxiliary spillway of both dams, concrete baffle blocks will be constructed to dissipate flows. A rip rap lined channel will also be positioned at the base of the primary and auxiliary spillway outlets to mitigate erosion and scour.

The material used to construct the dams will be predominantly locally sourced volcanic ash soils and pumiceous sand gravel materials from the adjacent Wharenui Rise Development hereafter referred to as the "borrow areas".

The design construction methodology is subject to refinement during the detailed design stage and will be confirmed by the contractor undertaking the works. Nonetheless the construction works are likely to include the following for each dam:

- Construct initial temporary work low flow flood diversion bypass (e.g. low flow channel or small bund and pump system) when the gully is dry.
- Divert stormwater pipes and wastewater line near Morey St West Dam footprint (unless otherwise undertaken by RLC prior to construction). Install construction service protection or bypass measures for wastewater line.
- Install erosion and sediment controls e.g decanting earth bunds, silt fences, contour drains etc – See Construction Management Plan attached at **Appendix E**.
- Excavate trench and install primary spillway culvert under dam foundation.
- Construct coffer dam bunds for diversion of 'clean' stormwater flows through the primary spillway culvert during the works and containment of sediment laden stormwater within the works site. For the works to be undertaken on the upstream face of the embankment, stormwater contained by the coffer dams will flow into the decanting earth bunds. Treated

stormwater which has been through the decanting earth bunds will also be discharged through the primary spillway culvert.

- Cut to waste auxiliary spillway channel to foundation level.
- Construct auxiliary spillway reinforced concrete weir, channel/chute and energy dissipation basin.
- Strip dam foundation area to founding level.
- Open fill borrow area including formation of access tracks. Excavate borrow material and use as fill to construct the dam embankment. Import and place drainage gravel blanket under downstream shoulder in gully base, horizontal and vertical filters, and chimney drain.
- The dam earth fill materials will be placed in no greater than 300 mm thick layers prior to compaction, then rolled with a sheepsfoot roller for the core, and otherwise a static smooth drum roller for the shoulder fill, filters and drainage.
- Place stockpiled and/or imported topsoil on the dam faces and hydroseed with grass.
- Commission dam.

3.2 Proposed works - wetland

The proposed works also involve the construction of a wetland north of the Morey St East Dam. The wetland will receive stormwater from some of the future development area (stages 4 and 5) via a manhole splitter. The wetland will receive first flush stormwater (water quality flows), and stormwater following first flush will be directed to the Morey St East Dam. The wetland has been designed to provide two key stormwater management objectives for future stages of the Wharenui Rise residential development (Stages 4 and 5);

- Water quality treatment; and
- Extended detention of the 90th percentile storm for 24 hours.

Drawings of the proposed wetland are attached at **Appendix C** and the design report is attached at **Appendix D.** As above, the construction methodology will be confirmed by the contractor undertaking the works, but the indicative methodology is outlined below:

- Construct initial temporary low flow flood diversion bypass (e.g. low flow channel or small bund) when gully is dry and construct contour drains for diversion of clean water from upstream areas.
- Realign overland flow path to a formed channel downstream of Morey St East Dam. Stabilise the channel with grass.
- Construct decanting earth bund with outlet to downstream channel to provide for construction of the western and northern wetland embankments.
- Construct channels to divert sediment laden stormwater from the works area to the decanting earth bund.
- Decommission temporary low flow flood diversion bypass.
- Excavate and construct the internal and eastern embankment of the proposed wetland. Hydroseed banks of wetland and plant wetland as per design (note wetland planting is likely to occur during the next planting season).

3.3 Earthworks

The approximate earthworks volumes for the flood detention dams and wetland are outlined in Table 3.1 below:

Table 3.1: Approximate earthworks volumes

Dam	Cut from borrow to dam fill	Cut to waste (e.g. foundation and spillway cuts) to be disposed of onsite
Morey St West Dam	27,500 m^3	4,000 m^3
Morey St East Dam	39,200 m^3	12,000 m^3
Morey St Wetland	3,200 m^3 (Assumes all imported fill)	6,400 m^3

The dam core and shoulder materials for the flood detention dams will be obtained from the borrow areas located along the existing spurs in the adjacent Wharenui Development as shown on the Drawings attached at **Appendix C**. The borrow cut will be undertaken prior to the Wharenui Development earthworks.

The borrow areas will be opened progressively to limit the exposed area of ash soils prior to cut to fill. The overburden materials above this layer (i.e. topsoil, unsuitable sand materials) will be stockpiled for reuse or placed in the designated unsuitable fill areas.

The preliminary design site investigations have identified suitable shoulder fill material (gravel sand mixtures) below the ash soil layer. This material would be excavated and compacted in the dam in parallel with excavation and compaction of the ash soils that form the dam core. This shoulder material can be stockpiled if needed for construction.

Unsuitable materials (e.g. in the dam foundation and primary and auxiliary spillway cuts) will be disposed of on-site (location to be confirmed with NWTL).

The sand filter, drainage gravel and rip rap rock materials would be imported from off-site as no suitable on-site materials have been identified. Structural concrete will also be sourced from off-site (i.e. from a certified concrete plant).

The fill material for the construction of the wetland embankments, wetland liner and metal for the accessways may be imported from off-site.

3.4 Site access

3.4.1 Morey St West Dam

The site will be accessed from Morey Street, opposite No. 24 Morey Street.

During peak periods, for truck access, Wharenui Road (to Porikapa Road and Morey Street) should be used to travel to the site entrance on Morey Street.

During off-peak periods, for truck access, Basley Road and Morey Street should be used to travel to the site entrance on Morey Street.

For site staff vehicles, Basley Road and Morey Street should be used at all times.

3.4.2 Morey St East Dam and Wetland

The site will be accessed from Morey Street, further east than the Morey St West Dam access, opposite No. 58 Morey Street.

A second access track may be off Wharenui Road through an existing track running along the property at No. 135 Morey Street.

During peak periods, for truck access, Wharenui Road (to Porikapa Road and Morey Street) should be used to travel to the site entrance on Morey Street.

During off-peak periods, for truck access, Wharenui Road (to Porikapa Road and Morey Street) should be used to travel to the site entrances on Morey Street and Wharenui Road.

For site staff vehicles, Wharenui Road should be used at all times.

3.5 Maintenance access

Pedestrian access is proposed along the dam crests (likely grassed accessway), and maintenance access will also be available to the dams (refer to design reports attached at **Appendix D** for safety considerations in dam designs).

Access to the wetland will be via a 4 m wide metalled access track that runs around the western and northern sides of the wetland. On the eastern side of the wetland the metalled access track will be 1.2 m wide to provide for pedestrian access only. For better access to forebay and body of the wetland for maintenance, the maintenance track will ramp down at 1V:12H into the wetland.

3.6 Construction Management

A Construction Management Plan has been prepared for the construction works and is appended at **Appendix E**.

The construction methodology includes consideration of reducing the potential for sediment laden stormwater runoff (erosion and sediment controls) and also measures to manage flood risk.

Temporary de-watering is not anticipated during foundation preparation works based on the ground water levels identified during the site investigations. Some temporary de-watering of the borrow area following a storm could occur (if water has not soaked away).

4 Resource consent requirements

The requirements for resource consents are determined by the rules in the Rotorua District Plan and Regional Natural Resources Plan. The rules which apply are determined by the zoning of the site, any identified notations in the plan and the nature of the activities proposed.

Morey St West Dam and borrow area is identified on District Plan Map 339 as being located within the Residential 1 zone, and the majority of the Morey St East Dam and borrow area is identified as being located within the Residential 2 zone. The wetland and a small portion of the Morey St East Dam is located within the Residential 1 zone.

4.1 Regional Natural Resources Plan

Table 4.1: Resource consents required

Proposed activity	Rule reference / description	Activity status
Earthworks for the construction of Morey St East Dam and wetland	Rule LM R4 – The disturbance of land and soil as a result of earthworks where the activity is not a permitted, controlled or restricted discretionary activity under a rule in the regional plan. The earthworks exceed the maximum volume and area requirements permitted under Rule LM R1[2].	Discretionary
Earthworks within an ephemeral flowpath for Morey St West Dam	Rule LM R3 – Earthworks exceeding 500 m^3 within an ephemeral flowpath.	Restricted Discretionary
Damming of water and associated dam structures for the flood detention dams and wetland	Rule WQ R17 – Damming of surface water runoff where greater than 5,000 m^3 of water is impounded.	Restricted Discretionary

Overall, resource consent is required from Bay of Plenty Regional Council under the Regional Natural Resources Plan as a discretionary activity.

[2] Slope 0 to 15^O – Exposed area no greater than 1 hectare and volume no greater than 5,000 m^3;
>15 to 25^O – Exposed area no greater than 5,000 m^2 and volume no greater than 5,000 m^3.
>25 to 35^O – Exposed area no greater than 500 m^2 and volume no greater than 500 m^3.

4.2 Rotorua District Plan

Table 4.2: Resource consents required

Proposed activity	Rule reference / description	Activity status
Earthworks for the construction of the dams and wetland	Rule EW-R1.2 - Earthworks exceeding 100 m^3 in a Residential Zone.	Restricted Discretionary
Flood detention dams and wetland	Rule WHDA-R7 - Stormwater Management reserves, facilities and overland flowpaths within Wharenui Road Development Area (restricted discretionary activity).	Restricted Discretionary
Construction works for Morey St West Dam	Rule NR2 – Construction noise which may exceed construction noise levels stated in NZS 6803:1999 at some properties.	Restricted Discretionary

Overall, resource consent is required from Rotorua Lakes Council under the Rotorua District Plan as a restricted discretionary activity.

5 Assessment of effects on the environment

5.1 Introduction

The following assessment identifies and assesses the types of effects that may arise from the proposed works. This assessment also outlines the measures that the applicant proposes to avoid, remedy or mitigate any potential adverse effects on the environment.

Actual and potential effects on the environment have been identified as:

- Positive effects;
- Flooding effects;
- Erosion effects;
- Ecological effects;
- Water quality effects;
- Natural character and visual effects;
- Traffic effects;
- Amenity effects;
- Dam safety effects; and
- Cultural effects.

The existing environment does not comprise development upstream that will be subject to a separate resource consent application. The effects of the development and stormwater discharge will be assessed and consented as part of that application. However, given one of the three objectives of the dams is to mitigate increases in stormwater caused by upstream development, we have considered maximum probable development on Ngati Whakaue Tribal Lands' (NWTL) land within the effects assessment below.

5.2 Positive effects

The proposed dams have the following objectives; facilitate urban development upstream i.e. mitigate increases in stormwater runoff from new development, provide some attenuation for projected increases in climate change, and help to reduce existing downstream flooding.

Rotorua currently has a shortage of homes, with the shortfall projected to increase to 3,630 homes by 2050 (RNZ, 2022). The funding acquired from Central Government will facilitate the construction of the proposed flood detention dams to enable housing to be developed upstream, including a mix of affordable housing. The dams will also help to mitigate existing flooding issues within the Kaipakau catchment downstream and help to mitigate effects from future projected increases in rainfall due to climate change.

Figure XX appended at **Appendix F** shows the maximum probable development upstream with and without the dams with climate change allowances. With no dams in place there would be a significant increase in flooding downstream due to development upstream, which would be exacerbated by future projected increases in rainfall due to climate change. This scenario demonstrates the need for the attenuation dams in order to facilitate residential development upstream.

The proposed wetland will provide extended detention of stormwater during storm events and treat stormwater from urban runoff from future development areas, thereby improving stormwater quality.

5.3 Flooding effects

TBC.

5.4 Erosion effects

Given the dams will attenuate peak outflows, the potential for large floods to erode stream banks downstream will generally be reduced. Flow velocities in downstream reaches will generally be reduced pre and post development with the dams in place in the 100 year ARI event. The modelled velocity results for pre and post development suggest that some downstream sections of the stormwater channel will experience an increase in velocities for the smaller events (e.g. the 2 and 10 year ARI without climate change allowances), particularly immediately downstream (i.e. within about 20 m of the toe of the dam). This increase is due to the concentration of flows through the primary spillway. Energy dissipation structures will be placed downstream of the primary and auxiliary spillway to mitigate any erosion and scour effects directly downstream.

There are also some changes in velocities within further downstream reaches of the Kaipakau watercourse pre and post development in the smaller events, however the level of effect on streambanks and streambeds attributed to this change in hydraulic regime is expected to be low. Given the Kaipakau watercourse has existing high bed and bank erosion susceptibility scores, further investigations outside of this resource consent application will be undertaken (i.e. as part of the future conveyance upgrade work downstream for the development in those downstream areas) to improve existing issues.

Given the above any downstream erosion effects are considered to be at most minor.

5.5 Ecological effects

An ecological assessment has been prepared by T+T and is appended at **Appendix G**.

The ecological assessment concludes that the sites for both flood detention dams and the wetland lack intermittent/permanent flowing watercourses. The Morey St West Dam footprint is located within an ephemeral flowpath and the Morey St East Dam footprint and wetland is located within a gully with no visible stream channel. Therefore, the construction of the dams and wetland will not result in a direct change to any permanently flowing watercourse onsite and associated aquatic habitat. Any potential ecological effects on freshwater values would therefore predominately occur in the Kaipakau watercourse downstream from Te Ngae Road due to changes in flood flows. The Kaipakau watercourse is described as being highly modified and having low to moderate ecological value.

The ecological assessment concludes that the terrestrial values of Morey St West Dam, Morey St East Dam and constructed wetland sites are considered low. Most vegetation within the project footprints comprises low value, grazed, exotic grasses.

Actual and potential ecological effects arising from the proposed construction and operation of the dams and constructed wetland are summarised as:

- Effects on downstream water quality due to construction related discharges;
- Vegetation clearance and earthworks during or following dam and wetland construction, totalling approximately 22,000 m^2 resulting in:
    - Removal of up to 7,500 m^2 of exotic dominated grassland and exotic dominated habitats at Morey St wetland (note grass will be re-established on the earth embankments, therefore some of this grassland will be reinstated);

- Removal of up to 6,500 m^2 of exotic dominated grassland and exotic dominated habitats at Morey St East Dam (note grass will be re-established on the earth embankments, therefore the removal of grassland will be temporary);
- Removal of up to 8,000 m^2 of exotic dominated grassland and exotic dominated habitats at Morey St West Dam (note grass will be re-established on the earth embankments, therefore the removal of grassland will be temporary);
- Construction and operations related noise, vibrations, dust, or lighting effects.

- Potential long-term ongoing adverse effects associated with the flood detention dams will include:
  - Effects on stream ecology through changes to stream flows during heavy rain / flood events where the peak flood flows will be reduced, but the length of time of the high flows will increase. The longer stormwater flow periods in these events may affect bank and bed erosion although it is not clear whether this will increase or decrease erosion.
  - Effects on terrestrial ecology through changes to hydrology (intermittent ponding during and following very heavy rainfall leading to the modification of up to 3,800 m^2 of potential skink habitat at Morey St West Dam).

The assessment outlines that the activities associated with the stormwater upgrades will likely result in a **low** or **very low** overall level of effect provided specific avoidance, remediation or mitigation measures are undertaken (outlined within the ecological assessment and summarised in Table 5.1 below).

Table 5.1: Level of effects associated with the proposed flood detention dams, and measures to avoid, remedy or mitigate for effects have been undertaken

Potential effect	Ecological value and justification	Summary of measures to avoid remedy and mitigate	Magnitude of effects category following completion of works, with avoidance, remedy and mitigation actions	Overall level of residual ecological effects
Reduction in the water quality downstream due to a potential discharge of sediment during construction works.	**Low to Moderate:** Stream has been modified for most of its length and has sedimentation issues.	Effects mitigated through the implementation of erosion and sediment controls (outlined within construction management plan).	**Low**	**Low to Very low**
Disruption to the nesting and foraging activity of native fauna due to temporary noise, dust, vibration and lighting effects.	**Low**- terrestrial habitat within the vicinity of the proposed dam footprint is considered low value skink habitat or unsuitable for lizards, birds and bats.	Effects mitigated through the implementation of a Construction Management Plan and Construction Noise and Vibration Management Plan.	**Low**	**Very low**
Injury and mortality of indigenous skinks due to ponding behind the western dam during large rainfall events.	**Low** – skinks may be utilising overgrown habitat at the site.	TBC.	**Low**	**Very low**
Injury and mortality of indigenous fish and disturbance of habitat as a result of changes to flow volumes and duration.	**Low -** stream has been highly modified, and habitat only exists in the permanently flowing sections of the stream downstream of Te Ngae Rd.	Peak flow volumes expected to decrease with the operation of the dams.	**Low**	**Low**
Loss of wetland extent (downstream near Lake) and function as a result of changes in hydrology. Note - There are no wetlands on site.	**Moderate** - dominated by exotic species and heavily modified by grazing and draining activities.	No effect expected as a result of the operation of the dams.	**Negligible**	**Very low**

Potential effect	Ecological value and justification	Summary of measures to avoid remedy and mitigate	Magnitude of effects category following completion of works, with avoidance, remedy and mitigation actions	Overall level of residual ecological effects
Decrease in stream stability as a result of changes in the hydraulic regime.	**N/A**	Further investigations required outside of consenting process to address existing erosion susceptibility.	**N/A**	**N/A**

Given the mitigation proposed above, any ecological effects are considered to be less than minor from the proposed dams and wetland.

5.6 Water quality effects

During the earthworks, there is the potential for sediment laden stormwater to run off down the gully, through the culverts under Morey Street and into the Kaipakau watercourse catchment. Pre-mixed concrete is also required to be poured to create the auxiliary spillway, and without careful containment, cement particles may be entrained in stormwater runoff and enter the Kaipakau watercourse catchment. It is noted that the Kaipakau watercourse is not a permanently flowing stream until downstream of Te Ngae Road. Upstream of Te Ngae Road, including the section of the stream downstream of the Morey Street culverts, is a formed stormwater channel. The erosion and sediment controls outlined within the Construction Management Plan appended at **Appendix E** will be implemented to reduce any potential water quality effects downstream.

For the construction of the dams these include:

- Installing coffer dams as part of dam embankment to divert clean stormwater through the primary spillway, and contain sediment laden stormwater within works area;
- Contour drains for clean water bypass around the dam embankment;
- Installation of silt fence downstream of auxiliary spillway construction;
- Installation of decanting earth bunds within works site/bunded works area to capture sediment laden stormwater, and allow suspended sediments to settle prior to discharging;
- Installation of silt fences, contour drains and decanting earth bunds within the borrow areas; and
- Containment measures (i.e. physical barriers such as boxing) will be undertaken to prevent cement particles leaving the site. Spill prevention measures will also be outlined within the contractors updated Construction Management Plan that will be submitted to council for certification prior to the commencement of works. All cement captured as residue and any cement by-products will be disposed of appropriately following the works.

For the construction of the wetland, the erosion and sediment controls include:

- Construct initial temporary low flow flood diversion bypass (e.g. low flow channel or small bund) when gully bed is dry;
- Installation of decanting earth bund to capture sediment laden stormwater from the construction of the wetland north and west embankment, and allow suspended sediments to settle;
- Construct channels to divert sediment laden stormwater from works area to decanting earth bund; and
- Contour drains for clean water bypass around wetland construction area.

Following construction, the wetland will have positive effects on water quality downstream.

Given the works are set well back from any permanently flowing watercourse, and the erosion and sediment controls outlined within the Construction Management Plan at **Appendix E** and summarised above, any adverse water quality effects on Kaipakau watercourse are considered to be less than minor.

5.7 Natural character and visual effects

The wetland is being co-designed by T+T, tangata whenua and RLC to provide water quality improvements and enhance the character of the environment. The existing environment comprises

grazed grassland. The amenity of the area will be improved following the planting of native wetland vegetation, therefore any adverse visual and natural character effects associated with the wetland are considered to be less than minor.

The proposed flood detention dams will result in a change of view from a grassed valley, to a large grassed embankment across a valley. The embankments will be linear, gently sloping and grassed. The dams have been designed to join into the contours of the existing ridgelines, however given the dams are required to be designed to a high standard for attenuation and dam safety, they are not able to be undulating like the surrounding hill landforms.

The Morey St East Dam is located well away from existing residential land use and the crest of the dam is set back approximately 700 m from Morey Street. Given the above, and the landscape plan that will be prepared and submitted to council for approval for the dam prior to works commencing (detailed further below) any visual and landscape effects of the Morey St East Dam, are considered to be minor.

Given the proximity of the Morey St West dam to existing residential land use, Boffa Miskell has been engaged to prepare a landscape and visual effects assessment for the dam which is attached at **Appendix H.**

In summary, the landscape and visual effects assessment concludes:

- The proposed physical changes to the landscape are considered to contrast with the existing gully system and undulating hill landforms on-site. Based on the proposed dam being relatively contained within the immediate landscape setting and of a similar grassy land cover, the site has an ability to absorb a 'grassy hill' outcome. It is primarily the infrastructure associated with the dam that will detract from the landscape pattern. The auxiliary spillway will contrast the existing grain and pattern of the existing gully system and represent a permanent hard urban outcome which detracts from existing open space setting within a future residential community. The proposal is considered to have a **moderate-low** adverse effect on physical landscape and its character attributes with targeted mitigation planting (indicative locations visually shown in *Morey St West Dam LVA, Rotorua, Proposed Mitigation Plan, Figure 6* of the landscape assessment).
- The visual catchment is very limited to the immediate residential dwellings that border the proposed dam location due to the surrounding undulating landscape and change in elevation across the site. Visibility of the site along a 75 m long stretch of Morey Street is also available for pedestrians and road users.
    - Based on the viewing distance from Morey Street, the transient nature of the viewing audience and proposed infrastructure associated with the dam, the adverse visual effects anticipated from Morey Street are considered to be low with mitigation planting.
    - From private locations, the adverse visual effects range from low to high during the construction phase and reduce to very low to moderate-high following commission of the dam with mitigation planting.
- The private landowners where adverse visual effects have been assessed as **moderate-low** to **moderate-high** (i.e. the adverse effects are minor or more than minor) following the commissioning of the dam and prior to mitigation planting are identified as 34C McKenzie Road, 34 McKenzie Road, 34A McKenzie Road, 25 Hayward Rise, 23 Hayward Rise and 29 Devoy Drive. These landowners are being engaged with to discuss the proposal, see section 7.2.
- To improve the visual impact of both dams, mitigation planting will be undertaken and a landscape plan prepared for each dam and submitted to council for approval prior to the

works commencing. These landscape plans will be prepared in collaboration with RLC, NWTL, Eastside Hapu and the nearby landowners. The Morey St West Dam landscape plan will include mitigation planting within the indicative areas shown on *Morey St West Dam LVA, Rotorua, Proposed Mitigation Plan, Figure 6* of the landscape assessment, or within areas that achieve a similar outcome. The areas where targeted mitigation planting could be undertaken, as outlined within the landscape assessment are summarised below:

- **Morey Street boundary**: Along the 75 m long stretch of Morey Street, where open views of the infrastructure associated with the dam will be visible, a variety of native shrubs and trees could be planted within the road reserve (that borders the site) to filter and contain visibility of the dam and its infrastructure.
- **Amenity Buffer Planting** (adjacent to residential dwellings and proposed auxiliary spillway) During the engagement and consultation phase with the adjoining residential properties, mitigation boundary planting should be discussed. A mix of native shrubs and trees could achieve filtered screening of the proposed dam and spillway structure depending on the orientation of the house, slope of the landform that planting is proposed and proximity to the dam itself.
- **Riparian Planting** (near the proposed dam outlet and spillway) Native riparian type planting should be implemented near the dam outlet and bottom of the spillway where it is practicable. This planting would soften and reduce the boldness of some of the hard lines and edges of the concrete structures within the landscape. Such planting could be adapted to allow the dam and the concrete spillway to be integrated into the wider landscape.

The landscape plans shall meet the general urban design expectations for the Wharenui Road area. The design will include consideration of the following design criteria within the Rotorua District Plan:

- Gully wall planting should use fast-growing shrubs or small trees e.g. kohuhu (Pittosporum tenuifolium), manuka, kanuka, phormium cookianum, karamu, koromiko, ti kouka (cabbage tree), whauwhaupaku, and makomako, that will rapidly create a closed canopy with lesser amounts of kōwhai and ribbonwood;
- Lower growing species should be planted near the base of the gully walls e.g. toetoe, whatariki, and harakeke, so that the gully floor is not shaded. Where there are existing populations of indigenous ferns, these should be left undisturbed during site preparation, if possible. On very steep/vertical slopes, species which only grow to a maximum of 3-4 metres will be planted, e.g. cookianum, coprosma lucida, hebe stricta, cortaderia fulvida, and kiokio;
- Planting at the interface between the gullies and adjoining areas shall take into account opportunities for reducing undesirable activity. For example, the interface between residential properties and the gully system may be planted with prickly or very dense species to prevent or deter unsolicited entry into residential properties from the revegetated areas.

Given the above, any landscape and visual effects (other than on those landowners identified above) of the Morey St West Dam are considered to be minor.

5.8 Traffic effects

A Traffic Impact Assessment has been prepared for the construction of the dams and wetland and has been attached at **Appendix I.** The Traffic Assessment takes into account that the majority of traffic movements will be internal i.e. the cut to fill will be from material on-site and only addresses the impact of vehicles on the surrounding road network. In summary, the traffic impact assessment concludes:

- The traffic generated is relatively low in comparison with current demands and it is considered that its overall impact on the safety and efficiency of the local road network will be minimal with the mitigation measures proposed;
- Mitigations measures/ transport recommendations include but are not limited to:
  - Using the vehicle accesses outlined in section 3.4 of this report which separates the works into peak and off-peak period accesses.
  - Consider planning truck trips to occur outside of school and kindergarten pick up and drop off times.
  - Sight distance from the Morey Street (opposite No. 58 Morey Street) site access to be improved. Consider removing obstructing tree and high shrub, lowering the speed limit and/or moving the entrance west.
  - A Construction Traffic Management Plan (CTMP) shall be prepared by the contractor and submitted to RLC and Waka Kotahi for certification prior to construction, and shall be implemented by the contractor during the works.
  - Community engagement shall occur before commencing and throughout construction activities.
  - Trucks shall be directly routed to SH30 where practicable to minimise heavy commercial vehicle exposure on the local road network and residential areas.
  - All construction staff should park within the site.

Given the additional traffic volumes are within the capacity of the surrounding roads, and the mitigation measures proposed, any adverse traffic effects are considered to be less than minor.

5.9 Amenity effects

During the construction period, there is the potential for noise and dust effects that are inherent with construction based activities.

Contractors will be using earthmoving equipment during the works such as excavators, scrapers and compaction rollers. This equipment will likely generate noise and vibrations that neighbouring residents may hear when in and around their homes, depending on the location of the works at any given period.

There are no sensitive receivers within the 100 m radius of the Morey St East Dam and wetland construction areas.

As outlined within the noise assessment attached at **Appendix J** the dwellings at 23 Hayward Rise, 25 Hayward Rise, 34C McKenzie Road, and 34 McKenzie Road are closest to the works for Morey St West Dam and therefore are the most sensitive receptors. Predictions indicate worst-case noise levels at these properties may exceed the long term construction NZS6803:1999 'Acoustics Construction Noise' noise limit of 70 dB L_{Aeq}. Predicted vibration levels indicate that construction vibration is not likely to exceed DIN 4150-3 limits for residential cosmetic building damage at all receivers.

To mitigate potential noise and vibration effects for the construction of the Morey St West Dam, the contractor undertaking the works will adhere to an approved Construction Noise Vibration Management Plan (CNVMP). A draft CNVMP has been prepared for the Morey St West Dam and attached **Appendix J.** This plan outlines requirements to manage construction noise and vibrations for the Morey St West Dam, including but not limited to:

- Works only taking place between 7:30 am and 6:00 pm, Monday to Friday, and 7:30 am and 1:00 pm Saturday, and outside of public holidays;

- General management measures to avoid unnecessary noise (e.g. avoid use of horns, loud site radios, rough handling of material and equipment, dropping of heavy equipment, and avoid multiple machinery operating in one location nearest to receivers);
- Using acoustic screening, where practicable, to help reduce noise levels;
- Monitoring noise and vibration levels as appropriate;
- Ongoing communication to keep residents informed; and
- Contact person always available should residents have any concerns or queries during the works.

As outlined within the Construction Management Plan dust nuisance will be managed in accordance with the Bay of Plenty Regional Council Erosion and Sediment Control Guidelines. These measures will include the following as a minimum:

- Controlling the speed of vehicles moving on-site;
- Completed areas shall be stabilised as soon as possible to control dust;
- Site entrance metalled to 20 m from the road edge;
- Restricting the total exposed area;
- An adequate supply of water for dust control, and an effective means for applying that water, shall be available on-site at all times during the construction and until such time as the site is fully stabilised. Given the earthworks area is roughly 5.25 ha in total, approximately 263 m^3 will be required per day (5 mm per m^2 per day) if there was no progressive stabilisation of the works. Given that the staging of the works has not yet been determined, it is appropriate to provide the details of the dust control water supply once the contractor has been appointed. Therefore, we have proposed a consent condition requiring details of the dust suppression water supply to be forwarded to BOPRC prior to commencement of the works.

The landowners at 17 Hayward Rise, 23 Hayward Rise, 25 Hayward Rise, 34 McKenzie Road, 34A McKenzie Road, 34C McKenzie Road, and 29 Devoy Drive within proximity to the Morey St West Dam are being engaged regarding construction and visual effects. The outcomes of this engagement to date are summarised within section 7 and attached at **Appendix M**. Given the mitigation and management measures outlined within the CNVMP and CMP any amenity effects on any other party/person (i.e. excluding 17 Hayward Rise, 23 Hayward Rise, 25 Hayward Rise, 34 McKenzie Road, 34A McKenzie Road, 34C McKenzie Road, and 29 Devoy Drive) are considered to be less than minor.

5.10 Dam safety effects

A Potential Impact Classification (PIC) assessment is contained in **Appendix K.** The assessment involved hydraulic modelling of a hypothetical dam break scenario and concluded that the most appropriate PIC for the proposed Morey St West Dam was high, and Morey St East Dam was medium. It is noted that a dam's PIC is purely a function of the consequences of a hypothetical failure breach, it has no correlation with the probability of the dam failing or experiencing a dam safety incident.

Given the high PIC for the Morey St West Dam, and medium PIC for the Morey St East Dam the design for the dams and ongoing management is to the highest standards with the likelihood of a dam break scenario occurring being negligible.

As the two dams meet the Building Act definition of a Large Dam, building consents will be required for each dam. The building consent process for dams in the Bay of Plenty Region is administered by Waikato Regional Council in their role as Building Consent Authority (BCA) for dams. The building consent process will require independent peer review of the dam designs, and a compliance review by the BCA. These reviews will check that the dams have been designed in accordance with the

NZSOLD Dam Safety Guidelines and other applicable industry standards and practice. Close supervision of the dam construction by a Chartered Professional Engineer with appropriate dam engineering experience, and a detailed construction report to demonstrate that the dam has been built in accordance with the design and specifications will be required in order to achieve a code of compliance certificate to close out the building consent.

It is further proposed that a Construction Quality Plan shall be prepared and submitted to Bay of Plenty Regional Council for approval prior to construction commencing which, as a minimum, details:

- The process for dealing with design adjustments;
- Key construction quality performance metrics, and processes for dealing with performance deviations;
- Periodic review of the construction quality plan.

This plan will enable the dams to be constructed in accordance with the design and specifications.

The NZSOLD Dam Safety Guidelines 2015 also recommend the appropriate level of ongoing dam safety management for each dam. Maintenance requirements shall be proposed in the dam safety management system (DSMS) that RLC will develop for these dams. A condition is offered in section 8 requiring a Dam Safety Management System (DSMS) to be submitted to BOPRC for approval within three months of the works being completed which shall include the following:

- Roles and responsibilities;
- Surveillance;
- Inspection forms for engineering and maintenance;
- Requirement for routine inspections as per the NZSOLD Guidelines 2015 which would be at least monthly, and also following any large flood event or event near the site that could potentially affect the dams such as earthquake, geothermal rupture, fire etc. The routine inspection shall assess any:
  - Sediment accumulation or obstructions within stormwater pipes; and
  - General maintenance requirements.
- Requirement for annual engineering inspections to assess any:
  - Structural maintenance required;
  - Evidence of seepage on slopes and hillside;
  - Evidence of any depressions and sinkholes;
  - Surface growth on dam embankment;
  - Cracks or signs of instability or settlement on the embankments;
  - Evidence of erosion in or around the impoundment area, embankments and stormwater drains; and
  - And any observable changes in stormwater drainage patterns or flow pathways.
- Dam safety review;
- Emergency preparedness systems;
- Systems for identification and management of dam safety issues;
- Information management; and
- Audits and reviews of the DSMS itself.

Hypothetical dam break scenarios are extremely low probability events (requiring a series of unlikely events occurring concurrently with a very large flood event), and are avoided to the extent

practicable by meeting industry accepted good practice (i.e. the NZSOLD Guidelines 2015) and the dam safety management system that will be put in place for the dams. Consent conditions to this effect have been proposed at Section 8.

5.11 Cultural effects

Engagement has been undertaken with Tangata Whenua and is summarised in section 7. The Eastside Hapu have formed a partnership with RLC to consciously use the expertise of Eastside Hapu to incorporate matauranga maori into the Kaipakau Catchment project. A co-design group was formed between Eastside Hapu, T+T and RLC. The meeting minutes of multiple workshops are attached in full at **Appendix L**.

Feedback, including but not limited to the following, has been incorporated into the design of the project to date:

- Ensuring the wetland does not dry out (incorporating a liner to prevent infiltration, having deeper ponding areas, choosing plants which are hardy);
- Ensuring the wetland is designed to cope with climate change;
- Incorporating native plants for the wetland; and
- Exceeding minimum size requirements for the wetland to enhance water quality treatment where possible (the permanent storage volume of the wetland is 8% larger than it needs to be).

T+T has also requested feedback from the Eastside Hapu with regards to the proposed plants for the wetland, and input into the landscape planting for the dams will also be sought.

The Eastside Hapu are also particularly interested in ensuring whanaungatanga (relationship building) is incorporated into the design, and that where practicable, the Maori principle of whanaungatanga is enhanced. For this purpose, walkways should be incorporated in the gully right up to the top of the ridge line. This way the community can experience the gully as a place to meet, talk and create a feeling of kinship and family connection. The importance of planting the wider gully was also discussed. It is noted that walkways and other works in the gully (e.g. planting) are not able to be directly addressed as part of the wetland and dam design as these are on NWTL land. However grassed walkways can be incorporated on the crest of the dams and also a walkway around the wetland. These features have been included in the design considerations.

The Eastside Hapu in attendance at the hui on 16 March 2022 have outlined that they are happy for the consenting process to proceed, subject to continued involvement in the project. The meeting minutes have since been distributed to the Eastside Hapu who were not in attendance for feedback.

6 Statutory assessment

6.1 RMA assessment

Section 104 of the RMA sets out the matters to which a consent authority must have regard to, subject to Part 2 of the RMA, when considering an application for resource consent. These are:

- Any actual and potential effects on the environment of allowing the activity (refer Section 5 above);
- Any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity;
- Any relevant provisions of:
  - a national environmental standard;
  - other regulations;
  - a national policy statement;
  - a New Zealand coastal policy statement;
  - a regional policy statement or proposed regional policy statement;
  - a plan or proposed plan; and
  - Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

6.1.1 Part 2 of the RMA

Part 2 of the RMA sets out the purpose and principles of the Act. The purpose of the RMA is to promote the sustainable management of natural and physical resources.

6.1.2 Section 5

The proposed dams will facilitate the development of the proposed affordable housing upstream, help to mitigate existing flooding issues within the Kaipakau catchment downstream, and help mitigate effects from future projected increases in rainfall due to climate change. The wetland will improve stormwater quality from urban stormwater runoff and also help to facilitate the development of housing upstream.

The construction of the dams and wetland are managed by the mitigation measures outlined within the Construction Management Plan and design standards set out within the design reports. Given the above, the proposal is considered to enable people and communities to provide for their well-being and health and safety while avoiding, remedying or mitigating adverse effects of activities on the environment.

6.1.3 Section 6

Regard has been given to:

- The relationship of Maori and their culture and traditions with their ancestral lands, water, sites waahi tapu, and other taonga;
- The management of significant risks from natural hazards.

Tangata Whenua have been involved in development of the proposal and are happy for the proposal to progress. The feedback from co-design meetings has been incorporated into the design of the wetland, and engagement will continue with regards to the project.

The dams will mitigate significant risks from flooding events as outlined in section 5.3.

6.1.4 Section 7

Regard has been given to:

- Intrinsic values of ecosystems;
- Maintenance and enhancement of the quality of the environment;
- The effects of climate change.

The wetland will improve the ecological values of the site (native plantings), enhance the quality of future urban stormwater runoff, and also enhance the quality of the surrounding environment by improving amenity values. The dams have been designed to provide some mitigation for projected future increased in rainfall due to climate change. Given the above, regard has been given to the effects of climate change.

6.1.5 National Environmental Standards

There are no National Environmental Standards relevant to the application.

The National Environmental Standards for Freshwater is not relevant to the proposal as there are no natural wetlands on the site, and the dams will not affect fish passage as there are no streams on-site.

The National Environmental Standards for assessing and managing contaminants in soil to protect human health (NES Soil) is not applicable to the proposal as the works site is not defined as a 'piece of land' under the NES Soil as it has not been subject to activities included on the Hazardous Activities and Industries List.

It is noted that an historic sheep dip has previously been identified on Lot 500 DP 548246 (CT – 997351) or Fee Simple 1/1, Part Puketawhero A2A2 Block (CT – SA16B/1093) (Morey St East Dam and wetland location). This feature was identified within the *Preliminary and Detailed Site Investigation – Brent Block, Owhata, Rotorua, Whakaue. Prepared by HAIL Environmental, The Contaminated Site Consultancy*, as part of the Wharenui Rise Stages 1-3 earthworks and subdivision resource consent applications (including NES Soil consent). However, the testing showed that contamination was isolated, and is located well away from the proposed works (approximately 300 m from the Morey Street wetland). The NES Soil applies to the piece of land on which hazardous activities are undertaken rather than the whole property parcel. The DSI concluded that the northern part of the site constitutes a 'piece of land'. Therefore, the NES Soil is not considered relevant to this proposal. It is noted that earthworks have commenced for Wharenui Rise Stages 1-3 and appropriate remediation and/or management of the identified contaminated area is required.

6.1.6 Bay of Plenty Regional Policy Statement

Table 6.1: Objectives and policies assessment

Objective/Policy	Comment
Objective 6 Provide for the social, economic, cultural and environmental benefits of, and use and development of nationally and regionally significant infrastructure and renewable energy. Policy EI 4B	Local authority stormwater networks are included under the definition of regionally significant infrastructure within the Bay of Plenty Regional Policy Statement. The flood detention dams are considered to form part of the stormwater infrastructure and network, and as above, provide for social and

Objective/Policy	Comment
Recognising the benefits from nationally and regionally significant infrastructure and the use and development of renewable energy.	economic benefits to provide for affordable housing upstream. Benefits of the flood detention dams and wetland are outlined within section 5.2. Given the above the proposal is considered to be consistent with the objective and policy.
Objective 7 Provide for the appropriate management of: (a) any adverse environmental effects (including effects on existing lawfully established land uses) created by the development and use of infrastructure and associated resources.	Any adverse environmental effects of the proposed dams and wetland will be managed by the measures outlined within the Construction Management Plan. Therefore, the proposal is considered to be consistent with the objective.

6.1.7 Regional Natural Resources Plan assessment

Table 6.2: Objectives and policies assessment

Objective/Policy	Comment
KT P20 (Policy 20) To assess effects of proposed development activities on the cultural and historic values and sites of water, land and geothermal resources in consultation with tangata whenua.	Tangata Whenua have been engaged and have contributed to the design of the Kaipakau catchment stormwater infrastructure and provided feedback on the works. Consequently, the proposal is considered to be consistent with KT P20.
DW P15 (Policy 51) To require the appropriate management of stormwater quality, including: (a) The use of source controls to avoid the contamination of stormwater. (b) The use of best practicable options. (c) Treatment of stormwater to prevent the contamination of receiving environments.	The wetland will provide appropriate management of stormwater quality from future urban stormwater runoff. The wetland has been designed to treat stormwater from 15.1 ha of residential development in accordance with BOPRC design guidelines. Therefore, the wetland will improve stormwater quality, and help to prevent contamination of receiving environments. Given the above the proposal is considered to be consistent with the policy.
WQ O12 (Objective 47) Damming and diversion activities avoid, remedy or mitigate adverse effects on the environment, as appropriate to the values, uses and existing environmental quality of the water body and downstream of the activity. WQ P32 (Policy 81) All new damming and diversion activities, or changes to existing damming and diversion activities, are required to comply with the following environmental standards: (a)Water flow • Ensure a sustainable residual flow to maintain the instream minimum flow requirement and provide for existing surface water takes, and for existing assimilative requirements associated	The damming proposed at Morey St East Dam and Morey St West Dam is of overland flow or stormwater runoff. The dams are not damming an existing waterbody. The Kaipakau Stream extends from Te Ngae Road to Lake Rotorua. Instream minimum flow requirements will continue to be achieved as low flows will continue to flow through the primary spillway. The dams will mitigate increases in stormwater runoff from new development upstream. The wetland will ensure water quality is maintained. Any adverse erosion effects will be mitigated by energy dissipation structures downstream of the spillways, see section 5.4.

Objective/Policy	Comment
with existing discharges of contaminants to water in downstream areas. • Provide for natural flow-variability where appropriate (b)Water quality • Not cause the breach of Water Quality Classification of the stream, river or lake. (c) Stability of Banks and Beds of Water bodies • Avoid, remedy or mitigate adverse effects on the stability of banks and beds of surface water bodies, including scour, erosion and slumping which can be directly attributed to the existence and operation of the dam. Any erosion events that can be directly attributed to the existence and operation of the dam are to be remedied or mitigated as soon as practicable. (d) Landscape values, natural character, recreational use, public access to and along the margins of rivers and lakes, and Maori cultural values • Refer to BW P3 for requirements for aquatic habitats. Refer to the Kaitiakitanga Section of this regional plan for matters relating to Maori cultural values. …	Given the above the proposal is considered to be consistent with the objective and policy.
WQ P34 (Policy 83) Mitigation or remediation is a requirement for all existing dams and diversions, and associated maintenance activities, to address adverse effects on aquatic ecosystems, water quality, water flow, the beds and banks of surface water bodies, and significant heritage values, where appropriate. Actions to mitigate or remedy adverse effects are to be appropriate to the scale of the effect, and have regard to the requirements of WQ P32.	The damming is of surface water runoff only not a permanently flowing stream. Therefore, there will be no direct change in permanently flowing watercourses or aquatic habitat. As discussed, the dams (and the development upstream) will result in a change to the hydrology downstream within the Kaipakau catchment. This stream has low ecological value from Te Ngae Road to Carroll Place, and low to moderate ecological value from Carroll Place to Lake Rotorua. Appropriate mitigation measures have been proposed to address effects. Give the above the proposal is considered to be consistent with the policy.
WQ O13 (Objective 48) Land use and development activities avoid, remedy or mitigate adverse effects on the natural flow of water, including flood flows.	The dams will mitigate adverse effects on flood flows as a result of upstream development. Therefore, the proposal is considered to be consistent with the objective.

6.1.8 District Plan assessment

6.1.8.1 Objectives and policies assessment

This section assesses the proposed works against the relevant objectives and policies of the applicable plans.

Table 6.2: Objectives and policies assessment

Objective/Policy	Comment
NOISE-O1 A noise environment consistent with the character and amenity expected for the zone. NOISE-P1 Control the potential adverse effects of noise on noise sensitive activities including by setting appropriate standards that reflect the function of the zones and permitted activities within them. NOISE-P4 Minimise, where practicable, noise at its source or on the site from which it is generated to mitigate adverse effects on adjacent sites.	During the construction works, there will be periods where the noise environment is not consistent with the character and amenity expected for the residential zone (where typically low levels of noise are anticipated). However, the works are temporary in nature and the CNVMP will be implemented to mitigate adverse effects as far as practicable. The noise at the source, will be minimised to the extent practicable as outlined in section 5.9 of this report. Given the above the proposal is considered to be consistent with the objective and policies.
EIT-O1 Infrastructure that provides for the economic, cultural, social and environmental wellbeing of the Rotorua district, the region and New Zealand.	The dams and wetland will facilitate affordable housing development in the Rotorua district, whilst also reducing existing flooding downstream and help to mitigate the effects of climate change. Therefore, it will provide for the economic, cultural and social wellbeing of the Rotorua district as directed by the objective.
EIT-O2 Infrastructure that avoids, mitigates or remedies the adverse effects on the character and amenity of the area. EIT-P10 Ensure that above ground infrastructure is designed and located in a manner that avoids, mitigates or remedies the adverse effects on the character of the surrounding environment. EIT-P2 Recognise the technical and operational requirements and constraints of infrastructure when considering the actual and potential adverse effects, including cumulative effects of infrastructure on the environment.	The wetland is being co-designed with T+T, tangata whenua and RLC to enhance the character of the environment and provide water quality improvements. The dams will result in a change in view from a grassed valley to a grassed mound within the valley. The potential location and design of the dams are constrained by the need for the dams to provide appropriate stormwater attenuation for the new development upstream, decrease downstream flooding, and help to mitigate the effects of climate change (i.e. there are technical and operational constraints). Due to engineering constraints, the dams are not able to be planted, other than in grass. Given the above the proposal is considered to be consistent with the objective and policies.
EIT-P1 Enable the research, exploration, development, operation, maintenance and upgrading of infrastructure that avoids, remedies or mitigates adverse effects on the environment.	The dam and wetland infrastructure will avoid, remedy or mitigate adverse effects on the environment. Therefore, proposal is considered to be consistent with the policy.

6.2 Other matters

6.2.1 Eastside Community Wellness Plan

The Eastside Community Wellness Plan was developed by Tatau Pounamu Collective, eastside hapu and Rotorua Lakes Council to provide a framework for future development and growth in a way that ensures that the key values of the area are maintained and, where possible, enhanced.

Eastside hapu have been involved in discussions with regards to the dams and wetland and the objectives of the Eastside Community Wellness Plan. In particular looking at the bigger picture and ensuring that a tikanga/kawa approach is embedded in the project.

Relevant Eastside Community Wellness Plan objectives include:

- Stormwater management is future proofed to ensure that the effect from climate change is anticipated and minimised.
- All waterways are protected and enhanced.
- Wetlands are restored where possible and new ones created.
- Green infrastructure is used to improve water quality.
- Replant gully areas and higher slopes for stormwater management and ecological enhancement.
- Provide an integrated stormwater management approach from the ridgeline to the lake.

The dams will ensure that stormwater management is future proofed as it will help reduce the effects of climate change on flooding downstream. The proposal also involves the creation of a new wetland to improve stormwater quality. Replanting the gully areas and higher slopes are not able to be considered within this proposal given RLC does not own the land. However, the importance of this planting and involvement of mana whenua is recognised. Ngati Whakaue Tribal Lands (NWTL) who is the landowner has confirmed that the planting of the gully and inclusion of walkways have been committed to by NWTL as part of the resource consents for Stages 1-3 of Wharenui Rise. A landscape plan is required to be submitted by NWTL for the planting of the stormwater basins in accordance with the Stages 1-3 Wharenui Rise land use consent.

6.3 Notification assessment

6.3.1 Public notification

Section 95A of the RMA is relevant when a consent authority is considering whether a consent application should be considered with or without public notification.

Section 95A identifies a four step process. In relation to these steps we note the following:

- The applicant does not request public notification of the application;
- There is no rule or national environmental standard that precludes or requires public notification of this application;
- An assessment of effects on the environment is provided in Section 5 of this AEE report. This assessment concludes that the adverse effects on the environment are likely to be no more than minor;
- The application is not for any of the activities identified in section 95A(5)(b) (i.e. a controlled activity, subdivision of land or a residential activities, a boundary activity, or an activity prescribed in section 360H(1)(a)(i));
- No special circumstances are considered to exist in relation to the application.

Based on this assessment, we consider that this proposal meets the tests of the RMA to be processed without public notification.

6.3.2 Limited notification

For applications that are not publicly notified, under section 95B, the consent authority must determine whether to give limited notification of an application to any affected parties. Section 95B identifies a four step process. In relation to these steps we note the following:

- The application does not need to be notified to any parties under section 95B(4). The proposed change will not affect any customary rights;
- The proposed activity is on land that is the subject of a statutory acknowledgement. The Rotorua region geothermal system (which covers the majority of the Rotorua district) is subject to a statutory acknowledgement by Te Arawa Iwi/Hapu. The works do not involve the use of the geothermal resource and therefore under section 6.9.3 of the statutory acknowledgement we consider no further actions are required;
- There are no applicable rules or national environmental standards precluding limited notification;
- No special circumstances are considered to exist in relation to the application that warrant notification of the application to any other persons not already determined to be eligible for limited notification.

Section 95E(1) states that a consent authority must consider a person to be an affected person if the activity's adverse effects on the person are minor or more than minor (but not less than minor).

NWTL and RLC have an agreement for RLC to undertake the works on NWTL land. The signatory page of the agreement is attached at **Appendix N.**

The following persons may be adversely affected by the activity given the proximity of the proposed Morey St West Dam to their properties:

Landowners/residents of;

- 17 Hayward Rise; and
- 23 Hayward Rise; and
- 25 Hayward Rise; and
- 34 McKenzie Road; and
- 34A McKenzie Road; and
- 34C McKenzie Road; and
- 29 Devoy Drive.

Given the above, this proposal shall be processed with limited notification to the above persons. If any written approvals are obtained as a result of further engagement with these persons, they shall be provided to council as we receive them.

As outlined within section 5.10 we consider the dam breach scenario highly unlikely and mitigated by meeting industry accepted good practice (i.e. the NZSOLD Guidelines 2015) and the dam safety management system that will be put in place for the dams. Consent conditions to this effect have been proposed at Section 8. The PIC assessment is attached at **Appendix K**, and impacted dwellings in a 100 year ARI event hypothetical dam breach scenario (flood depth >0.5 m at building above ground level) is attached at **Appendix O**.

6.3.3 Section 95 conclusions

Following the steps set out in sections 95A and 95B, we consider that the application should be processed with limited notification to the above persons. Note, engagement is continuing to occur with these persons, and if any written approvals are obtained as a result of further engagement with these persons, they shall be provided to council as we receive them.

7 Consultation

7.1 Tangata Whenua

The engagement with the Eastside Tangata Whenua which formed part of the co design group and which has been undertaken to date is summarised below. The co-design group included the following tangata whenua; Ngāti Tuteniu, Ngāti Uenukukōpako, Ngāti Te Roro o Te Rangi, Hinemihi Marae and Ngāti Hurungaterangi. Notes and meeting minutes of each hui are attached at **Appendix L**:

- Hui held on 13 July 2021 – Pou/values for engaging with each other. Eastside values that relate to water and in particular stormwater. Understanding the whenua/land and catchment of the Kaipakau Stream.
- Hui held on 3 August 2021 – Decision to join the two Kaipakau Catchment Working groups. Shared pou/values. Maori Matauranga. Overview of potential constructed wetland, and upgrade of stormwater infrastructure.
- Hui held on 23 September 2021 – Discussion on how to form partnership and ongoing relationship. Some slides were presented of stormwater modelling and the upstream development was discussed.
- Hui held on 7 October 2021 – Flood modelling shown, current thinking around solutions for water quality and quantity (flood detention dams and wetlands).
- Hui held on 22 October 2021 – Matauranga Maori workshop. A partnership was discussed and how Eastside Mana Whenua and RLC /Advisors can consciously use western science and matauranga maori to co-design the Kaipakau Catchment project.
- Hui held on 27 January 2022
  - Eastside wellness plan objectives
  - Function of stormwater wetland/pond
  - Potential wetland locations
  - Feedback received on wetland concept
- Hui held on 16 March 2022
  - Consenting process for dams and wetland discussed
  - Proposed dam design presented
  - Wetland design presented (with inclusion of feedback from previous hui) and possible proposed planting
  - Feedback requested

Emails were also sent to the Tangata Whenua groups that Bay of Plenty Regional Council (BOPRC) advised may have an interest in the resource consent application (Ngāti Rangiwewehi, Ngāti Raukawa and Ngāti Whakaue) on 10 February 2022. These emails described the project and requested feedback. This engagement is also attached at **Appendix L**.

Ngati Raukawa responded on 18 March 2022 outlining that the proposed location is not within their takiwa and therefore have no further comments to raise provided that iwi accidental discovery protocols are in place throughout the duration of the project. The Eastside Hapu will be engaged to undertake cultural monitoring as required. Ngati Raukawa were also satisfied that the co-design group will be fully addressing matters of importance for mana whenua in relation to the project. Ngati Whakaue responded outlining that they are happy that Eastside hapu are the points of contact. No response has been received from Ngāti Rangiwewehi.

7.2 Landowners within proximity to works

The landowners/residents of 17 Hayward Rise, 23 Hayward Rise, 25 Hayward Rise, 34 McKenzie Road, 34A McKenzie Road, 34C McKenzie Road, and 29 Devoy Drive were sent letters and fact sheets on 9 March 2022 informing them of the proposed works and providing some information with regards to noise and visual effects.

A follow up phone call was made to these residents on 17 March 2022. A summary of the calls and further actions are attached at **Appendix M**. Engagement is ongoing, and further information is currently being provided to these residents.

7.3 Wider community

A letter and fact sheet were sent to the residents within the wider community on 17 March 2022 informing them of the works and providing contact details should residents have any queries. This was sent to the properties adjacent to Morey St West Dam, and also downstream properties within the Kaipakau catchment. Information and FAQs have also been put up on the RLC webpage (https://letstalk.rotorualakescouncil.nz/morey-street-detention-dams).

Some queries from property owners have come through including: the risk of flooding and whether insurance premiums would be affected; whether the dams have been designed and engineered to cope with future development; whether ponding of water and increases in insects would be an issue and how it would be resolved; where maintenance access is proposed (looking at whether the maintenance access would provide an additional access to the rear of their section for housing development); and where water would flow in the event of a dam break.

8 Proposed conditions of consent

The following conditions of consent are proposed;

1 The works shall be undertaken in general accordance with the Draft Construction Management Plan titled *Morey Street Flood Detention Dams and Wetland – Draft Construction Management Plan* dated April 2022, or any updated Construction Management Plan provided by the consent holder or contractor and certified by council.

2 The consent holder shall submit a Traffic Management Plan for certification by Rotorua Lakes Council prior to the commencement of works.

3 The consent holder shall submit a Landscape Plan for each flood detention dam authorised under this consent for certification by Rotorua Lakes Council prior to the commencement of works. The Morey St West Dam landscape plan shall include mitigation planting within the indicative targeted areas shown on *Morey St West Dam LVA, Rotorua, Proposed Mitigation Plan, Figure 6* dated March 2022 and prepared by Boffa Miskell Limited, or within areas which achieve the same outcome.

4 The consent holder shall submit a Construction Quality Plan to Bay of Plenty Regional Council and Rotorua Lakes Council prior to the commencement of works.

5 The consent holder shall submit the detailed design of the dams to Bay of Plenty Regional Council and Rotorua Lakes Council prior to the commencement of works. It is noted that there may be opportunity within the detailed design to temporarily modify the primary spillway intake to improve flood attenuation in the shorter term.

6 A Dam Safety Management System (DSMS) shall be submitted to council within three months of the works being completed. As a minimum the DSMS shall include the following:

- Roles and responsibilities;
- Surveillance;
- Inspection forms for engineering, and maintenance;
- Requirement for routine inspections as per the NZSOLD Guidelines 2015;
- Requirement for annual engineering inspections;
- Dam safety review;
- Emergency preparedness systems;
- Systems for identification and management of dam safety issues;
- Information management; and
- Audits and reviews of the DSMS itself.

7 The consent holder shall adopt a proactive strategy for dust control during the construction phase, specifically by complying with the principles of dust management set out in the Environment Bay of Plenty guideline document 2010/01 “Erosion and Sediment Control Guidelines for Land Disturbing Activities” or any subsequent edition so as to prevent a dust nuisance from occurring beyond the property boundary.

8 The consent holder shall ensure that a sufficient supply of water for dust control (sufficient to apply a minimum of 5 mm/day to all exposed areas of the site) and an effective means for applying the quantity of water is available on-site at all times during construction and until such time as the site is fully established. Details of the dust suppression water supply shall be forwarded to BOPRC prior to commencement of the works.

9 Conclusion

This AEE report has been prepared on behalf of Rotorua Lakes Council to accompany a resource consent application for the construction of, and use of two flood detention dams and a wetland.

This AEE report draws the following conclusions:

- The works are consistent with Part 2 of the Resource Management Act 1991;
- The works are consistent with the relevant objectives and policies of the Bay of Plenty Regional Policy Statement, Regional Natural Resources Plan and Rotorua District Plan;
- The works will have a minor effect on the environment. Mitigation and management measures are proposed and/or recommended within the Construction Management Plan (which includes erosion and sediment controls), Construction Noise and Vibration Management Plan, Traffic Impact Assessment, and Landscape Assessment, and have also been incorporated into the design of the wetland.

Accordingly, we respectfully request that this resource consent application be granted on a limited-notified basis, subject to fair and reasonable conditions. We would appreciate the opportunity to comment on draft conditions prior to any consent being granted.

10 Applicability

This report has been prepared for the exclusive use of our client Rotorua Lakes Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
.....	.....
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1-Apr-22

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Appendix A: Consent application forms

Appendix B: Record of Title

Appendix C: Drawings

- Morey St West Dam Drawings
- Morey St East Dam Drawings
- Wetland Drawings

Appendix D: Design reports

- Morey St West Dam Design Report
- Morey St East Dam Design Report
- Wetland Design Report

Appendix E: Construction Management Plan

Appendix F: Flood Figures

Appendix G: Ecological Assessment

Appendix H: Boffa Miskell Visual and Landscape Assessment

Appendix I: Traffic Assessment

Appendix J: Noise Assessment and Construction Noise and Vibration Management Plan

Appendix K: PIC Assessment

Appendix L: Tangata Whenua Engagement

Appendix M: Landowner Engagement

Appendix N: Agreement with NWTL

Appendix O: Hypothetical dam breach - flood depths at downstream properties

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