Notice of Requirement for a New Designation

Project Name: **Eastern Hills Reservoir**

Project No.: **OPC101031 / 3-WW021.02**

Date: **27 June 2024**

Our water, our future.

Document Control

Panel Member	Connect Water/WSP
Panel Project Manager	Petra Burns
Client Council	Hutt City Council

REVISION SCHEDULE

Current Status			Final			
No	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
1	6/11/23	For external legal review	Cathy Crooks	Jo Lucas	Max Pocock	John Leatherbarrow
2	13/02/24	Issued to Wellington Water	Cathy Crooks	Jo Lucas	Max Pocock	John Leatherbarrow
3	26/02/24	Final Notice of Requirement	Cathy Crooks	Jo Lucas	Max Pocock	John Leatherbarrow
4	27/06/24	Update to Ecological Inputs	Cathy Crooks	Petra Burns	Max Pocock	Jo Lucas

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Form 20 – Notice of Territorial Authority's Requirement for Designation

Eastern Hills Reservoir

The Hutt City Council gives notice of its requirement for a designation for a public work.

The site to which the notice of requirement applies is in the Eastern Hills reserve at the end of Summit Road, Fairfield, Lower Hutt; legally described as Lot 14 DP 59678 and Lot 35 DP 31233 and as shown on the plans attached as **Appendix A** of the attached Assessment of Environmental Effects (AEE). The site coordinates are NZTM 1762733mE / 5436349mN.

The nature of the proposed public work is the construction, operation and maintenance of the Eastern Hills Reservoir including all activities associated with the construction, operation and maintenance of:

1. The Eastern Hills Reservoir structure and delivery and scour pipelines;
2. Access to the reservoir and delivery and scour pipelines;
3. Associated connections to the bulk water supply, local water supply, and local stormwater networks; and
4. Associated construction activities such as vegetation clearance and geotechnical testing.

The nature of the proposed conditions that would apply are those included in **Appendix B** of the attached AEE. It is expected that these proposed conditions will be refined through the designation Notice of Requirement process.

The effects that the public work will have on the environment and the ways in which any adverse effects will be mitigated are outlined in the attached AEE.

Potential adverse effects include:

1. Effects on residents (noise and vibration)
2. Effects on recreational users of the Eastern Hills Reserve and firebreak track;
3. Effects on the road network users (from construction traffic);
4. Landscape and visual effects of the reservoir and associated pipes; and
5. Ecological effects resulting from removal of vegetation/habitat.

The effects range from negligible to more than minor, but are generally temporary, and there will be only minor permanent landscape effects.

There are significant benefits to the resilience of Lower Hutt Central and Taita Water Storage Areas, and to the wider region, both from an operational and disaster perspective.

Alternative sites, routes and methods have been considered to the extent outlined in Section 8 of the attached AEE. Considerable investigations have resulted in the selection of the Eastern Hills Reservoir site.

The public work and designation are reasonably necessary for achieving the objectives of the territorial authority because:

The Eastern Hills Reservoir Project objectives are:

- Address the current water storage shortfall and ensure sufficient storage for future growth in the Lower Hutt Central and Taita water storage areas (WSA):
    - To improve disaster resilience of the Lower Hutt Central and Taita WSAs by providing a seismically resilient water supply capable of meeting Wellington Water's target level of service.
    - To ensure the Lower Hutt Central and Taita WSAs are operationally resilient by providing sufficient secure, safe, and reliable water storage to supply 48 hours of water to residents, businesses, and critical water users (including Fire and Emergency NZ) under normal operating conditions, based on projected demand with appropriate consideration of population growth.
- To deliver a secure, safe, and reliable water storage solution that has a 100-year design life.
- To integrate the chosen solution into the Lower Hutt Central WSA network in a cost-effective manner.

The proposed work and designation are reasonably necessary for achieving the objectives of the territorial authority for the reasons set out in section 21 of the attached AEE.

The following resource consent are needed for the proposed activity and will be applied for:

From Greater Wellington Regional Council:

1. Land use consent for earthworks and the removal of vegetation
2. Land use consent for earthworks within the vicinity of natural inland wetlands
3. Land use consent for the disturbance of the bed of a stream and construction of an outfall structure
4. A water permit to temporarily take groundwater

From Hutt City Council:

5. Subdivision consent for minor boundary adjustments.

Consultation has been undertaken with parties that are likely to be affected as set out in Section 7 of the attached AEE including hosting two open days, facilitating a number of meetings with individual stakeholders and interested groups, as well as publishing information on a website and circulating project emails.

The Hutt City Council attaches the following information required to be included in this notice by the district plan, regional plan, or any other regulations made under the Resource Management Act 1991:

6. Eastern Hills Reservoir Notice of Requirement: Assessment of Environmental Effects

A lapse period of seven years is sought for the Hutt City Council to give effect to the designation.

Signed by:

Bruce Hodgins

Strategic Advisor – Hutt City Council

Date: 26.02.24

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PART A: INTRODUCTION AND BACKGROUND

1 Introduction to the Project

1.1. Introduction

This Notice of Requirement (see attached Form 20) and Assessment of Environmental Effects is submitted by Wellington Water Limited (Wellington Water) on behalf of Hutt City Council (HCC) in accordance with Sections 168A of the Resource Management Act 1991 (RMA) for the construction, operation and maintenance of a water supply reservoir adjacent to the existing Naenae Reservoir at Summit Road, Fairfield, Lower Hutt.

The notice of requirement is for a Designation for the construction, operation and maintenance of the Eastern Hills Reservoir. A lapse period of seven years is sought for the Hutt City Council to give effect to the designation.

1.2. The Requiring Authority/Applicant

1.2.1 Hutt City Council

HCC is a territorial authority, and a Requiring Authority pursuant to section 166 of the RMA. HCC has financial responsibility for all water related infrastructure assets and asset development programmes within Hutt City.

HCC's purpose is to provide a city whereby everybody thrives, and this will be delivered through a pathway of partnership, collaboration with and for our people to achieve this.

There is an aspiration to prioritise resilience for the needs of the community now, and into the future. This will be achieved through investment in water infrastructure, the transport network, and housing.

HCC has developed six key priority areas[1]. These are:

- Investing in infrastructure;
- Increasing housing supply;
- Caring for and protecting our environment;
- Supporting an innovative, agile economy and attractive city;
- Connecting communities; and

[1] Hutt City Council, Our 10-year plan 2021-2031.

- Financial sustainability.

This Project, the Eastern Hills Reservoir, is strongly aligned with the key priority area of investing in infrastructure, and will contribute towards HCC's aspiration for a resilient community. HCC has financial responsibility for all infrastructure assets and asset development programmes within Hutt City, which includes the Eastern Hills Reservoir.

1.2.2 Wellington Water Limited

Wellington Water is a shared-service Council Controlled Organisation (CCO) jointly owned and funded by the Wellington, Hutt, Upper Hutt, Porirua City councils, South Wairarapa District Council and the Greater Wellington Regional Council (GWRC). Established in 2014, Wellington Water's role is to manage drinking water, wastewater and stormwater services on behalf of its six client councils. Ownership of the assets remains with the individual councils themselves.

Wellington Water's purpose, as described in its Statement of Intent, is:

> *"To create excellence in regional water services so communities prosper".*

Wellington Water's service-related outcomes are:

1. **Safe** and healthy water
2. **Respectful** of the environment
3. **Resilient** networks support the economy.

Although HCC is the Territorial Authority and consent holder and has overall financial responsibility for this Project, HCC has delegated to Wellington Water, as a CCO, the development of the Project including consultation and preparation of this AEE.

Wellington Water will also be responsible of the construction, operation and maintenance of the Reservoir on behalf of HCC.

1.3. Purpose and Scope of this Report

This AEE and the supporting documents have been prepared to support the Notice of Requirement that would authorise, under the RMA, the construction, operation and maintenance of the Project.

This includes all activities associated with the construction, operation and maintenance of:

1. The Eastern Hills Reservoir structure;
2. Delivery and overflow pipelines; and
3. Associated connections to the bulk water supply network, local water supply and local stormwater networks.

Outline Plan approval related to the Project works are not covered in this AEE nor is the application for subdivision consent required so that the reservoir is contained wholly within one allotment.

A separate application for resource consent will be made to Greater Wellington Regional Council.

2 Background to the Project

2.1 Introduction

The Project relates to the construction, operation and maintenance of a new 15ML concrete reservoir in Naenae. It will be located adjoining the existing Naenae reservoir.

This chapter sets out the background to the Project and the basis for the Project objectives. It provides an overview and description of:

- The strategic context for the Project;
- The need for investment in a new water reservoir;
- The Project objectives; and
- The benefits to be delivered by the Project.

2.2 The Need for the Project

Potable water storage for the Lower Hutt Central Water Storage Area (WSA) is currently provided by two existing reservoirs at Naenae (11.3 ML) and Gracefield (5.7 ML). The location of the Lower Hutt Central WSA serviced by these reservoirs is shown in Figure 1. Previous investigations[2] found that the available storage volume does not currently meet current level of service requirements with a current shortfall of approximately 12 ML for the Lower Hutt Central WSA[3]. Future population growth[4] and development will exacerbate impacts on the level of service.

The Lower Hutt Central WSA does not currently meet the seismic resilience level of service requirements which require reservoirs to store sufficient volume of water to enable supply of 20 L/person/day to residents from day 8 to 15 after an earthquake and to reconnect supply to “critical” users such as hospitals and rest homes[5].

Investigations undertaken by Wellington Water have also identified that the 5.7ML Gracefield reservoir has structural issues, which has resulted in it having limited remaining useful life. As a consequence, it is programmed for replacement within the next 10 years. This would impact the available volume of storage within the Lower Hutt Central WSA during construction as the 5.7 ML storage would not be available, further impacting the level of service in the future.

Wellington Water has also identified that there is a similar shortfall of storage within the Taita WSA which adjoins the Lower Hutt Central WSA. Currently, the Taita WSA is serviced by a single 5.5ML reservoir in Taita which is fed via pumps from the Lower Hutt Central WSA. The distribution network is shown in Figure 2.

[2] The Hutt City Water Supply Zone Management Plan, Stantec, November 2020
[3] Based on the requirement to provide 2 x the average day demand per person
[4] Assuming 50th percentile growth based on data from Sense Partners
[5] Section 4, Lower Hutt Central and Taita Storage Volume Assessment, Connect Water, October 2023

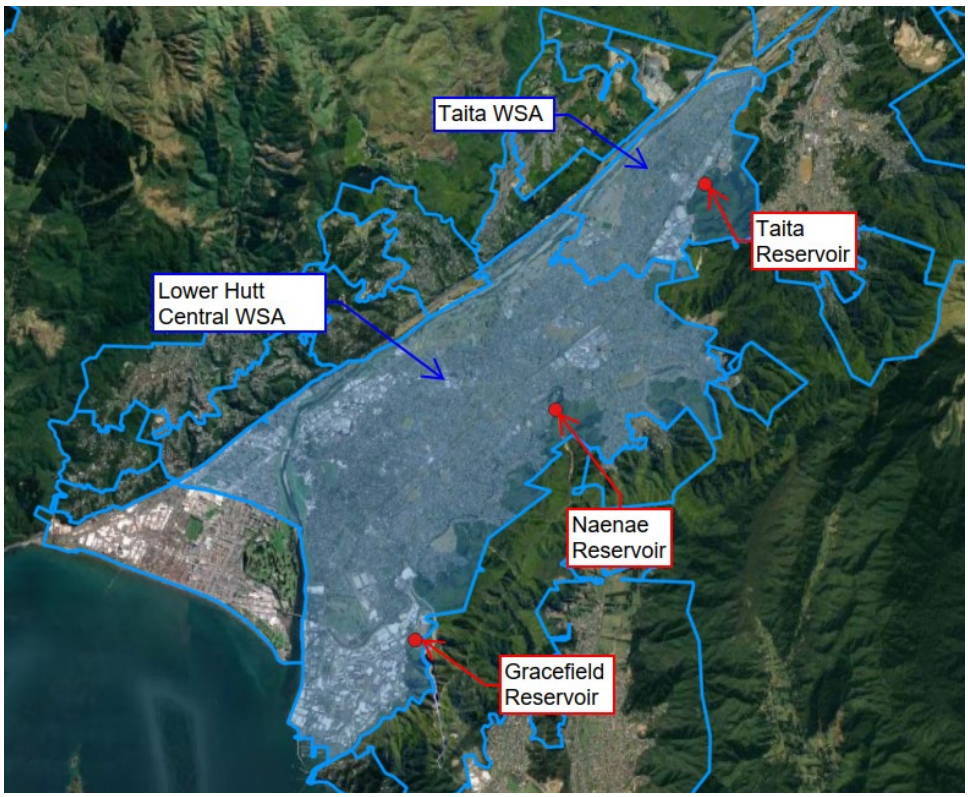

Figure 1: Water Service Areas within the Hutt Valley

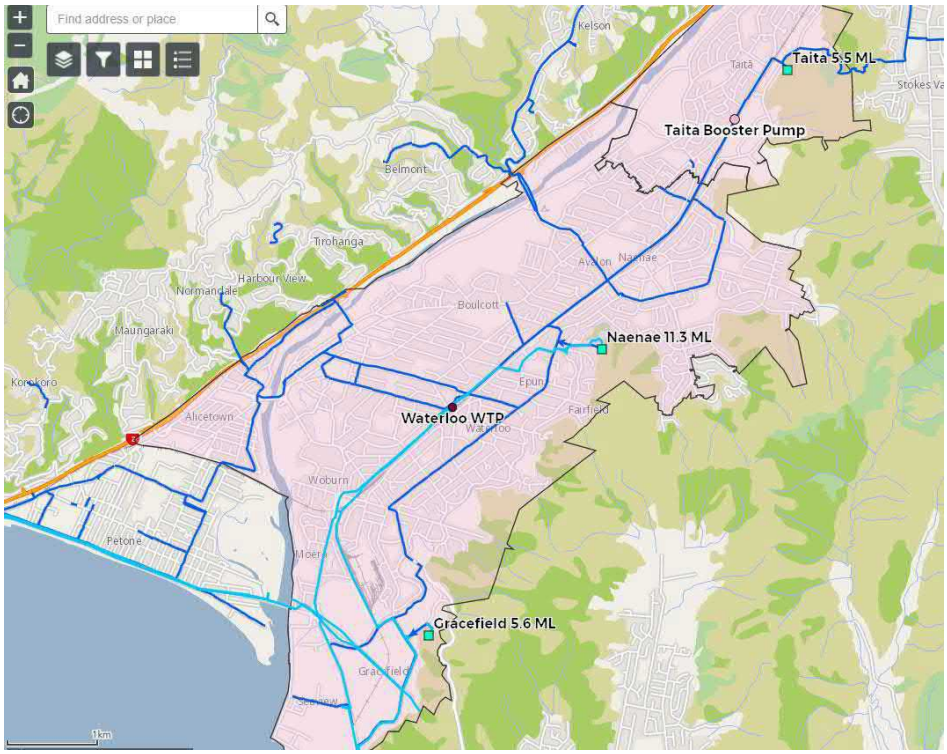

Figure 2: Existing bulk water supply (light blue) and large diameter network distribution (darker blue) mains

Within both the Taita WSA and Lower Hutt WSA, population growth and future development is predicted that will drive demand for water and in turn impact the level of service provided from existing infrastructure should no change occur. The Eastern Hills Reservoir will directly contribute to supporting, sustaining and growing the Hutt Valley's economy by improving water supply safety and reliability and increasing business and residential confidence in the quality and reliability of the city's water infrastructure. Further, as population growth occurs the level of service from a resilience perspective is also decreased. Because of this, option assessments[6] have confirmed that there is an immediate need to introduce additional storage capacity serving the Lower Hutt Central and Taita WSAs to meet the Wellington Water level of service requirements.

2.2.1 The Need for a Reservoir

Wellington Water is addressing water storage shortfalls across the region through a range of measures such as demand reduction (repairing leaking pipes, customer education, recycled water measures, and metering commercial properties) and investigating alternative raw water sources. However, population growth is predicted to out-pace any demand reduction measures necessitating the need for storage within individual WSAs.

The interconnected nature of the Lower Hutt Central WSA and Taita WSA means that a combined approach (single reservoir) for addressing the storage deficit is feasible, and is the preferred option. Further, due to the level of service being driven by both demand and seismic measures an increase in storage capacity provided by a new reservoir is the optimal solution. Storage at an individual property level is encouraged (e.g. rain water tanks), but is not a current requirement of the building code and will not meet the Wellington Water levels of service.

A volume shortfall assessment was completed for the combined Lower Hutt Central and Taita WSAs, which considered the existing population and water demand against the current potable water storage volume provided by Gracefield, Naenae and Taita reservoirs. This was extrapolated using population growth, predicted water demand and an estimated reservoir replacement programme, based on current condition, to confirm the volume required for a new reservoir and the volume of the replacement reservoirs. The 15 ML Eastern Hills reservoir and Gracefield reservoir replacement will meet this volume shortfall – refer to Figure 3. Note that the volume of the existing Naenae reservoir will also need to be increased when it is replaced in the late 2040s. The Taita reservoir will need to be replaced in approximately 2067 when it reaches its end of life, but it is difficult to increase the reservoir volume as the inlet and outlet pipes are constrained.

[6] Section 6.2, Lower Hutt Central and Taita Storage Volume Assessment, Connect Water, October 2023

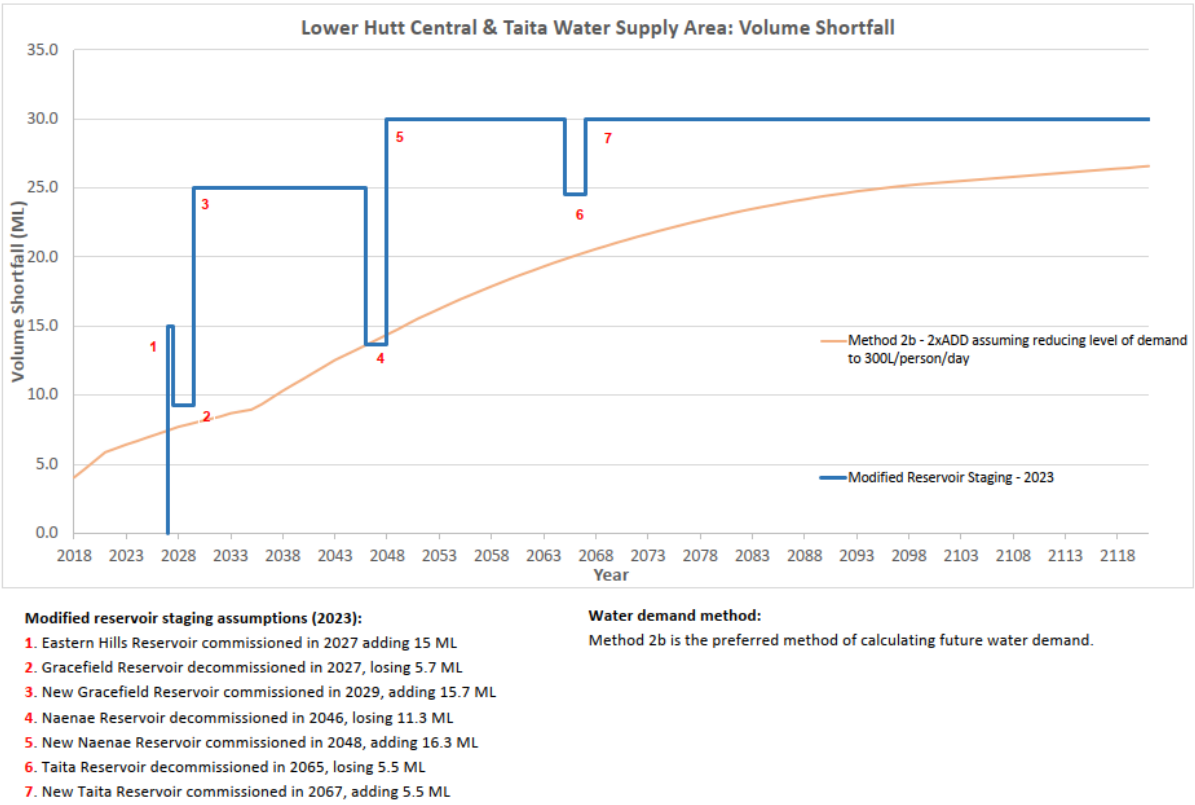

Figure 3: Lower Hutt Central & Taita Water Supply Area Shortfall

A new reservoir would meet the present needs, whilst also providing for future growth. This will also mean that Wellington Water can provide reliable services to customers and accommodate future population growth. The customer outcomes and service goals linked to this activity are shown in Table 1.

Table 1: Customer outcomes and service goals

Primary customer outcome		Outcome 3: Resilient networks support our economy
Primary goal		3.3 We plan to meet future growth and manage demand
Secondary customer outcome		Outcome 3: Resilient networks support our economy
Secondary goal		3.4 We provide reliable services to customers

The recommended solution is that a new 15ML reservoir be developed to provide sufficient storage capacity within the WSA through to 2049 based on the following assumptions[7]:

- 50th percentile population projections;

[7] Lower Hutt Central and Taita Storage Volume Assessment, Connect Water, October 2023

- Potable water consumption, known as "average day demand" reducing at 1% pa[8] to a minimum of 300L/person/day; and
- A 15-day recovery time (water supply restored to Lower Hutt Central reservoirs) (or less) following a seismic event.

The reservoir is required to address the existing storage deficit as identified previously. Further, construction of a new reservoir will enable other reservoirs, such as Gracefield, to be taken offline and replaced in a staged approach following the completion of construction of the new reservoir. Currently, surplus storage in adjoining WSAs is being used to manage short term risk associated with the storage deficit. However, given the current deficit it would be difficult for Wellington Water to undertake work, such as the required Gracefield work, without impacting the level of service and resilience within the Lower Hutt Central and Taita WSA.

Consequently, a new 15ML reservoir to service the Lower Hutt Central WSA and a new reservoir outlet main is the subject of this Notice of Requirement to address the current storage deficit.

2.2.2 Operational Resilience

"Operational resilience" is the ability of a network to continue service in response to a reasonably predictable disruption event, including planned maintenance. For the HCC supply network this could include a pipe breaking or being severed, a water treatment plant breakdown, or an issue with water quality.

HCC and Wellington Water are targeting a level of service for operational storage of 48 hours "in-zone" storage. Based on average day demand, including sufficient provision for fire fighting water supply, the additional storage volume required in the Central Lower Hutt/Taita WSAs for a range of planning horizons is shown in Table 2[9].

Table 2: Additional Storage Required

Year	Period	Additional Storage Required (ML)
2021	"present"	5.9
2051	30 years	15.6
2071	50 years	21.3
2101	80 years	25.4
2121	100 years	26.5

The volume assessment completed by Connect Water, and previously by Stantec[10], confirms that a 15 ML reservoir would provide enough storage capacity through to about 2049, based on operational

8 Predicted reduction in water demand agreed with Wellington Water based on water efficiency measures, demand management and leakage reduction.

9 Section 5.1, Lower Hutt Central and Taita Storage Volume Assessment, Connect Water, October 2023.

10 Hutt City Water Supply Zone Management Plan, Rev 4, Stantec, November 2020

resilience LOS requirements. Beyond 2049, upgrades to existing reservoirs in the WSA will be required to meet the storage deficit.

2.2.3 Hazard Resilience

New reservoirs are required to achieve a seismic resilience level of service whereby a scenario exists where no incoming water supply is provided.[11] The volume required to meet this level of service is based on providing 20 L/person/day from days 8 to 30 post earthquake as well as providing water to defined "critical" users.

For the Eastern Hills Reservoir, it is expected that water supply to the reservoir will be restored within 15 days (rather than the standard 30 days) thereby reducing the storage requirement. The location of the Waiwhetū Aquifer will contribute to the WSAs resilience as direct connections to bores from the mains network are possible should the Waterloo WTP be offline. This influences the sizing of the reservoir.

Utilising a 15-day seismic storage assessment results in the operational requirements of the WSA being the determining factor for required storage volume as opposed to hazard resilience requirements. As set out previously in section 2.2 there exists a storage deficit that is required to be addressed. However, a new reservoir will provide post event functionality that will have benefits for the local community and assist with post disaster recovery. Reducing the time taken to return to a business-as-usual economic activity will contribute toward to providing economic, community and social wellbeing in the Hutt Valley after a significant event.

The reservoir will also be designed and developed in accordance with the resilience requirements of the New Zealand Building Code so that it can withstand potential future seismic events.

2.3 Project Objectives

The development of a new reservoir has been determined as the preferred solution to address the issues with the level of service identified in section 2.2. Through a site selection process[12], the most appropriate location for the reservoir was identified as being within the eastern hills, adjoining the existing Naenae Reservoir. The project objectives are:

1. To address the current storage shortfall and ensure sufficient storage for future growth in the Lower Hutt Central and Taita Water Storage Areas (WSA) by:
    - To improve disaster resilience of the Lower Hutt Central and Taita WSAs by providing a seismically resilient water supply capable of meeting Wellington Water's target level of service; and
    - To ensure the Lower Hutt Central and Taita WSAs are operationally resilient by providing sufficient secure, safe and reliable water storage to supply 48 hours of water to residents, businesses and critical water users (including Fire and Emergency NZ) under normal operating conditions, based on projected demand with appropriate consideration of population growth.
2. To deliver a secure, safe and reliable water storage solution that has a 100-year design life.

[11] Section 3.2, Lower Hutt Central and Taita Storage Volume Assessment, Connect Water, October 2023.
[12] The site selection process is addressed in Section 8.3 of this AEE.

3. To integrate the chose solution into the Lower Hutt Central WSA network in a cost-effective manner.

The Project (this Notice of Requirement) is further detailed in Section 3 of this report. It has been developed with specific consideration given toward achieving the Project objectives.

2.4 Project Benefits

The Project will have broad range of benefits, including:

- Address current storage deficits in the existing potable water supply network.
- Enable future growth within the WSA through both future development and population growth.
- Provide operational, network and hazard resilience to the water network.
- Support the redevelopment of other reservoirs within the WSA through providing additional capacity.
- Positive long-term recreational benefits associated with the regrading of the access track, wayfinding signage, and seating.
- Ecological benefits associated with remediation planting proposed which will create habitat and improve ecological values at the site.

2.5 Project Requirements

In order for the Eastern Hills Reservoir to meet the Project objectives the following key requirements must be met:

- Storage volume of 15 ML (15,000 m^3).
- Top water level of 72.53m (required operationally to match the Gracefield and Taita reservoirs as they are hydraulically connected).
- Reservoir located to be able to service the Lower Hutt Central WSA and receive inlet water from the Waterloo Water Treatment Plant.
- Designed to seismic importance level 4.
- 100-year design life.

PART B: DESCRIPTION OF THE PROJECT

3 Description of the Project

The proposal provides for the construction, operation and maintenance of the Eastern Hills reservoir. Construction activities will include bulk earthworks and vegetation clearance, installation of a new inlet pipe and overflow / scour pipe and delivery pipe, and the trenching of the overflow pipe and the delivery pipe through the bed of Waiwhetū Stream.

There is a separate package of work involving the delivery pipe connection to new assets within Balgownie Grove within the road, through to the connection at the Oxford Terrace main. These works are separate to the main reservoir works and have not been assessed further in this Notice of Requirement.

The design of the reservoir and associated pipework have been developed in accordance with Wellington Water's general requirements for reservoirs and potable water piping in the Regional Specification for Water Services v3.0, published in December 2021. These details are approximate, and subject to finalisation as part of the detailed design for the Project. Any design refinement is not considered likely to alter the conclusions contained within the assessment of effects (i.e. worse case situation figures will be used meaning that the effects will be in general accordance with the effects assessed by the Project specialists).

3.1 Eastern Hills Reservoir Design

The preliminary design is outlined in detail in the Preliminary Design report in **Appendix C.**

In summary the proposed Eastern Hills Reservoir structure has the following features detailed in Table 3.

Table 3: Reservoir Arrangement

Storage Volume	15,000 m^3
Shape	Circular
Internal Diameter	55m
Top-water Level	72.53m(NZVD2016) (required operationally to match the Gracefield and Taita reservoirs)
Wall Height	7.5m (top of perimeter foundation to roof slab)
Water Depth	6.5m
Main Structural Form	Precast post-tensioned reinforced concrete
Roof and Support Stricture	• **Outer units**: 500mm deep single-tee precast panels (spanning from walls to central roof ring beam) with 100 mm thick insitu reinforced concrete topping slab • **Inner units**: 500 mm deep single-tee (or double-tee) precast panels (spanning between the central roof ring beam), with 100 mm thick insitu

	reinforced concrete topping slab • Roof supported on the walls and a central reinforced concrete column and ring beam arrangement
Walls and Wall Foundation	• 72 precast pre-stressed concrete panels, 7.5m high, with insitu stitch joints between panels • 6 pilasters, 7.5m high, anchoring horizontal post-tensioning tendons • Horizontal post-tensioning tendons in walls. Each tendon consists of a bundle of 15.2 mm super strands within a cement-grouted ribbed steel galvanized duct • Panels reinforced vertically each face by layers of pre-stressed 15.2 mm super strands with conventional reinforcement in the horizontal direction • 3 m wide x 0.6 m deep reinforced concrete ring beam footing located centrally beneath wall units and internal columns
Internal Columns and Colum Foundation	• 12 No. 600 mm x 600 mm precast reinforced concrete columns arranged in a circular configuration. • Precast roof ring beams 1000 mm deep, 600 mm wide with 400 mm deep and 150 mm wide corbel on both sides of the beam (at the bottom) arranged between columns with an insitu stitch between each beam
Floor Slab	• Reinforced concrete slab, cast in-situ, 250 mm thick
Valve Chamber / Control Building	• Reinforced concrete slab and chamber walls cast in-situ, 400 mm thick • 200-series reinforced blockwork walls for control building, supporting reinforced concrete roof slab

The new reservoir will be constructed on top of a flat platform, cut into the existing ridgeline. The cut platform will be up to 20m below the existing ground level, in order to achieve the required top water level (72.53m) of the reservoir, and set back from the natural slope. Approximately 83,000m^3 of earthworks for the construction of the reservoir, with an additional 7,000m^3 for the overflow/scour pipeline will be required.

A buffer of approximately 20m will be provided between the existing Naenae reservoir and the new reservoir. The new reservoir will be an above ground reservoir with a valvehouse. Landscaping around the reservoir is proposed.

The firebreak track that runs through the site will be reconstructed after completion of construction to run around the site boundary and then graded to reconnect with the existing firebreak track to the south of the Project site. The track will be graded at a slope of 1:3 to the south, and to the north of the reservoir, where it connects with Summit Road, it will be graded to 1:6.

3.1.1 Seismic design criteria

The new reservoir has been designed to achieve the following standards in Table 4.

Table 4: Reservoir Design Standards

Design Life (strength & durability)	100 years
Importance Level	4
Seismic limit state annual exceedance	1/2500 ULS

probabilities	1/1000 SLS2 1/25 SLS

The importance of the reservoir as a seismically resilient structure is reflected in the Importance Level design of 4 (of a possible 5), which is typically used for post disaster critical structures. Designing to this standard results in the reservoir still being operational (i.e. no cracks or leakage) after a 1-in-500 year event.

The foundations for the reservoir will be shallow, as the site will be pre-loaded by the material that will be removed to provide for the reservoir platform. Foundations of the reservoir structure will feature concrete beams and a concrete slab. Slope stabilisation soldier piles will also be included around a portion of the reservoir's circumference where ground conditions indicate there is the potential for a loss of ground support in a strong earthquake. These will be installed into competent rock below ground and reinforced with concrete.

Seismic design criteria, and slope stability requirements have heavily influenced the design of slopes surrounding the site. Cut slopes have been designed so that they are suitably flat and remain stable under normal conditions so that they do not impact the performance of the new reservoir during hazard events. The permanent earthworks are designed with cut slopes of 1H:1V, flattened to 1.5H:1V where the rock is residually to completely weathered. Slopes will be reinforced with geogrid reinforcement where necessary. Small quantities of fill, up to 4m high may be required outside of the tank foundations. The fill will be benched into the natural slopes with batters of 2H:1V. Cuts will be rounded at each end to blend into the natural landscape and prevent fretting in these areas. Sub-horizontal drains will be installed to drain persistent water bearing defects.

3.2 Stormwater

Stormwater design for the reservoir site incorporates open channels and piping to convey flow and, where possible, will discharge this to the Waiwhetū Stream via the new reservoir scour pipe. Stormwater from, and adjacent to, the existing Naenae Reservoir will be conveyed by open channels and an outlet pipe to the gully near the Summit Road site entrance. The long-term site stormwater has been designed in accordance with Wellington Water standards to a 10% primary level of service.

The existing stormwater pipes within Balgownie Grove are also required to be partially realigned due to a service clash as a result of the Project. The existing stormwater pipe will be rerouted, and a new manhole installed adjacent to the delivery pipe valve chamber, with the delivery pipe "scour" (valve that allows the delivery pipe to be emptied to the stormwater network for maintenance) discharging into this manhole as well.

3.3 Existing Trig Station

There is an existing 4th order trig station located on the reservoir site (refer to Figure 3). This station is within the boundary of the site earthworks. This trig station will be relocated as part of the project, prior to physical works beginning on site, to a site at the head of the Farrelly Grove cul-de-sac as informed by LINZ.

Figure 4: Trig Station

3.4 Pipelines

3.4.1 Water Supply

The existing DN750 bulk water supply pipeline up Summit Road is sufficiently sized for the Project and there is no need to replace this pipe as part of this project. The inlet pipe to the Eastern Hills Reservoir will be connected to this existing DH750 pipe which presently feeds the Naenae Reservoir.

3.4.2 Delivery, Overflow and Scour Pipe

The design flowrate for the dedicated Eastern Hills Reservoir delivery pipe is 600 L/s, based on

the 2050 population projection as modelled by Wellington Water. To achieve this flowrate a DN750 pipe will be installed. This pipe will be connected to the new reservoir, then run down the slope to the north of the site following a bearing toward Balgownie Grove. The delivery pipeline is then required to cross Waiwhetū Stream at the end of Balgownie Grove to connect to the water supply network. This crossing will be achieved beneath the stream bed. Approximately 9m of DN750 concrete lined steel pipe will be encased in concrete to protect it from scour from the stream.

A combined overflow/scour pipeline is also required to be constructed from the new reservoir. The overflow pipe is for any emergency overflows from the reservoir and the scour pipe is used to empty or “scour” the reservoir to allow routine maintenance. This pipeline will follow the same pipe alignment as the delivery pipe, down the bush-clad slope to the north of the reservoir with a bearing toward Balgownie Grove. It will be a DN500 pipe with internal water stops where grades exceed 20% (although the gradient for both pipes down this alignment is approximately 25%). The existing Naenae reservoir overflow/scour pipe will also be connected to this pipe as the existing scour pipe discharges to the top of the gully adjacent to the Naenae reservoir and is potentially causing erosion through the gully towards the stream. Stormwater will be conveyed down this new pipe and discharged to Waiwhetū Stream.

3.4.3 Waiwhetū Stream Outfall

The scour/overflow pipe will have an outfall to Waiwhetū Stream, via a partially buried bubble-up chamber (located approximately 15m from the stream) and lined swale. The swale and associated rip

rap have been designed to accommodate flows up to 894 L/s and an energy dissipation device is also proposed to be installed through the use of a bubble-up chamber. The exact location of the chamber will be determined during detailed design.

The swale from the bubble up to the chamber shall be approximately 12m long, filled with rock rip rap. The swale shall be a 700mm deep trapezoidal channel with side slopes of 1H:0.5V.

Gabion baskets will be embedded in the stream back at the discharge point to protect the banks from erosion. The swale will discharge to the stream approximately 500mm above the dry weather stream flow level.

3.5 Landscape Design

Landscaping has been proposed around the reservoir and delivery pipe corridor as detailed in the Landscape and Visual Assessment included as **Appendix E** of this Notice of Requirement. Key landscaping features include:

- Native planting along the delivery pipe corridor;
- Riparian planting adjacent to Waiwhetū Stream;
- Native planting adjoining the access tracks/firebreak;
- Native planting surrounding the proposed reservoir; and
- Provision of a grassed area between the proposed and existing reservoir.

Plants will be native species and their selection has been influenced by the site's presence within Ecological Zone 7 of the Greater Wellington Regional Council Native Plant Guide.

The proposed vegetation mixes have been selected to provide a layered cover and range in height from low shrubs through to specimen trees. In areas with deep cut rock faces, to aid vegetation establishment some of the native mixes could be hydroseeded onto the faces if the area is accessible by truck. To better screen the reservoir, planting areas have been extended beyond the immediate extent of the works.

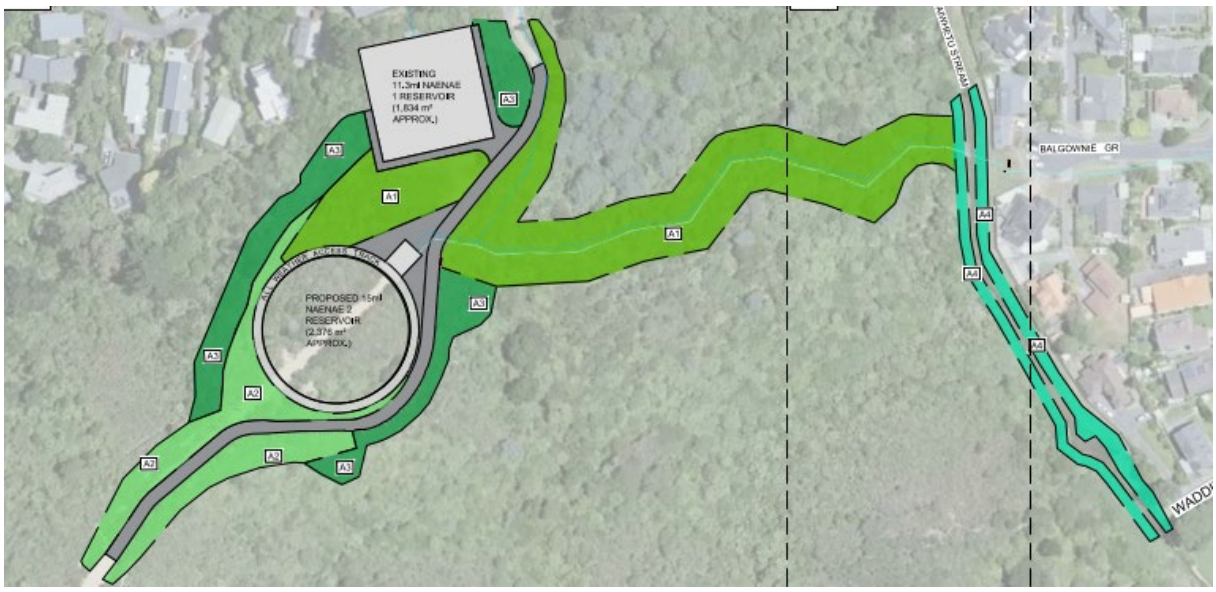

Figure 5: Proposed landscape planting (provided in Appendix E)

4 Construction of the Project

4.1 Introduction

The scope of works for construction of the reservoir includes:

(a) Geotechnical investigations as part of the enabling works

(b) Construction of a 15 ML circular, reservoir with associated concrete valve house;

(c) Installation of approximately 200m of DN750 delivery/outlet pipe;

(d) Installation of approximately 200m of DN554 scour/overflow pipe;

(e) A new outfall to Waiwhetū Stream with an energy dissipation structure;

(f) A below stream bed crossing under Waiwhetū Stream for the delivery pipe;

(g) Installation of approximately 100m of DN750 inlet pipe connecting the new reservoir to the existing bulk main on Summit Road;

(h) Installation of approximately 100m of DN500 delivery pipe connecting the existing Naenae reservoir to the new reservoir;

(i) Installation of approximately 50m of DN300m scour/overfloew pipe from the existing Naenae reservoir to the scour/overflow pipe from the new reservoir;

(j) Connections to the existing bulk network within Balgownie Grove;

(k) Bulk earthworks on the site to facilitate construction of the reservoir;

(l) The operation of a construction yard including its use for stockpiles, site offices, and storage of construction equipment;

(m) Reinstatement of a fire-break and access track around the reservoir site; and

(n) Landscaping and planting

4.2 Construction Timing and Duration

Working hours will generally be Monday to Saturday 7am – 6pm with noise restricted before 7.30am. Works able to occur between 7:00am and 7:30am shall be limited to preparation works and shall not include the operation of machinery. No work will take place on Sundays or public holidays. Exceptions to this will be night works, crane mobilisation and delivery of oversized materials (i.e. the reservoir panels) which will likely require delivery before 7am due to traffic restrictions and traffic management requirements.

Approximately four days of night works will be required for the concrete pours for the reservoir slab and roof and curing attendance.

It is anticipated that the construction of the Project will take 2.5 years to complete.

4.3 Proposed Construction Sequence

The following construction sequencing is anticipated:

(a) Set up site, environmental controls and access road preparation;

(b) Bulk earthworks and enabling works for the reservoir;

(c) Subgrade works at the reservoir and valvehouse footprints;

(d) Reservoir and valvehouse construction

(e) Earthworks and enabling works for the delivery/scour pipelines;

(f) Install scour and delivery pipes including Waiwhetū stream discharge and crossing;

(g) Valvehouse fitout;

(h) Reservoir testing and commissioning; and

(i) Landscaping and site finishing works including decommissioning of the site and disestablishment of temporary erosion/sediment control measures.

It is noted that the site features a restricted working space on the site, so the feasibility of carrying out pipe installation works in conjunction with earthworks will be considered further in detailed design. For the purposes of this Notice of Requirement, and the associated assessment of effects, it has been assumed that vegetation clearance and earthworks for the reservoir and pipeline works will occur during two separate earthworks seasons.

A full indicative construction programme is included in **Appendix D**.

4.4 Enabling Works

Prior to the commencement of construction activities, a suite of activities will occur which are referred to in a combined name as the Enabling Works. These activities will include pre-construction

site investigations so as to inform the detailed design of the Project, and site establishment activities which are required to occur prior to starting any bulk earthworks on site. These activities include;

- Geotechnical investigations;
- Site establishment activities including site yards, site offices, fencing, and formation of site access points;
- Construction of the site access road;
- Ecological surveys and any necessary relocations;
- Vegetation removal and protection works;
- Construction and installation of erosion and sediment control measures; and
- Establishment of mitigation measures (such as screening, bunds, noise walls).

The geotechnical investigations may require the removal of vegetation where the drilling machinery is unable to avoid established vegetation on the side of the firebreak track. Drilling rigs will be helicoptered to the site and placed on top of scaffolding which will be carried to the drilling site. The placement of scaffolding will be undertaken in a manner where it is orientated to avoid the removal of vegetation where practicable and supervised by a project ecologist. It will provide an approximate 50m^2 elevated working platform for the drilling rig to be operated from. Hand augers may also be required, and where this occurs access will be undertaken via foot with no vegetation removal being required. Any geotechnical drilling undertaken as part of the enabling works will be within the construction works footprint. The boreholes will confirm the geotechnical suitability of the land as well as inform the detailed design of the reservoir.

The site establishment activities will occur prior to any bulk earthworks commencing on site. These will provide for the contractor to establish a works area whereby they can deploy erosion and sediment controls, start bringing in equipment and materials required for the job, and will be bunded by appropriate erosion and sediment controls. At this stage public access to the track and area is likely to be restricted. The site yard will be established on top of the existing Naenae 1 reservoir as well as the adjoining firebreak track. Any vegetation clearance required as part of a site establishment activity may require formal mitigation to be addressed via an Enabling Works Outline Plan.

Some localised earthworks will be required to upgrade the existing firebreak track to form the site access road so as to be a suitable size and gradient for construction equipment access. This may involve importing material to form an all-weather surface that will incorporate the existing firebreak track.

Prior to the main construction works commencing, ecological surveys, monitoring and relocation work will be required. These investigations and surveys will be undertaken in accordance with the approved wildlife permits as well as the approved wildlife management plans. Investigations and relocations are non-intrusive activities which will not result in any vegetation being removed.

4.5 Preparation of Management Plans

The Notice of Requirement relies on the preparation and implementation of a range of management plans so as to manage construction activities and associated effects. These management plans will be

prepared prior to the commencement of Construction Works and will be informed by the development of detailed design of the Project.

The management plans are not required to support any of the enabling works described in Section 4.4 previously, with a separate Outline Plan Enabling Works proposed to address this. This Outline Plan Enabling Works will also address any remediation work required in the unlikely event that the enabling works are carried out but the construction works do not ultimately proceed.

The purpose of the management plans is to manage effects associated with the construction works described below.

4.6 Reservoir Construction

The construction of the reservoir will involve the following activities.

4.6.1 Geotechnical Investigations

Prior to the main phase of construction commencing, geotechnical investigations are required as part of enabling works to determine ground conditions that will subsequently inform the detailed design of the reservoir. These boreholes may be drilled to a depth of 20m.

The proposed geotechnical investigation locations are indicated in red in Figure 6. Note that the notations in black indicate the location of samples that have been previously obtained.

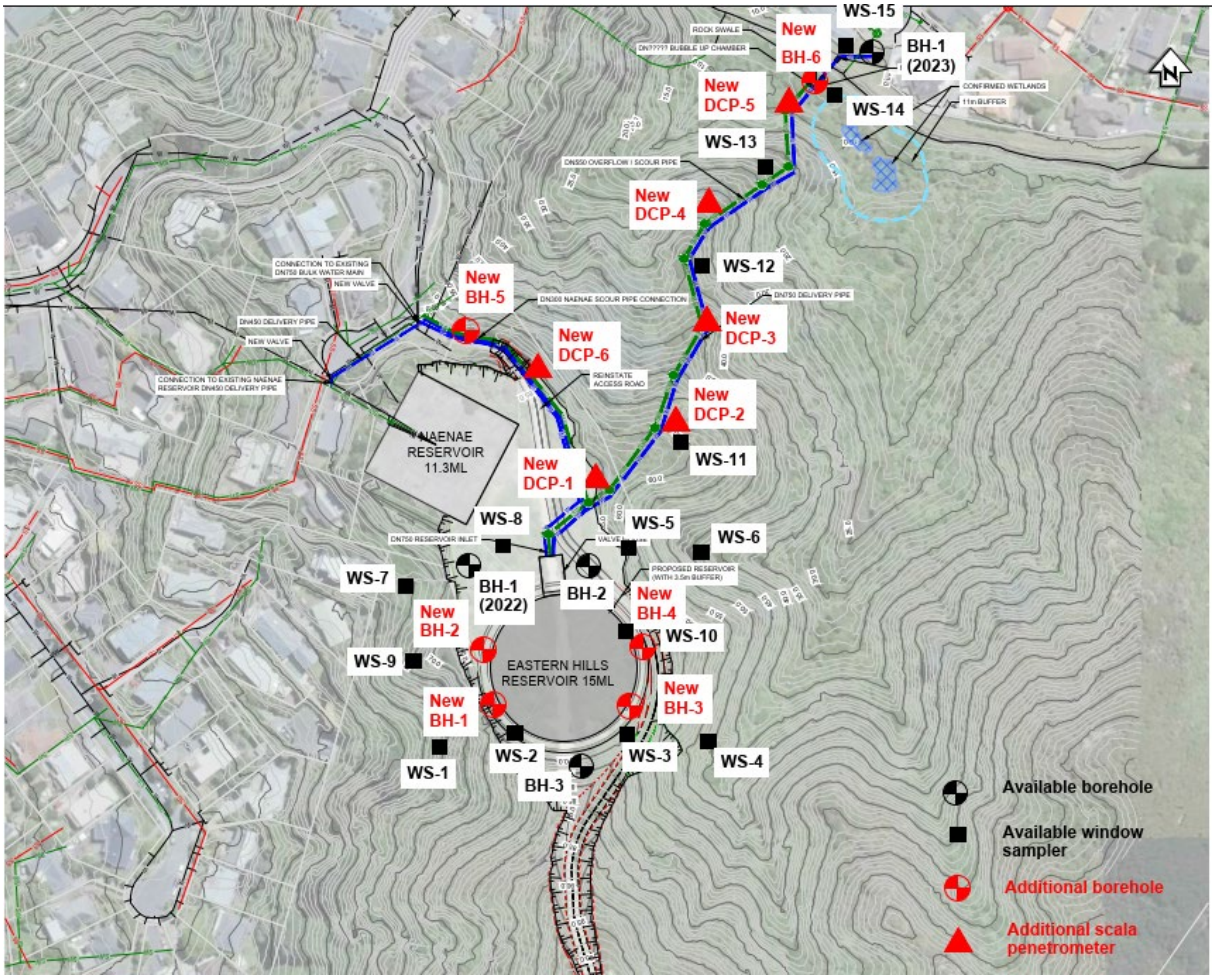

Figure 6: Proposed Geotechnical Investigations

The location of the boreholes is influenced by the location of the reservoir and supporting utilities.

4.6.2 Construction Access

Access to the site is via Summit Road which is a moderately steep, winding and narrow residential street. There are no overhead lines up Summit Road, but some vegetation may need to be trimmed to allow the passage of high loads. Signage will be put in place as required, and construction vehicle movements will be managed in accordance with a Construction Traffic Management Plan (CTMP).

It is noted that due to the nature of the construction activities that will occur at the site, the existing firebreak track will be shut to the public during construction for health and safety reasons.

4.6.3 Construction Support Areas

Two construction support areas will be established to facilitate the construction of the Project. The construction support area at the reservoir site will feature:

1. Site offices and amenities for construction staff;
2. Areas for parking construction machinery;
3. Areas for the loading and unloading of construction materials;

4. Designated areas for storage of excess soil; and
5. Stormwater treatment facilities where required.

The construction support area at Balgownie Grove, which is considered a satellite site, will be limited to providing for those activities associated with the pipeline construction and for works within close proximity to Waiwhetū stream.

Following completion of these works, which is estimated to take approximately 7 months, the sites will be disestablished and remediated.

4.6.4 Vegetation Clearance

Vegetation is required to be removed within the Project footprint. Vegetation removal will be staged, and only occur prior to the necessary works occurring (i.e. the entire site will not be de-vegetated at the same time). Prior to the removal of vegetation, lizard salvage activities will be undertaken whilst being supervised by an ecologist. A Department of Conservation Wildlife Authority has been applied for.

Vegetation clearance activities will also be influenced by seasonal requirements.

4.6.5 Earthworks

Earthworks will be required to form the levels required for the Project as well as for the installation of supporting network utilities.

Following the removal of vegetation, erosion and sediment control devices will be installed prior to bulk earthworks occurring. During earthworks, a range of equipment may be used including large excavators, off-road dump trucks, and truck and trailer units for both onsite and offsite operations. It is anticipated that a large volume of excess spoil (approximately 83,000 m^3) will need to be excavated and removed from the site to create the reservoir platform. An additional 7,000 m^3 will be removed for the construction of the delivery and scour pipelines.

Clean fill will be disposed of off-site by the appointed Contractor to an appropriate facility. The site will be progressively excavated from Summit Road to create sufficient turning area to the south of the existing Naenae Reservoir.

During earthworks, Erosion and sediment controls will be installed in accordance with the *Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Wellington Region* (February 2021).

The proposed control measures cover three phases of work:

(o) Phase 1 – Pre-construction (site mobilisation) stage;

(p) Phase 2 – Construction stage

(q) Phase 3 – Post-construction (site de-mobilisation) stage

Further details can be found in the Draft Erosion and Sediment Control Plan (ESCP) in **Appendix F**.

4.6.6 Construction Traffic

The construction activities have the potential to generate a large number of traffic movements. Construction vehicle movements will be influenced by a site specific construction traffic management plan. Access restrictions, such as the removal of on street car parks, will also be detailed within this management plan.

There is the potential for a large volume of construction traffic to be generated during off-site disposal of bulk earthworks, and concrete pours. Vehicle movements associated with the delivery of panels and beams may require access to site outside of the core working hours due to road network constraints. Activities that will require vehicle movements outside of the ordinary construction traffic will be subject to temporary traffic management practices.

Additional construction traffic advisory signs will be installed throughout the construction period for the Project.

4.6.7 Construction of the Reservoir

Following completion of the earthworks within the reservoir footprint, all of the necessary pipework will be installed prior to pouring of the concrete slab. The installation of the concrete slab will require a continuous, single pour. Approximately 300m^3 of concrete will be required, which will require approximately 50 concrete truck deliveries. Due to the requirement for a continuous concrete pour night works will be required.

The reservoir will then be constructed using cranes which will lift the precast panels into place prior to tensioning. A roof structure will then be installed utilising the cranes and pre-cast beams and slabs as well as an insitu topping slab with waterproofing and drainage. The final roof slab will then be installed using a single pour which will involve night works. Access stairs, handrails and security fences will then be installed for safety purposes.

Prior to the reservoir commencing full operations testing, disinfection and commissioning of individual elements will occur. This will occur progressively as elements are installed. A leak test will also occur whereby the reservoir is completely filled and monitored. A controlled discharge will then occur prior to any remediation works commencing. Following these works, the final fill will occur and the reservoir will be connected to the network.

4.6.8 Construction of the Delivery and Scour Pipes

Delivery and scour pipes are required to service the new reservoir. These will traverse the bush covered hillside and will be installed via open excavation trenching and then subsequently buried. This will occur within a 30m wide construction corridor which provides the necessary space for a contractor to install the pipes, operate machinery, and install erosion and sediment control devices.

It is anticipated that the trenching will require the excavation of 7,000m^3 of soil. Vegetation will also be required to be removed along the pipe alignment across an approximate width of 12m plus 1m additional working area either side – refer to Figure 7. Vegetation clearance and lizard salvage will occur in a manner consistent with the methodology set out previously.

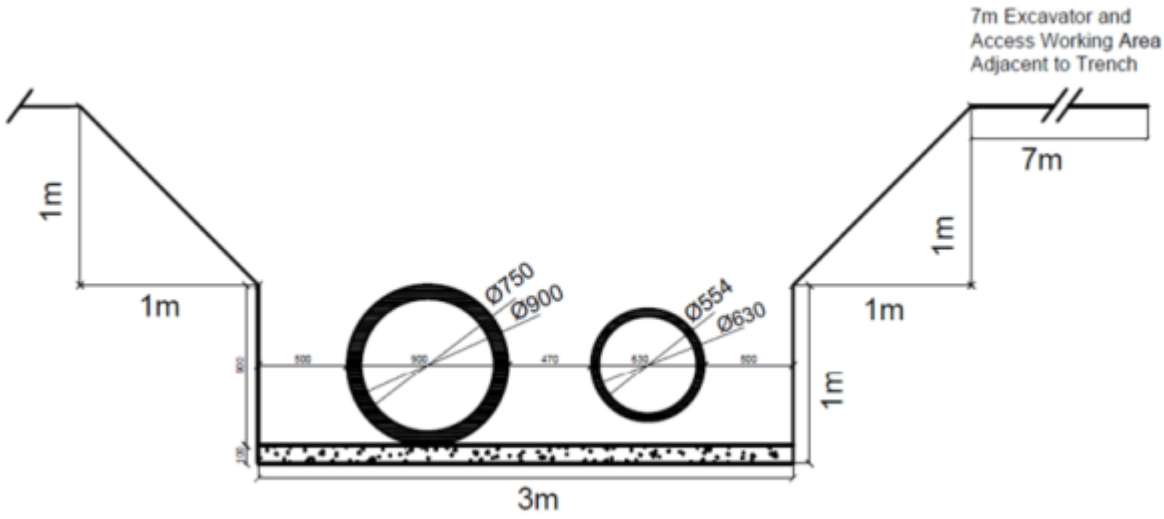

Figure 7: Indicative trench width and working area

The pipelines will be constructed in stages, backfilling and stabilising the land as the works progress. It is anticipated that the pipelines will be constructed from the bottom up (i.e. from Balgownie Grove, heading toward the reservoir up the hill).

The route for the pipes will follow the ridge to the north of the valvehouse towards Waiwhetū Stream and Balgownie Grove. The chosen method of construction for the combined alignment of the pipes is both pipelines will be buried via open excavation. Benching and shoring may also be required to support the pipe depending on the ground conditions encountered.

Following the completion of the installation of the pipelines, re-vegetation with shallow-rooting plants, across the entire pipe corridor, will occur as soon as possible in order to stabilise the surface.

4.6.9 Waiwhetū Stream Crossing and Outfall

It is proposed that where the delivery pipe crosses Waiwhetū Stream, this will occur below ground and will be constructed via open trenching. An above-ground crossing was not preferred due to the need to clear the 100-year flood level and the health and safety concerns of having a pipe approximately 4m above stream level. An aerial crossing would have a visual impact and could impede maintenance and recreational activities along the stream bank.

For the trenching methodology, cofferdams will be utilised to provide a dry works area. Bypass pumping of the stream will occur in order to maintain flows. Fish barriers and other fish management measures will be required as outlined in the ecology assessment (**Appendix G**).

Cofferdams will also be used where the gabion baskets are installed on the scour outfall, however if possible, passage for the stream will be allowed for around the works site.

Methodologies for dewatering and overpumping are provided in more detail in the Notice of Requirement for Resource Consent submitted to the Greater Wellington Regional Council.

4.6.10 Temporary Vehicle Bridge

A temporary staging bridge across the Waiwhetū Stream is to be established to assist in the construction of the pipes down the hill and the works around the stream. The bridge will be a prefabricated deck installed on driven piles, crossing at a level high across to the hill on the hill side of the flood plain. Piles are to be located such that they are not driven through the stream bed. The staging bridge may be installed for up to 4 – 5 months, primarily over the summer period.

4.6.11 Reinstatement

Following the construction of the Project, reinstatement works will occur.

The firebreak track will be reinstated and reconnected to the wider track network, extending from the site entrance to the top end of the site around the reservoir. The section of track up to the reservoir will be improved by re-grading and re-surfacing. Planting and landscaping activities will be carried out during the final stages of construction and commissioning.

Between the reservoirs, the flattened area will feature a combination of grass, low-level plants and hard surfacing. The sections of the hillside where vegetation was cleared for the delivery and scour pipelines will be replanted with shallow-rooted plants. Landscaping will occur progressively and as the seasons allow. Detail of this is contained in the landscape concept plan appended to this AEE.

Pipe connections to the existing Naenae inlet and delivery mains will also be constructed within the carriageway of Farrelly Grove and Summit Road. The new Eastern Hills reservoir delivery pipe will connect to the remainder of the new delivery pipe within the verge at the end of Balgownie Grove. The new delivery pipe within the road corridor of Balgownie Grove, that connects to the water network, is not included within this NOR.

PART C: DESCRIPTION OF THE EXISTING ENVIRONMENT

5 Description of the Environment

5.1 Overview

The site for the reservoir is adjacent to the existing Naenae reservoir which is located at the top of Summit Road in Fairfield, Lower Hutt. The existing reservoir was built in 1946 and is a partially buried square reservoir with a capacity of 11.3ML.

There are two land parcels which form the reservoir site, which are both owned by Hutt City Council:

- Lot 14 DP 59678 (13.206 ha)
- Lot 35 DP 31233 (1.126 ha)

Access to the site is via a track from Summit Road; this has a lockable barrier to prevent unauthorised vehicle access, but pedestrian and cycling access is possible.

5.2 Existing Naenae Reservoir and Network

The existing 11.3 ML Naenae Reservoir is a rectangular concrete reservoir constructed in 1946. This reservoir was buried, although the roof was permanently exposed several years ago to allow repairs to be made to cracks. A small control room with various monitoring equipment was retrospectively added to the reservoir. Work was completed in 2023 to permanently expose most of the walls, for maintenance and resilience purposes. The reservoir has a remaining design life of 20 years.

The existing reservoir is serviced by the Waterloo WTP, with a bulk watermain running up Summit Road. Overflow and stormwater from the reservoir is discharged to a gully at the top of Summit Road, whereby it eventually enters Waiwhetū Stream via overland flow.

5.3 Local Authorities and Zoning

5.3.1 Hutt City Council

Under the Hutt City District Plan (HCDP) part of the site is zoned as 'Medium Density Residential' and part is zoned 'Passive Recreation', with a Significant Natural Resource (SNR:12) overlay (Figure 8).

As shown in Figure 8 the site is located within a Significant Natural Resource (SNR) area and the values of this area are described in the HCDP and replicated in Table 5.

Table 5: Significant Natural Resource Area Description

SNR 12: Eastern Hills Bush	*Lowland forest on hill country. Contains a fire-induced regionally representative regenerating vegetation mosaic, including areas of pre-European Podocarps and Hard Beech.* *Nearly two-thirds of the forest is 90-110 years old. Plants - Arthropodium*

	cirrhatum, Fuchsia excorticata and Podocarpus totara. Large species diversity due to different topography. Many bird species, including NZ pigeon.

SNR 12 comes under the wider definition of 'Significant Natural, Cultural and Archaeological Resources' in the HCDP, which is described as having significant indigenous vegetation/habitat values.

SNR12 has the status of a 'Significant Natural Area' (SNA) under the transitional provisions of the National Policy Statement for Indigenous Biodiversity (NPS-IB), as discussed further below.

The existing Naenae reservoir is not designated, and there are no other notations on the site such as historic places, natural hazards, or protected trees. There are no interests registered on the records of title.

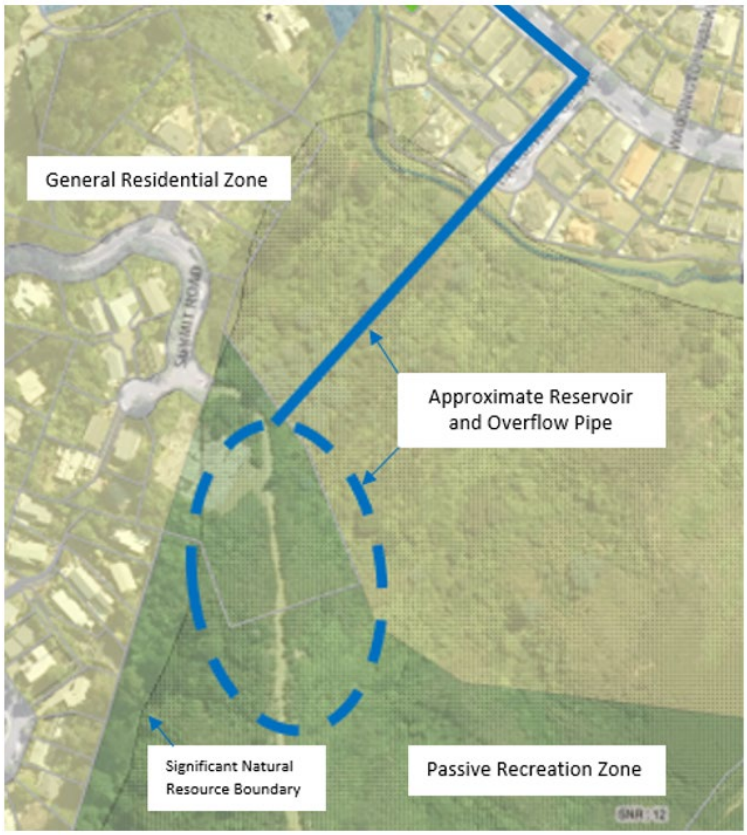

Figure 8: Hutt City District Plan Zoning

5.3.2 Greater Wellington Regional Council Natural Resources Plan

Under the Greater Wellington Natural Resources Plan (NRP) the site, including the area in the vicinity of the proposed crossing of Waiwhetū Stream (River Class 6), is not listed in any Schedules as having any values. However, following further ecological assessment in early 2023 it has been determined that there is a wetland present on site. It is important to note that due to their rarity, all natural

wetlands in the Wellington Region are classed as ecosystems and habitats with significant indigenous biodiversity values[13].

5.4 Built Environment and Land Use

5.4.1 Social Environment

People within the surrounding environment have a median age of 35.2 years, which is slightly lower than the median age for the local area (36.9 years) and for New Zealand (37.4 years). Car ownership figures within Fairfield are consistent with the Wellington Regional Average (being 38.6% own one vehicle and 32.8% own two vehicles). Car ownership figures are approximately 10% less in Naenae.

5.4.2 Land use

The site is surrounded by residential land uses, with Fairfield to the west and Naenae to the north-east. These areas are characterised by cul-de-sacs nearest to the works and borders on the reserve area. For those located in Naenae, the Waiwhetū Stream provides a boundary between the Project site and residential area. The reserve area has multiple access routes from various points, including Balgownie Grove via informal tracks.

Within the wider environment, the closest school is located approximately 500m to the east of the site, within Naenae. This school has a church onsite and functions as the Community Emergency Hub.

There are no other churches, marae, medical centres or libraries within a 500m study area.

5.4.3 Local Road Network

Access to the reservoir construction site will be via Summit Road, a 500m cul-de-sac leading into the eastern hills of Lower Hutt. Two other cul-de-sacs come off Summit Road: Farrelly Grove and Laura Fergusson Grove. Summit Road connects to the rest of the road network via Tilbury Street, which is classified as a Local Street with an average of 1,730 vehicles per day.

Summit Road, Farrelly Grove and Laura Fergusson Grove are classified as Local Streets under Waka Kotahi's One Network Framework. Traffic volumes are typically low with fewer than 250 vehicle movements per day. For the most part, the streets are only used for access to residential properties. Other trip generators include:

- A walking and mountain biking track that begins at the end of Summit Road;
- An existing reservoir (Naenae) located just beyond the end of Summit Road; and
- Laura Fergusson Trust campus, located at the end of Laura Fergusson Grove (which can also be accessed via Hammerton Street).

[13] "*Note that, because of the rarity of wetlands in the Wellington Region, all natural wetlands will meet the representativeness and rarity cirteria listed in Policy 23 of the Regional Policy Statement 2023 and are therefore ecosystems and habitats with significant indigenous biodiversity values managed under Policy P42"* Greater Wellington Regional Council Natural Resources Plan, Operative Version, 2023. Page 35.

Table 6: Transport Information for Summit Road, Farrelly Grove and Laura Fergusson Grove

	Summit Road	Farrelly Grove	Laura Ferguson Grove
ONF Classification	Local Street	Local Street	Local Street
Traffic Volume	200 vpd	6 vpd	65 vpd
Heavy Traffic Volume	3% (6 vpd)	0% (0 vpd)	0% (0 vpd)
Average Carriageway Width	7.5 – 8 m	7.5 m	6.5 – 7 m
No. Properties	30	10	32

Access for some of the construction of the two new delivery and overflow pipelines will be via Balgownie Grove (with the upper portion access via the Summit Road site). Balgownie Grove connects to the road network via Waddington Drive, which is also classified as a Local Street, with an average of 2, 530 vehicles per day. This street is also a low volume cul-de-sac with fewer than 50 vehicle movements per day. There are several home businesses located on Balgownie Grove which require regular vehicle access.

5.4.4 Recreational Uses

The proposed reservoir is located in the Hutt Valley's Eastern Hills Reserve. The reserve forms part of a network of connected public open space which serves the community for a wide range of passive and active recreation uses.

The site features an existing track known as the Summit Road Firebreak Track, which links Summit Road with Te Whiti Riser Summit. This track and the wider recreational reserve is popular with mountain bikers, walkers/hikers and trail runners. The track is identified by Greater Wellington Regional Council's Recreational Tracks GIS Viewer as a tramping track (easy). The Summit Road Firebreak Track serves as a link between Summit Road and a network of trails situated in the Eastern Hills area. Spanning from Upper Hutt to Wainuiomata, the Eastern Hills boast numerous tracks branching off from the ECNZ Pylon Track.

Surrounding the site are three significant recreation sites: the Waiwhetū Stream and associated green space, the Waddington Winder mountain bike track and the ECNZ Pylon Track which links to the surrounding ridge lines (Figure 9).

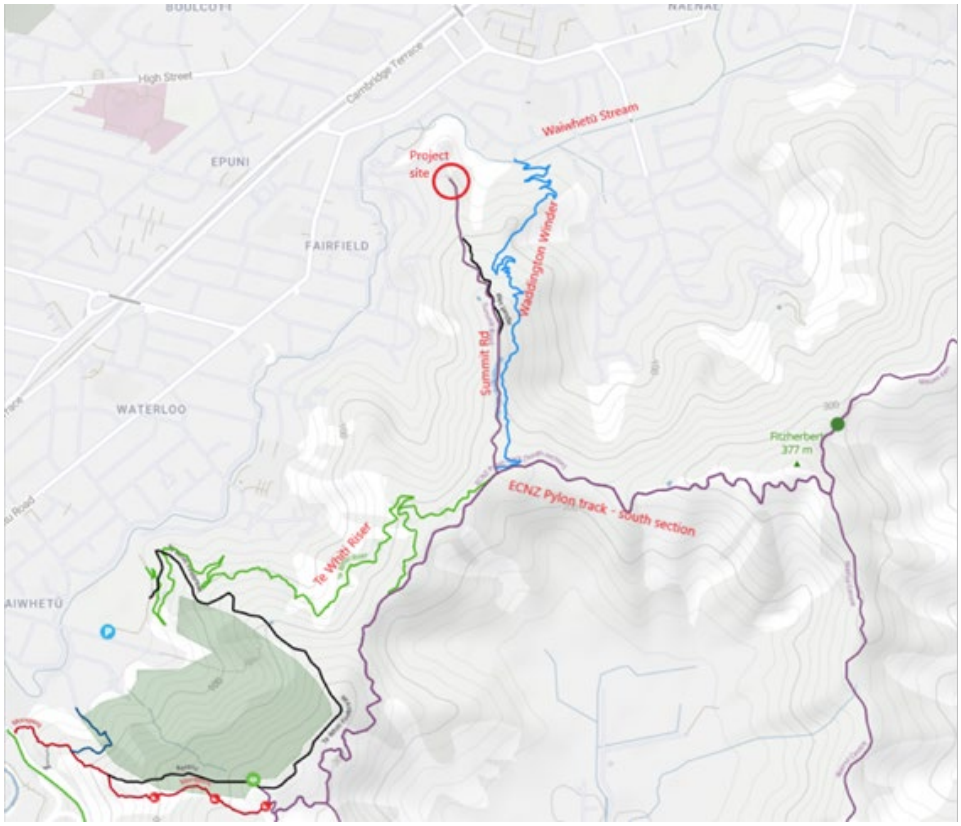

Figure 9: Recreation Tracks

5.4.5 Noise Sensitive Receptors and Baseline Noise Conditions

Residential dwellings are located to the west and north near the proposed reservoir boundary.

Table 7 indicates the parameters used for the calculation and predicted sound pressure level in terms of $L_{Aeq,24hr}$. Further details are provided in the Noise and Vibration Assessment included as **Appendix H**.

Table 7: Baseline traffic noise level prediction on surrounding road

Road	Average Daily Traffic (ADT)	Speed (kph)	Heavy Commercial Vehicles	Approximate Sound Pressure Level @ 10m,dBL AEQ,24HR
Summit Road	200	50	3%	50
Tilbury Street	1700	50	3%	59
Waddington Drive	2500	50	4%	61
Balgownie Grove	< 20	20	0%	<50

Sound pressure levels from road traffic noise ranges from 50 to 61 dB $L_{Aeq,24hr}$ along the principal surrounding roads to the proposed Reservoir[14].

5.4.6 Contaminated Land

A desktop contaminated land study (**Appendix I**) has determined that the proposed Reservoir site is not listed on Greater Wellington Regional Council's Selected Land Use Register (SLUR) as potentially contaminated.

5.4.7 Heritage and Archaeology

A desktop archaeological assessment (**Appendix J**) was prepared as part of the site selection process. It concluded that the archaeological risk is low as the nearest recorded archaeological site (the 1894 Flock Mill) is over 500m from the proposed reservoir site.

A Cultural Impact Assessment prepared by Taranaki Whānui (**Appendix K**) confirmed that the proposed site has the lowest Māori cultural impacts (of the three shortlisted sites). The site has no identified Māori sites of significance in the vicinity. There were no Pā, kainga, urupā or ngakinga (traditional garden clearings).

5.5 Environmental Features

5.5.1 Landscape Character and Values

The Eastern Hills of the Hutt Valley provide a backdrop to the eastern side of the Hutt Valley. When combined with the fault escarpment on the western side, the hills create a sense of enclosure that defines the unique character of the Hutt Valley. The Eastern Hutt Hills showcase a diverse mosaic of regenerating vegetation, shaped by historical fire events. Historically, the Eastern Hutt Hills were densely covered in beech forest, with podocarps such as rimu and kahikatea found on the lower slopes. This vegetation was cleared for timber and to make way for pasture, market gardens and later residential development.

The subject site differs from the wider landscape. The presence of human interventions, such as the firebreak track and the existing square concrete reservoir, signify the influence of human activity in this particular area. Additionally, the adjoining suburbs of Fairfield and Naenae further contribute to the human influence in this area. The proposed site exhibits modified character resulting from a combination of natural processes, such as fire events, and human interventions. A mosaic of vegetation is also present. The site is bounded by steep topography, with a flat area provided where the existing Naenae 1 reservoir is located.

The presence of the hills plays a vital role in fostering a sense of place within the local community. Their distinct presence is not only visible from Lower Hutt but also contributes to the connection between the landscape and the people residing in the nearby residential catchment. This connection to the hills further strengthens the local community's sense of identity and belonging.

5.5.2 Ground Conditions

[14] The ADT flows at Summit Road and Balgownie Grove fall outside of the allowable range defined within the CoRTN methodology, providing a low confidence in the predicted existing levels on these roads.

The site is predominantly underlain by Wellington Greywacke sandstone and siltstone. Investigations show the rock has a relatively deep weather profile with the upper approximately 12-16m comprising very weak to extremely weak, highly to residually weathered rock that could also be described as stiff to hard clay with remnant rock fabric.

5.5.3 Ecology

- **Avifauna**

A desktop review of the eBird database identified 37 bird species previously recorded within proximity of the site. Of the 21 indigenous birds recorded, two are 'Threatened' and five 'At Risk' based on their regional threat classifications. Site investigations subsequently identified 16 confirmed, likely, or possible indigenous bird species, one of which is 'Threatened – Regionally Critical' and another 'At Risk – Recovering'. A summary of birds can be found in the Ecological Impact Assessment in **Appendix G**. The ecological value of avifauna on-site has been assessed and summarised in Table 8.

Table 8: Summary of Bird Attributes and Ecological Value

Matter	Attributes	Value	Overall Value
Representativeness	• Greater than half of the 37 species within proximity to the site are indigenous. Although, the vast majority are 'Not Threatened' or 'Introduced and Naturalised'. • Bird community highly likely to be significantly altered from pre-1840 • Species assemblage/richness is typical for the habitats on-site and within the ZOI	Low	**Moderate**
Rarity/Distinctiveness	• Regionally 'Threatened' and 'At Risk' species may utilise the site	Very high	
Diversity and Pattern	• Surrounding environment likely supports daily and seasonal lifecycles (e.g., foraging and nesting) of bird species	Moderate	
Ecological Context	• Urban local environment has likely played a role in shaping bird community on-site • Site boundary is a small proportion of the overall SNR and bird species on-site will likely be able to utilise adjacent habitats	Low	

- **Chiropterans**

The DOC Bat Database of previous surveys was reviewed to within 25 km of site, pursuant to the protocols to minimise the risk of felling roosts. A 2022 record from DOC tier 1 monitoring recorded three passes of the 'Threatened – Nationally Increasing' central lesser short-tailed bat (*Mystacina tuberculate rhyacobi*) approximately 15 km east of the site. Acoustic Bird Monitoring devices (ABMs) were deployed at the site as detailed in **Appendix G**. No bats were detected during the ABM survey or with the handheld monitor. Due to the substantial bat surveys within 25 km of the site and the lack of detection, it can be assumed long-tail bats are not present.

- **Herpetofauna**

The site falls within the geographic range of eight indigenous lizard species and two introduced frog species. The DOC herpetological database confirms all these species have previously recorded within

10km of the site. Of the eight indigenous lizards, six are regionally 'Threatened' and two are regionally 'At Risk'. Suitable habitat for indigenous lizards exists across the entire site.

The Project Ecologists identified approximately 20 northern grass skinks along the firebreak track edge. A single barking gecko (*Naultinus punctatus*) was observed off-site, 100-150m south of the proposed work area. Although not observed on-site, the connectivity of suitable contiguous habitat means it must be assumed barking gecko could be present within the site boundary. Barking gecko are nationally 'At Risk – Declining'. A summary of herpetofauna, their regional threat classifications, and likelihood of presence on-site is provided in the Ecological Impact Assessment in **Appendix G**. The ecological value of herpetofauna on-site has been assessed and summarised in Table 9.

Table 9: Summary of Herpetofauna Attributes and Ecological Value

Matter	Attributes	Value	Overall Value
Representativeness	• Expected herpetofauna assemblages are likely changed from a pre-1840 state but are typical of the current SNR	Moderate	**High**
Rarity/Distinctiveness	• Habitat on-site must be assumed to support regionally 'Threatened' herpetofauna	Very High	
Diversity and Pattern	• Abundance of herpetofauna on-site is likely very low for regionally 'Threatened' or 'At Risk' species and moderate to high for 'Not Threatened' species • Diversity of lizards on-site likely to be limited for only few of the potential range of species known from the mainland Wellington region	Low	
Ecological Context	• Site provides high quality habitat and connectivity to high quality habitat for lizards • Natural diversity and offer carrying capacity that supports healthy populations of herpetofauna	Very High	

- ### Invertebrates

Terrestrial invertebrates on-site were assessed. There was a relatively high abundance of common invertebrates as detailed in the ecological assessment. Based on the 'Representativeness', 'Rarity / distinctiveness', 'Diversity and pattern', and 'Ecological context' matters the overall ecological value of terrestrial invertebrates on-site is **Moderate**.

- ### Mamallian pests

A desktop review of the DOC mammalian pest database and subsequent field surveys revealed 11 mammalian pest species that have known distributions that include SNR12.

Results of the pest monitoring confirmed the presence of a variety of pests and predators in low densities within the SNR and transiting through the site. The Project Ecologists have noted that deer are the likely cause of the significant lack of palatable species within the understory on and off-site and will be impacting the recruitment and regeneration of some canopy species. Details of the pests and predators identified within the site are provided in **Appendix G**.

- ### Vegetation

A number of methodologies were used to identify vegetation within the subject site as identified in **Appendix G**.

The environment types and corresponding categories present on-site shows almost entirety of the site falls within the environment type F1.4b. A small area associated with the urban area north of Waiwhetū Stream falls within environment C2.1. For the purposes of this assessment only Environment F1.4 has been considered. This environment type elevates the value of indigenous vegetation on-site. A summary of this environment type and its national context is provided in Table 10.

Table 10: Threatened environments on-site and national context.

Environment	LENZ category and criteria	Site area (ha)	National area (ha)	Site context (5)
F1.4	3 : 20–30% indigenous cover left	1.87	290,292	0.0009%

A review of the Land Cover Data Base LCDB shows the site to be almost entirely comprised of either 'Broadleaved Indigenous Hardwoods' or 'Gorse and/or Broom'. A summary of the LCDB is provided in Table 11.

Table 11: Landcover database types on-site

Landcover	Site area (ha)	Site percentage (%)
Built-up Area	0.0914	5%
Broadleaved Indigenous Hardwoods	0.7848	41%
Gorse and/or Broom	1.0152	53%

A summary of confirmed land cover types and their site context is provided in Table 12.

Table 12: Confirmed land cover types on-site

Landcover	Site area (ha)	Site percentage
River	0.008	0.4%
Gravel and/or Rock	0.1133	6.0%
High Producing Grassland	0.0274	1.4%
Broom and/or Gorse	0.2347	12.4%
Exotic Forest	0.1103	5.8%
Mānuka / Kānuka	0.3512	18.5%
Broadleaved Indigenous Hardwoods	0.9656	50.8%

The area of 'Gorse / Broom' was considerably smaller than indicated in the LCDB and primarily occurred in the highly disturbed habitats immediately adjacent to the firebreak track. The negligible area of 'High Producing Grassland' is restricted to the highly maintained park area on the north side of Waiwhetū Stream and around the Naenae No 1 reservoir. 'Exotic Forestry', in the form of pine (*Pinus radiata*) and silver wattle (*Acacia dealbata*) was clustered across the site and species occurring in the understory was dominated by gorse, and other regenerating natives similar to the

'Broadleaved Indigenous Hardwoods' vegetation type. Within the 'Mānuka / Kānuka' vegetation areas, kānuka (*Kunzea* sp.) dominated, while few scattered mānuka (*Leptospermum scoparium* var. *scoparium)* were restricted to the areas immediately adjacent to the firebreak. Mature and regenerating kānuka extended down the spur towards the northern end of the site. The understory was often sparse but included hangehange (*Geniostoma ligustrifolium* var. *ligustrifolium*), bracken (*Pteridium esculentum*), gorse (*Ulex europaeus*), blackberry (*Rubus fruticosus*) and pampus (*Cortaderia jubata*).
Within the 'Broadleaved Indigenous Hardwoods', the canopy was dominated by black tree fern (*Cyathea medullaris*) māhoe (*Melicytus ramiflorus* subsp. *ramiflorus*), *Pseudopanax* spp. with scattered wild cherry (*Prunus avium*)). The understory and groundcover tiers consisted of sparse, unpalatable species including hangehange, rangiora (*Brachyglottis repanda*) and red matipo (*Myrsine australis*) silver fern (*Alsophila tricolor*) and bracken.

Vegetation on-site is consistent with the wider Eastern Hills, having suffered extensive impacts since human occupation and being fundamentally changed from a pre-1840 state. Predicted pre-human vegetation of the site and much of the Eastern Hills is believed to have consisted of a mixed podocarp beech complex including rimu (*Dacrydium cupressium*), miro (*Prumnopitys ferruginea*), kamahi (*Pterophylla racemosa*), red beech (*Nothofagus fusca*), hard beech (*N. truncata*), kahikatea (*Dacrycarpus dacrydioides*) and, pukatea (*Laurelia novae-zelandiae*). The confirmed area of 'Broadleaved Indigenous Hardwoods' on-site only makes up 0.3% of the LCDB area of 'Broadleaved Indigenous Hardwoods' within the SNR, and although the LCDB shows no 'Mānuka / Kānuka' within the SNR, observations confirmed this landcover type to be relatively abundant throughout the SNR. The site's vegetation provides suitable habitat for some regionally 'Threatened' and 'At Risk' bird species, though none were observed utilising the site during surveys and are likely transient. Although no arboreal geckos were found within vegetation on-site, regionally 'Threatened' and 'At Risk' lizards may be present on-site.

The overall value of vegetation on-site is **Moderate**, as detailed in Table 13.

Table 13: Terrestrial Flora Values

Matter	Attributes	Value	Overall Value
Representativeness	• The site is fundamentally changed from a natural state pre-1840 • Considering the Eastern Hills and SNR12, the site comprises a typical structure and composition, consistent with historical (logging, fire) and ongoing (pests) impacts • Emergency and ground cover tiers are lacking, while understory is lacking in some areas • The site is largely dominated by indigenous species	Moderate	**Moderate**
Rarity/Distinctiveness	• The indigenous species found on-site are typical of SNR12 • Nationally 'Threatened' but regionally 'Not Threatened' myrtaceae (mānuka/kānuka) are present on-site • The site is comprised almost entirely of a moderately threatened environment type with only 20-30% of vegetation remaining nationally	Moderate	
Diversity and Pattern	• The diversity and pattern of vegetation types on-site is low, dominated by indigenous species, of which	Moderate	

	species richness is moderate • Lack of ground cover and understory abundance on-site due to herbivore browsing pressure		
Ecological Context	• The ecosystem services that the vegetation on site provides are rare considering the surrounding urban catchment • Historical impacts (fire and logging) and local conditions (pests) has contributed to shaping vegetation community on-site	Moderate	

- **Watercourses and Wetlands**

The Waiwhetū Stream[15] runs through the northern extent of the site and is a permanent, low gradient, third order headwater stream, characterised within the project footprint by moderately flowing runs and riffles with the streambed comprising gravels, cobbles and organic debris. Riparian vegetation within this area provides little to no shading and includes arborescent indigenous and exotic vegetation, rank grass, exotic weeds and highly maintained grass. Various infrastructures is present along the stream's reach, including multiple culverts and at least one weir. Upstream of the site, Waiwhetū Stream has been highly modified, having been converted to run entirely underground beneath residential housing in some areas.

Three unnamed tributaries of Waiwhetū Stream are present on-site (Figure 10), all of which appear to be partially intermittent to permanent, and meet the definition of a river under the GWRC Regional Policy Statement and the RMA.

During site visits four natural inland wetlands were identified within the Waiwhetū Stream floodplain, at the northern extent of the site (Figure 10). It is considered likely that these wetlands are fed hydrologically by tributaries of Waiwhetū Stream, ephemeral pathways on-site and act as catchment for surface water during periods of rain.

[15] The ecological effects in this NOR are limited in scope to those effects associated with earthworks and vegetation clearance in accordance with the jurisdiction afforded to HCC as a territorial consenting authority and section 9 of the RMA. As such, descriptions of watercourses and wetlands and effects on them do not form part of this assessment. However, a brief description is provided as part of section 5.5.3 watercourse and wetlands.

Figure 10: Delineated Tributaries and Wetlands (refer to Figure 56, Appendix G)

PART D: STATUTORY CONTEXT

6 Approvals sought under the Resource Management Act 1991

6.1 Notice of Requirement for Designation

This Notice of Requirement seeks a designation for the construction, operation and maintenance of the Eastern Hills Reservoir. The designation footprint being sought is shown in Figure 12 (and on the land requirement plan in **Appendix A**). Activities to be authorised by the designation are described in Part B of this AEE and are to be undertaken in accordance with the designation conditions – a draft set of which is proposed in **Appendix B**.

The activities to be undertaken under the designation (and the Hutt City District Plan rules they would typically be assessed under) include the construction of a reservoir (Rule 13.3.1.33), associated pipework (Rule 13.3.1.14 and 13.3.1.15), earthworks and vegetation clearance (Rule 14E 2.2(b)) and construction noise (Rule 14C 2.2).

The designation boundary will be pulled back following the completion of construction, completion of site remediation and reinstatement and successful commissioning of the reservoir to the area required for the on-going operation and maintenance of the reservoir.

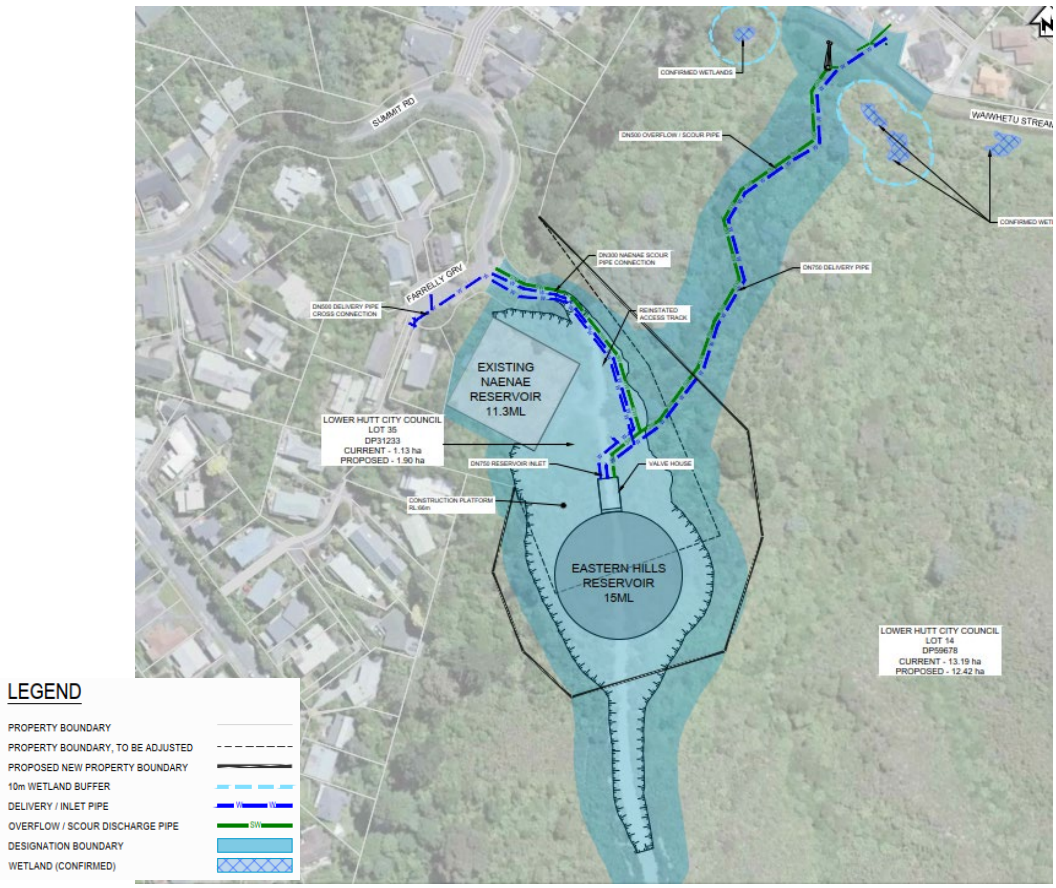

Figure 11: Image depicting the proposed designation (Appendix A)

6.2. Outline Plans

Section 176A provides that an outline plan must be submitted to a territorial authority before commencing construction of a project or work under a designation unless certain circumstances apply. In accordance with Section 176A(3) an outline plan must show:

(a) the height, shape, and bulk of the public work, project, or work; and

(b) the location on the site of the public work, project, or work; and

(c) the likely finished contour of the site; and

(d) the vehicular access, circulation, and the provision for parking; and

(e) the landscaping proposed; and

(f) any other matters to avoid, remedy, or mitigate any adverse effects on the environment.

Upon receiving an outline plan, a territorial authority has 20 working days to request any changes to the outline plan. The requiring authority may accept or reject the requested changes.

HCC (as territorial authority, i.e. in its regulatory capacity) has the ability to waive the requirement for an outline plan under 176A(2)(c). In this instance, HCC is not seeking that requirement to be

waived. Rather, if the NOR is approved, Wellington Water (on behalf of HCC) will finalise the Project's design and submit outline plans to HCC prior to the commencement of works onsite for all relevant aspects of the Project.

6.3. Resource Consents

The Project includes activities that require resource consents to be obtained under the Greater Wellington Natural Resources Plan. These consents are being sought from GWRC in a separate Notice of Requirement.

PART E: CONSULTATION AND ENAGEMENT

7 Consultation and Engagement

Wellington Water on behalf of HCC has engaged with residents, HCC (as landowner and territorial authority), iwi, and a wide range of groups and organisations with direct interests in the site, and the surrounding residential area.

7.1 Mana Whenua

7.1.1 Taranaki Whānui

Connect Water on behalf of HCC/Wellington Water Limited met with Taranaki Whānui (Port Nicholson Block Settlement Trust) in May 2022 to discuss and develop the preferred location for the reservoir serving Hutt City central area. At this workshop, the sites that were technically feasible were discussed and there was good alignment between the sites that were preferred technically and the site which would carry the least risk of impact on Mana Whenua values. The three sites that were discussed at the workshop included:

- "**Cambridge Terrace**" an area above the Taita Cemetery near the Pick a Part industrial area heading between Naenae township and Taita College.
- "**Naenae 2**" an area off Tilbury Street, Fairfield. Already has the existing Naenae reservoir.
- **"Gracefield 2"** an area above the Ngāti Ira Pā site on the Wainuiomata Hill. Already has an existing reservoir. Above the Callaghan Innovation site.

It was agreed at this workshop that a Cultural Impact Assessment (CIA) would be completed to confirm details relating to the preferred site (Naenae 2) and further guide the project through its next design phases. The Cultural Impact Assessment (**Appendix K**) included several recommendations to be carried into the next phase of the project, these being:

- The Port Nicholson Block Settlement Trust, Wellington Tenths Trust and Te Runanganui o Te Atiawa do not consider an archaeological survey of the area is required prior to this development.
- The construction method should avoid any potential discharges of contaminated water into the Waiwhetū Stream.
- The Trusts consider there is a need for an accidental discovery protocol for this development in the unlikely situation that cultural material may be found when the site is cleared prior to development.
- If the reservoir were to be named it is proposed that the old block name Waiwerowero be used.

- That a blessing of the site prior to the commencement of work is done by the kaumatua of Te Atiawa/Taranaki Whānui.

An information pack was subsequently sent to Taranaki Whānui in October 2023 providing an update on the project prior to consent lodgement and seeking any further feedback. Taranaki Whānui provided a written response on 12 February 2024, providing details as to how they wanted the Project to recognise their values and tikanga as well as providing a response to those Project elements that required feedback. In summary, Taranaki Whanui recommend that the Project:

- Implement stringent erosion and sediment controls to protect and maintain the mauri of Raumānuka and the Waiwhetū Stream;
- Have regard to 'Te Mana o Te Wai as set out in the NPS-FM 2020;
- Implement Accidental Discovery Protocols during construction;
- Follow the pipe alignment with the lowest environmental impact on Raumānuka and the Waiwhetū Stream;
- Finalise the Landscape Plan in partnership with Taranaki Whānui ki Te Upoko o Te Ika and ensure that the landscape treatments are context sensitive to their values, land use, sense of place, and the viewing audience; and
- That the new reservoir is adequately bunded to address potential leakages as well as being planted to improve the visual amenity and visual effects of the Project on Raumānuka.

In response to the feedback provided, the applicant has recommended conditions of consent that require the implementation of robust erosion and sediment controls that follow the Greater Wellington Regional Council guidance documents, require the use of accidental discovery protocols during construction works, as well as amended the recommended condition for the Landscape Plan to provide for the input of Taranaki Whānui ki Te Upoko o Te Ika. Through the design of the Project, as well as the mitigation proposed, Te Mana o Te Wai has also been had regard to. This is further detailed in Section 12.3.1 of this AEE.

Through the robust pipe selection process, the potential environmental effects of each of the alignments has also been robustly considered. The preferred and proposed alignment has the lowest environmental impact of all of the options considered that were reasonably practicable to construct. Screen planting has also been proposed around the reservoir so as to mitigate the visual impact of the Project on Raumānuka.

Engagement with Taranaki Whānui ki Te Upoko o Te Ika will continue throughout the construction of the Project.

7.1.2 Ngāti Toa

An information pack was sent to Te Runanga o Toa Rangatira (Ngāti Toa) in October 2023 providing a summary of the project prior to consent lodgement and seeking any feedback, particularly regarding any impacts on Waiwhetū Stream. In December 2023 they advised that they have no immediate issues with the proposed work, and are happy to support Taranaki Whānui where needed.

7.2 Hutt City Council

A pre-application meeting was held with Hutt City Council's Planning team on 12 June 2023 regarding the Notice of Requirement and supporting specialist reports required. This meeting confirmed the relevant zones, district plan provisions, requirements for detailed landscaping of earthworked areas, and particular consideration to be given to noise mitigation during construction.

Feedback has also been sought from the HCC Parks and Recreation team. Feedback from the Parks Planner identified the potential for the pipe beneath the bed of Waiwhetū Stream to generate cultural impacts and pose a risk to stream health, that a large volume of the works would occur within an area identified by HCC's internal mapping software as a SNA, and that the closing of public access to the firebreak for a year or more will impact on how people access the wider recreation reserve and that consideration needed to be given toward alternative accesses. HCC's Parks Planner also suggested that written approval should be sought from all affected parties.

Based on the feedback received by HCC's Planning team and Parks and Recreation Team the technical reports included with this NoR have been updated, and where possible feedback incorporated and addressed.

Local HCC councillor Andy Mitchel was briefed on 20 February 2023 and an information package was provided to all HCC councillors and the mayor. One outcome of this meeting was to rename the reservoir to the Eastern Hills reservoir. This name will be carried forward in all subsequent documents. A name proposed by Taranaki Whānui is likely to be provided to the Eastern Hills Reservoir following the completion of construction. .

7.3 Fire and Emergency New Zealand

A meeting was held with Fire and Emergency NZ (FENZ) on 22 May 2023 to discuss the maintenance of the existing firebreak during construction. The outcomes of the meeting are discussed below:

- The firebreak acts as an emergency access road, although FENZ do not expect to get a fire engine up the track;
- FENZ do not maintain the firebreak themselves
- It is not expected that the firebreak will be maintained during construction. It is an acceptable risk to assume that the firebreak will not be needed, and there are other access points above the site that can be used by FENZ if needed;
- The firebreak should be reinstated upon completion of construction works. It is sufficient to use the road grade of other firebreak tracks when reinstating this one;
- FENZ would like to know if it is viable to reinstate the access track from Farrelly Grove to the reservoirs to a standard where fire engines can access the reservoirs in the case of an emergency; and
- FENZ raised concerns around maintaining access to residential properties at the end of Summit Road and Farrelly Grove during construction, including maintaining suitable water pressure for firefighting in an emergency.

7.4 Department of Conservation

The Department of Conservation (DOC) has been consulted regarding lizard salvage and transfer permits. A wildlife permit for the relocation and potential killing of lizards is being sought separately to this Notice of Requirement and DOC has been involved throughout the development of the Lizard permit application.

7.5 Land Information New Zealand

Consultation with Land Information New Zealand (LINZ) has been undertaken regarding the proposed relocation of a trig station that is located within the earthworks boundary. Their preferred relocation point is to install a mark at the head of the cul-de-sac at Farrelly Grove.

7.6 Public Engagement

A project community and engagement plan has been prepared identifying key stakeholders and detailing the project team's approach to engagement with the various stakeholders. The plan is a live document and is updated throughout the lifecycle of the project.

Key messages have been created to inform the public about the potential construction of Eastern Hills Reservoir. These messages are being relayed through a multi-layered communications strategy, including: social media releases, website development, flyer and letter drop and community drop-in sessions.

The community drop in sessions provided members of the community with the opportunity to find out more about the Project and take away further information in the form of a flyer. Information boards were displayed and members of the Project team were available to answer questions. Approximately 20 people attended these sessions. Feedback was supplied verbally, via written feedback forms and via email.

In general, members of the community were supportive of the Project recognising the benefits to Naenae from a storage capacity and resilience perspective. Feedback sought clarification on detailed design matters, which at the time of the first two open days were not readily available. Feedback received was taken on by the Project team and considered as part of the development of the design and construction methodology for the Project. Further information was then subsequently supplied via the neighbourhood engagement discussed in the subsequent section.

Project questions have also been received via email and responded to directly whilst also then informing the FAQs posted to the project's website.

7.7 Neighbourhood Engagement

7.7.2 Online Survey

Local community members and community environmental groups were provided a link to participate in an online survey via a number of means that sought feedback on the impacts of the proposed Reservoir on their way of life during construction and operation. A copy can be found in the Social Impact Assessment Report in **Appendix L**. The key engagement outcomes from the online survey are summarised in Table 14.

Table 14: Online Survey Outcomes

Location	Summary
Online Survey 25 respondents started the survey, with 22 completed responses.	• Approximately half (48%) the respondents were residents who lived within 500m of the site. • Most respondents (66.67%) supported the development, with 27.78% neither agreeing or disagreeing, and only 1 respondent (5.56%) disagreeing with the proposal. • Reported use of the Summit Road Firebreak Track was for recreational purposes. The most common activity was walking, and to a less extent other activities such as running, cycling/mountain biking, and gathering mushrooms. It was also common for people to mention taking their dogs to the area. • Respondents use of the area differed, with 23% indicating use of the area on a weekly basis, while others tended to be occasional / infrequent users which access the area a few times a year or less. • Most respondents reported they would use an alternative route to assess the area or a different recreation area while the Summit Road Firebreak Track is inaccessible. • Once the track is reopened, most respondents said they would return to their typical usage, with some having plans to increase their use of the track. • Key construction phase concerns were impacts on recreational use and enjoyment of the reserve, noise, dust, vibration, and changes to the character of the area. With the least concern being the potential impact on property prices. • Concerns were raised regarding construction noise and vibration impacting on sleep, reduced road and reserve access, and potential traffic delays. • The most prominent concern identified in respect of the operational phase was the potential change to the character of the area/visual changes. • There were positive ratings in relation to respondents' perceptions of the project's effect on security of water supply associated with the operational phase

7.7.3 Intercept Survey

An intercept survey was carried out on 19 and 22 July 2023 to gather data on the use of the reserve area around the proposed reservoir by the local community. The results are summarised below in Table 15 and in **Appendix L**.

Table 15: Intercept Survey Outcomes

Location	Summary
Intercept Survey – Reserve Area Three respondents were intercepted on or near the reserve area	• Used the area for recreation and fitness • The three respondents used the area with varying frequencies (from 3-4 days a week a few times a month) • Two of the respondents enjoyed the hilly terrain to push their fitness. One of the respondents typically only walks as far as the exiting reservoir area before retuning down hill • Track can be a hazard when wet as it becomes muddy and slippery • Enjoyed the peacefulness and nature • All three respondents said they would return to using the track when it is reopened after construction • Each respondent enjoyed the track as it is. One resident would make use of

Location	Summary
	seating on the track if made available, while another individual said they do not stop on this section as they use it as part of the wider walking network. One of the respondents would like for signage in the area around the different tracks and how they link up, so they didn't have to view the map on their phone • It was suggested that the adjacent tracks should have some maintenance done ahead of the Summit Road track closing.

7.7.4 Street Events

Street events were held to target groups of for nearby residents in Fairfield and Naenae who were identified as being in close-proximity to the work. Residents were invited by letter drop notification to attend an event in their neighbourhood and were within two key groups as detailed in the Social Impact Assessment. These were Fairfield proximity residents and Naenae proximity residents.

Fairfield proximate residents did not express any concerns specifically relating to the recreation use and values of the reserve. Naenae proximate residents had concerns regarding the extent the adjacent reserve area will be impacted and about discharges to the stream. Residents also recommended mitigation. A summary of the engagement outcomes from the street events is provided in Table 16.

Table 16: Street Event Outcomes

Location	Summary
Fairfield Proximity Residents Approx 15 participants	• Concern around the frequency of work vehicles on the road and the associated disruption, particularly the potential that the road will become essentially a one-way street due to trucks – delaying residents who want to enter and exit their properties • Concern about the trucks speeding down the road and trucks driving around corners may find it difficult to see other drivers • Concern resident vehicles undertaking dangerous manoeuvres to pass slow trucks. Has been observed during current construction on the existing reservoir. • Concern the road restrictions and trucks in this area may impact the access of emergency vehicles to Farrelly Grove. • Concern surrounding loss of parking on street as currently a number of residents have cars parked on the street as they are unable to park on their property or have insufficient off-street parking for the number of vehicles they have. In addition, it would make it difficult to have visitors as they would have nowhere to park, especially for those properties which have shared driveways. • Concern about impact of noise and vibration and disrupting those people working from home. • Concern about the risk of reservoir failure during an earthquake • Concern on the impact of vibrations on the bank below property at 9 Farrelly Grove. • Concern about the condition of the road and dust, both during and after construction. • Concern about aesthetics of the work (e.g., currently an unpainted handrail on the existing reservoir is in stark contrast with the colours of the nature area

Location	Summary
	and catches the sun). • Questions regarding what will be happening with the fill that is removed from the site. • Comment in relation to the water pressure not being sufficient near the area. However, understanding that this project as defined is unable to address that.
Naenae Proximity Residents Approx 7 participants	• Notable number of people running business from home in the Balgownie Grove area, particularly in the cul-de-sac. • One property receives frequent deliveries of landscaping supplies on large trucks for their business and the trucks already at times struggle to turn in the cul-de-sac. • Some concern over parking restrictions as this area is utilised for home-businesses. However, provided parking restrictions were limited to the end of Balgownie Grove, there is sufficient parking on the remainder or the street and adjacent roads. • Concern regarding the extent the adjacent nature area will be impacted, how much vegetation will be cleared, and about discharge into the Waiwhetū Stream. • Concern about re-instatement of the road seal when work for the pipeline under the road has been completed. • Resident's fence (No. 6 Balgownie Grove) backs up against the stream area, and there is concern this will be affected as they have plans to replace the fence. • Residents closest to the proposed work (No. 5 and 6) were less concerned with noise and vibration impacts. • Concerns about increased flooding risk as a result of the water pipe being above ground/crossing the stream and potentially causing a damming affect. • Concerns raised around existing maintenance activities (mowing the stream bank using a tractor) and the potential risk of bank collapse. • Questions regarding the reasoning for not routing the pipeline down Waddington Drive. • Questions asked about the seismic resilience of the reservoir structure. • Questions regarding whether an access bridge will be added to the stream. • Taxi wiring business run from home in Balgownie Grove, which receives approximately 500 vehicles per year for wiring (only person that can do this work in Wellington). Resident understanding of the need for the work. • Questions raised regarding water pressure (noting this project is unable to address this).
Email correspondence from residents	• Concerns in relation to the road surface after the work has been completed. The preference would be to have the whole cul-de-sac resealed rather than a patchwork of just the affected area (this feedback relates to the reticulation of water which is not included in the scope of this NoR) • Concern about the Waiwhetū Stream flooding if the new pipeline creates a dam during heavy rainfall. This concern stems from residents being present when the stream has flooded in the past • Questions on the accessibility to Balgownie Grove for delivery vehicles for their businesses that they run from home • Questions about the reasoning for the pipeline route and reasons for not routing the pipeline down Waddington Drive

PART F: CONSIDERATION OF ALTERNATIVES

8 Consideration of Alternatives

This section provides a summary of the consideration that has been given to alternative sites, routes and methods for delivering the Project as required under Section 168A(3)(b) of the RMA. Wellington Water have carried out a robust and detailed assessment of alternative sites, routes and methods for delivering the Project, before arriving at the proposal described in this NoR.

This has involved a number of investigations and reports as follows:

- Hutt City Water Supply Zone Management Plan (Hutt Valley Excluding Wainuiomata)[16] – This report identified that the available storage volume does not meet the current level of service requirements and that additional water storage is required to meet present needs and to accommodate future growth/demand;
- Lower Hutt Central and Taita Reservoir Storage Volume Assessment[17] - Following the identification that the volume of water storage within the Water Supply Area (WSA) did not meet the existing and future level of service, this report identified that an additional 15 ML of storage capacity would be required to meet current storage shortfall and provide for future growth until other reservoirs can be increased in volume.;
- Site Selection Report[18] - A detailed MCA process was employed to assess a range of sites where a 15ML reservoir could be accommodated to service the WSA. The report details the identification and subsequent evaluation that occurred for each site and then presents a recommended site; and
- Pipe Alignment Assessment[19] - Following confirmation of the preferred reservoir location, consideration was required to be given to alignments/routes for the pipes to service the reservoir. This report confirms that there is an Operational Need for the pipe to follow the alignment down the hill toward Waiwhetū Stream and Balgownie Grove.

Various other concept design, design refinement, cost, and geotechnical investigation reports have been prepared during the development of the Project. The options assessments undertaken as part of the development of the Project are summarised in the following sections of this AEE.

8.1. Statutory Requirement to Consider Alternatives

Section 168A(3)(b) RMA imposes a statutory requirement to consider alternatives where either:

[16] Hutt City Water Supply Zone Management Plan, Stantec, November 2020.
[17] Lower Hutt Central and Taita Reservoir Storage Volume Assessment, Connect Water, December 2021.
[18] Site Selection Report, Connect Water, June 2022, attached as Appendix M
[19] Pipe Alignment Assessment, Connect Water, October 2023, attached as Appendix P.

- The requiring authority does not have an interest in the land sufficient for undertaking the work, or
- It is likely that the work will have a significant adverse effect on the environment.

Wellington Water is owned and funded by the Wellington, Hutt, Porirua and Upper Hutt city councils, Greater Wellington Regional Council and South Wairarapa District Council. As Hutt City Council own the land where the reservoir is proposed to be located it is considered that the first ground for requiring an assessment of alternatives does not apply.

Further, the technical assessments carried out (and attached to this AEE) have not concluded that the project is likely to have any effects on the environment that would qualify as 'significant'. However, Wellington Water (on behalf of, and in conjunction with, HCC) has nonetheless carried out an assessment of alternative sites, routes and methods that has been robust and would readily meet the statutory and case law requirements.

Accordingly, for completeness (i.e. even though it is not considered that section 168A(3)(b) is engaged for this NOR), the relevant principles and the assessment undertaken are summarised below.

Where an assessment of alternatives is required, the case law has identified that 'adequate consideration' does not mean exhaustive or meticulous consideration, but means that the consideration must be sufficient or satisfactory, and this will depend on the circumstances.[20]

While the case law does not require a requiring authority to fully evaluate every non-supposititious alternative with potentially reduced environmental effects (i.e. every possible feasible option), the adequacy of the consideration of alternatives needs to be proportionate to the impact of the proposed designation. If effects are likely to be more substantial, both in terms of the impact on any land not held by the requiring authority and in relation to the severity of the adverse effects of an option this will have an impact on the alternatives required to be considered. If there is a non-suppositious option that would have reduced effects, then it should be evaluated in a transparent and replicable manner. The caselaw has identified that it is for the requiring authority to establish an appropriate range of alternatives and properly consider them.[21]

8.2. Alternative Methods

In developing the Project, there has been a robust consideration of alternative methods for undertaking the works. This has focussed on alternative methods of providing additional operational capacity and resilience, additional disaster resilience, and improving network operations to meet the level of service. Through the Hutt City Water Supply Zone Management Plan, and subsequent Lower Hutt Central and Taita Reservoir Storage Volume Assessment a number of alternative methods were considered.

Within the WSA, several options have been considered for addressing the current water storage shortfall and deficient level of service. These have included:

[20] *NZ Transport Agency v Architectural Centre Inc* [2015] NZHC 1991 ('Basin Bridge'), at [137].
[21] *NZ Transport Agency v Architectural Centre Inc [2015] NZHC 1991, at [154].*

- Investigate opportunities to reduce pressure on sprinkler systems, commercial water installations, commercial metering and internal multi-storey building water systems.
- Explore opportunities to influence demand management such as a reduction in water usage through customer education, leakage repair, reduced pressure in the network, meter installation, rain-water tanks and water efficient fittings.
- Deliver network optimisation within the existing network.
- Provide for water back-feed from adjoining WSAs where there is a current calculated storage excess.[22]

Whilst these options would contribute toward improving the level of service within the WSA, they would not adequately address the Project objectives, as detailed in Section 2.3 of this NoR. These measures alone have not reduced the storage shortfall significantly and need to be implemented in tandem with additional storage in the WSA. Future population growth would also exacerbate the storage deficit. It is also noted that these options would not increase the available volume of storage available within the WSA to meet the required seismic resilience level of service which relies on storage in the WSA to provide post-earthquake potable water to residents.

From a resilience perspective, following a seismic event the water back feed option from the western hills may not be transferrable to the Hutt Central WSA. This is primarily due to cross connections traversing known fault lines. It is noted however that Wellington Water have been working on a water supply resilience programme that features a mosaic of solutions should a significant seismic event occur and disrupt services[23].

Overall, it is concluded that the development of a new reservoir is the only way for Wellington Water to meet its Project Objectives and is considered the best method for providing the necessary additional operational capacity and resilience for the Lower Hutt Central WSA.

8.3. Site Selection

Following the identification of the need to develop a new, 15ML reservoir, a site selection process was undertaken. A copy of the detailed Site Selection report is included as **Appendix M**. The site selection process was influenced by a number of key parameters. These included:

- Requiring a reservoir with a capacity of 15 ML that would meet a series of design assumptions;
- Consideration of the existing water network within the vicinity of the proposed sites;
- Topography and hydraulic requirements (a new reservoir would need to be developed at a similar elevation to other reservoirs within the network so as to integrate with the existing distribution system and provide a gravity supply to the WSA);
- Access for the construction, operation and maintenance of the reservoir;

[22] Section 7.2.2, The Hutt City Water Supply Zone Management Plan, Stantec, November 2020.
[23] Towards 80-30-80, Wellington Water Limited, 2017

- Development of a new inlet pipe from the Waterloo WTP and a separate outlet pipe (i.e. proximity to existing mains); and
- Effects on the environment associated with the different options.

8.3.1 Initial site selection

The Site Selection process initially identified a long list of 28 possible sites, based on the sites being located within the target elevation band (on the eastern and western hills surrounding the Hutt Valley). Following an initial screening exercise, many of the sites were discounted due to their steep terrain that would make access and construction unfeasible. Where sites were located directly adjoining another site the site that was the less favourable was discounted.[24] This refined the number of potential sites from 28 to 14.

The 14 sites were then subject to a design refinement exercise whereby they were assessed against indicative earthworks volumes (i.e. cut and fill so as to establish a reservoir platform), access roads, and potential corridors for inlet and outlet pipes. This resulted in seven sites being discounted due to earthworks volumes, very high cut/fill heights, long/unfeasible access roads, and long pipeline routes.

8.3.2 Long list

The long list of sites comprising seven possible locations was then assessed against a broader range of attributes and values. To provide a representation of each of the options, the potential sites were modelled to show a reservoir and any earthworks that would be required to support its development. A qualitative scoring exercise was then undertaken prior to confirming a shortlist of preferred sites. The sites were assessed against the following criteria; earthworks, pipeline route challenges, structural considerations, geotechnical conditions and hazards, contaminated land, planning, cultural values, ecology, recreation and education, archaeology and land ownership. Each aspect was scored qualitatively from 1 (very unfavourable) through to 5 (very favourable). No weightings or averages were applied to the criteria. The advantages and disadvantages for each long-listed site are summarised in Table 7, **Appendix M**.

Within the Site Selection report, a summary of the outcomes of this assessment has been provided.[25] It was identified that the 'Naenae 2' site (as it was then called) would be the most favourable due to its proximity to the existing Naenae reservoir, an established access road, and the presence of an existing bulk water inlet that could also be used for the new reservoir. Other advantages are associated with its location in close proximity to the Waterloo WTP and being towards the middle of the WSA. Two other sites also scored well and were progressed to subsequent detailed assessment being the Cambridge Terrace site and the Gracefield 2 site.

Following the assessment of the long list options, the Project team presented the outcomes to Wellington Water staff and Hutt City Council representatives. This confirmed both the importance of the project in the Council's infrastructure investment programme as well as the support for the three preferred sites.

8.3.3 Short list

[24] Section 3.7, Site Selection Report, Connect Water, June 2022.
[25] Table 7, Site Selection Report, Connect Water, June 2022.

A subsequent Multi-Criteria Analysis (MCA) process was undertaken for the three most favourable sites. These three sites being Cambridge Terrace, Naenae 2, and Gracefield 2. The location of these sites is shown in Figure 12.

A range of criteria were used for the MCA, against which each option can be assessed and scored. These criteria cover cost, non-cost and design related outcomes to ensure a comprehensive, balanced assessment of the options.

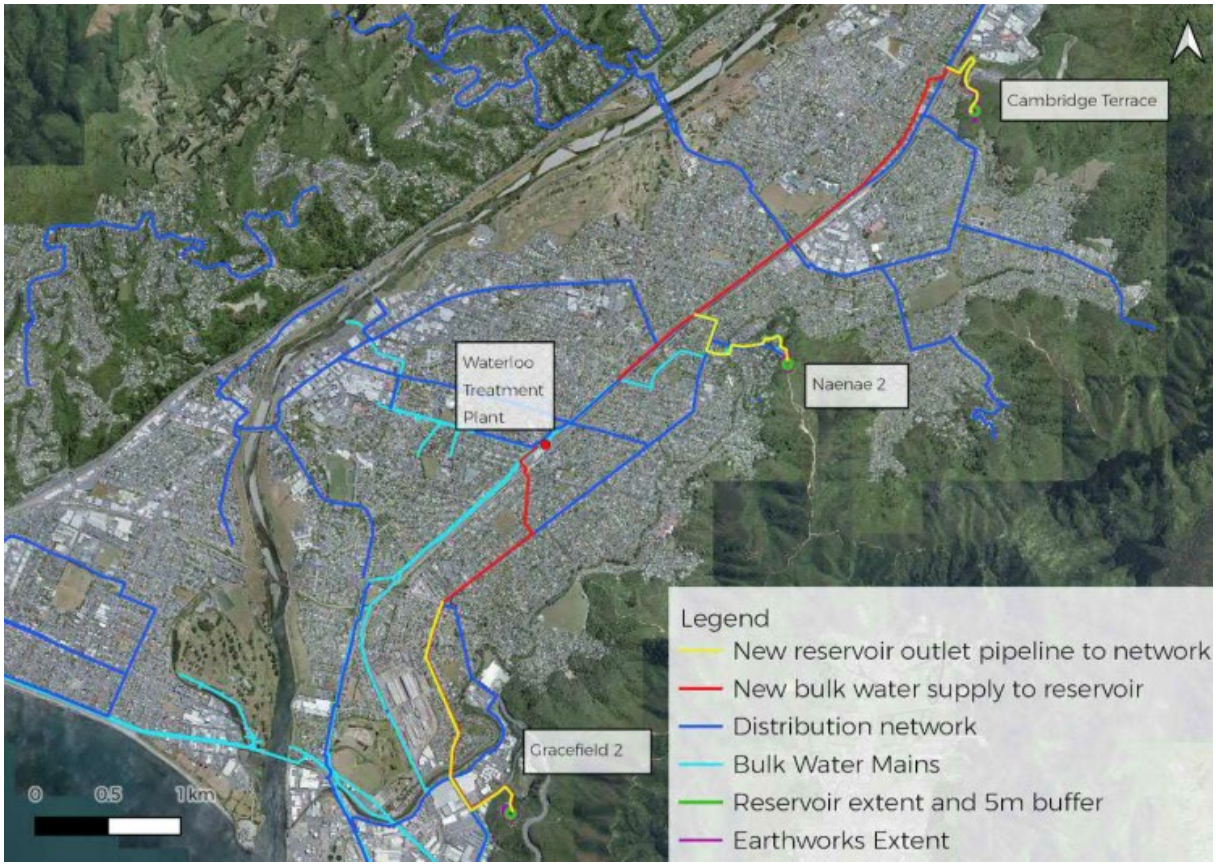

Figure 12: Short List Sites (Source, Figure 32, Site Selection Report, Connect Water, June 2022).

The MCA process has relied on the input of subject matter experts and representatives including; Mana whenua and te Ao Māori, Engineering – structural, geotechnical, civil, hydraulics, ecology, landscape, planning, cost estimating and carbon assessment, legal, archaeology, and contaminated land. Using an MCA framework, weighting and scoring criteria, each of the three options were subsequently assessed.[26] Table 11, **Appendix M**, displays the assessment criteria that were used and their weighting.

All three of the sites would be developed to deliver the same design requirements including the construction of a 15 ML, above ground, circular, precast concrete reservoir at a top water level of 72.53 m which matches the top water level of other reservoirs within the WSA. Between the sites, variety will only occur with the volume of earthworks required to develop a suitable platform, access roads, and the length of pipelines depending on the location of the site to the Waterloo WTP and

[26] Section 5, Site Selection Report, Connect Water, June 2022.

distribution network. Detailed descriptions of each of the options considered are providing in Section 5.4.1 – 5.4.3 of the Site Selection Report.

A seven-point scale was adopted for scoring the options against each criterion. A score of 4 reflects a neutral assessment of the option - middle of the road, business as usual. A lower score indicates some drawbacks or compromises associated with the option, but only to the extent that such dis-benefits can be tolerated and potentially offset by advantages with respect to other criteria.

If an adverse outcome cannot be tolerated, then this would be considered a fatal flaw and the option eliminated from contention. A higher score indicates advantages and opportunities associated with the option.

The key findings of the MCA process are summarised below:

- Naenae 2 scored highest in all criteria except for social (due to proximity to residential properties and streets).
- The Cambridge Terrace site scored better than the Naenae 2 site for social but was second for all other criteria.
- The Gracefield 2 site was the poorest scoring site of the three options considered.

As a result of the MCA findings and discussions with stakeholders, the preferred option was identified as Naenae 2 adjoining the existing Naenae reservoir. A summary of the scoring is presented in Table 17. Further detail is provided in the site selection report included with this Notice of Requirement as **Appendix M**. Consequently, the Naenae 2 site (now referred to as Eastern Hills) has been progressed through this NoR.

Table 17: Overall MCA scoring.

Option Name	MCA score	MCA Rank
Cambridge Terrace	3.7	2nd
Naenae 2	**4.5**	**1st**
Gracefield 2	3.0	3rd

For the details of how the three options were scored against the various criteria see Table 33 in **Appendix M**.

8.3.4 MCA Sensitivity Analysis

Sensitivity analysis was carried out on the site selection MCA results by varying the weighting of various criterion. During sensitivity analysis Naenae 2 was still the best scoring site overall under the 'Increased Environmental Weighting' (environmental criteria weighted at 40% rather than the standard 20%) and the 'Increased Social Weighting' (social criteria weighted at 40% rather than 15%).

Following sensitivity analysis, the overall MCA scores remained unchanged, with the exception of one extreme scenario ('increase social, zero financial') – refer to Table 18. This demonstrates that the MCA outcome is not sensitive to the adopted weightings and confirmed the Naenae 2 site as the preferred site.

Table 18. Sensitivity Analysis Scores

Scenario	Description	MCA weighted score totals		
		Cambridge	Naenae	Gracefield
-	**Base Weightings**	**3.7**	**4.5**	**3.0**
a	Zero Financial weighting	3.5	3.7	3.3
b	Increase Financial weighting	3.7	4.7	2.9
c	Increase Environmental weighting	3.6	4.3	3.1
d	Increase Social weighting	3.5	3.9	2.9
e	Increase Technical weighting	3.7	4.5	3.1
f	Decrease Technical weighting	3.6	4.6	2.8
g	Increase Carbon weighting	3.7	4.6	3.0
h	Decrease Carbon weighting	3.6	4.5	3.0
i	Increase Social, Decrease Financial	3.5	3.6	3.1
j	Increase Social, Zero Financial	3.5	3.3	3.1

8.3.5 Reservoir Form

After the site selection process was complete, Connect Water prepared a Concept Design Report[27] that confirmed the design that was to be employed at the site. The new reservoir will be a 55m diameter above-ground concrete circular reservoir that will utilise the existing bulk network pipe which runs up Summit Road to service the existing Naenae Reservoir.

An above ground reservoir is preferred over a buried or partially buried tank as it provides access for routine maintenance and allows for visual inspection of the outside of the tank. A concrete reservoir is preferred over alternatives like steel due to durability requirements.

The proposed reservoir top water level will be the same as the Naenae, Gracefield and Taita reservoirs. This is an operational requirement of the network as these reservoirs are hydraulically connected. The reservoir platform level will be constructed at the required ground level by removing significant volumes of soil (up to 20m vertically) and disposing of surplus material off site.

Utilising the existing bulk network inlet or “supply” pipe means that a new inlet pipe is not required to be constructed, reducing community disruption and reducing cost and carbon.

8.3.6 Pipeline Location

[27] Concept Design Report, Connect Water, March 2023

The new reservoir can share the existing inlet main serving the existing reservoir, however a new delivery main to the bulk water distribution network is required. Additionally, a new overflow/scour pipe is required to serve both reservoirs. These are operational requirements that are suitably necessary for the ongoing operation of the proposed reservoir.

Several pipeline alignment options have been identified, including Summit Road and other alignments down the north-facing valley towards Waddington Drive (shown in Figure 13). All options have advantages and disadvantages that have been considered to identify a preferred alignment.

Community consultation identified a general preference for an alignment down the hillside north of the proposed and existing reservoirs, towards Balgownie Grove. This alignment avoided generating additional construction impacts on Summit Road properties, noting that Summit Road is the only available access for reservoir construction and will already be subject to heavy vehicle traffic over the construction period. Balgownie Grove residents expressed concern about pipeline construction impacts along their street and proposed an alternative alignment adjacent to Waiwhetu Stream and through the Waddington Drive reserve (Option 2b).

All four of the hillside alignments pass through the SNR12 area identified in the District Plan. Construction of both pipelines would require removal of existing vegetation along a ~14 m wide construction corridor and for vegetation removal and earthworks to occur within close proximity to identified natural wetlands. The National Policy Statement for Indigenous Biodiversity (NPS-IB) and the NPS for Freshwater Management (NPS-FM) broadly require avoidance of these environments/effects unless there is an operational or functional need for the works to occur, and no other practicable locations exist.

As assessment of the options (**Appendix P**) has determined that the Summit Road alignment (Option 1) is not practicable based on constructability issues in conjunction with the very high level of construction impacts (noise, vibration, traffic and access) on residents over an extended duration. Due to the impracticability of Option 1, and the operational need for the new reservoir to have an outlet main and overflow/scour pipeline, the only practicable options remaining require the pipeline to traverse the identified SNR12 area.

The remaining options considered, Options 2a, 2b, 3a and 3b as set out in the Pipe Alignment Options Report (**Appendix P**) were all various iterations of the pipelines travelling through SNR12 and then connecting to the wider water network at differing locations. Option 2b was proposed by Balgownie Grove residents during open days and was also assessed.

The environmental impacts associated with the recommended option down the ridge north of the site (Option 2a) are considered appropriate and the vegetation impacts can be mitigated, remedied and offset over an appropriate time period. Option 2b was considered less favourable to 2a as it would run along the true right bank of Waiwhetū Stream for approximately 150 m which introduces construction and environmental risks, and overall construction impacts (noise, vibration, traffic) that would potentially be greater, for longer duration, and more intrusive due to the need for additional stream over-pumping and piling operations. Options 3a and 3b were discounted due to the complexities associated with constructing the pipeline within the gully, slope stability risks associated with the underlying topography, maintenance challenges, the potential for residents to be disturbed

during construction due to the close proximity of properties to the alignments, and freshwater ecological constraints.

The Pipe Alignment Options Report concludes that Option 2a is the preferred and recommended alignment as it has the least complex construction, lowest community impact, best operability and resilience, the smallest environmental impact, and the potential for the lowest cost.

It is noted that the original multi criteria analysis (MCA) carried out in June 2022 to select the preferred reservoir site was based on the pipe alignment option 1. A review of the site selection MCA scoring was carried out as part of this pipe alignment assessment. The scoring review confirmed that the alternative pipe alignment for Option 2a would have made no material difference to the site selection outcome and that the Naenae site is would still have been selected as the preferred site for a new reservoir.

Figure 13: Pipeline options as identified in the Pipe Alignment Option Report (Appendix P).

PART G: ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

9 Assessment of environmental effects

9.1 Summary of environmental effects

As required by section 168A(3) effects on the environment of allowing the requirement and suggested methods for avoiding, remedying or mitigating these effects are addressed throughout section 9 and in further detail in the Technical Assessments as detailed in Table 19. Table 20 provides a summary of the environmental effects generated by the works proposed in this NoR.

Table 19: Effects on the Environment Assessment Topics

AEE Section	Relevant Technical Report
9.2 – Positive Effects	N/A
9.3 – Traffic and Transport	**Appendix N:** Construction Traffic Assessment
9.4 – Recreation and Amenity	**Appendix O**: Recreation Assessment
9.5 – Mana Whenua Values	**Appendix K**: Cultural Impact Assessment
9.6 – Social Impacts	**Appendix L:** Social Impacts Assessment
9.7 – Landscape and Visual	**Appendix E:** Landscape and Visual Assessment
9.8 – Ecology	**Appendix G:** Ecological Impact Assessment
9.9 – Erosion and Sediment Control	**Appendix F:** Erosion and Sediment Control Plan
9.10 – Noise and Vibration	**Appendix H:** Noise and Vibration Assessment
9.11 - Archaeology	**Appendix J:** Desktop Archaeological Assessment

Table 20: Summary of Environmental Effects

Effect	Summary	Level of effect with proposed mitigation	
		Construction	Operation
Traffic and Transport	During construction, the effect of heavy vehicle movements on the road surrounding the reservoir site are expected to result in disruption to other road users, including some temporary loss of parking.	Minor effect	No permanent effects

Effect	Summary	Level of effect with proposed mitigation	
		Construction	Operation
Recreation and Amenity	Minor adverse effects on recreation use and values during the construction phase due to restrictions on access. Following mitigation, operational, recreational effects are positive due to improved amenity of the recreation areas.	Minor effect	Positive
Mana Whenua Values	The site has no identified Māori sites of significance in its vicinity.	None identified	None identified
Social Impacts	Social impacts will be experienced by residents in close proximity to the site during construction works and include loss of access to recreational facilities, increased road safety risk and reduced wellbeing. Once operational, there will be positive social effects including improved future water security and resilience.	More than minor (on select receivers)	Positive
Landscape and Visual	Landscape and visual effects during construction include earthworks, vegetation clearance and the presence of construction machinery. Planting of taller vegetation will mitigate permanent visual effects associated with the new reservoir, earthworks cut and change to landform, and removal of vegetation.	Minor effect	Less than minor
Ecology	Effects on ecology include the removal of native and non-native vegetation, and the disturbance and removal of habitat for avifauna and herpetofauna. Remediation of the available site with eco-sourced vegetation, will improve the underlying character and composition of vegetation within SNR12 as well as resulting in an overall improvement of the values.	Less than minor	Positive
Erosion and Sediment Control	A draft Construction Erosion and Sediment Control Plan sets out methods to minimise the discharge of sediment. It is recognised that some discharges will be unavoidable; however, with good erosion and sediment control management, the effects on the receiving environment will be temporary and less than minor.	Less than minor	No permanent effects
Noise and Vibration	Predicted noise levels fall above acoustic criteria but due to timing, assessment location, hours of operation, and application of best practicable means of mitigation, the level of noise impact on the receiver is not considered unreasonable.	More than minor	No permanent effects
Archaeology	The nearest archaeological site is over 500m away and will be unaffected by the proposed work. It is unlikely that pre-European Māori cultural material will be found anywhere in the soil around the site.	No effects	No permanent effects

9.2 Positive Effects

They key benefits of the reservoir are:

- The Project will deliver a significant regional public benefit as it will contribute towards the Hutt Valley's water resilience following a significant natural hazard event. Following a natural hazard event, the rapid re-establishment of portions of the water supply network will enable the functioning and recovery of services within the community. Restoration of services within the Hutt WSA will enable resources to be focused elsewhere within the region, contributing positively towards the Wellington region's restoration and recovery. From a resilience perspective, this is considered to provide a significant regional public benefit.
- The Summit Road Firebreak Track will be reinstated to the eastern side of the Eastern Hills Reservoir post construction and seating and signage provided, resulting in improved recreational outcomes for people using this facility. The enhanced enjoyment of the Eastern Hills Reserve will be experienced by the local area, with a moderate number of people positively impacted for a permanent duration.
- Remediation of the available site with eco-sourced vegetation, suitable for the site conditions and consistent with the values of SNR12, will improve the underlying character and composition of vegetation on-site. It will also improve upon the values of the vegetation on site when compared to the current values present. .
- Revegetation of the Waiwhetū Stream banks near the outlet pipe, with native vegetation, will improve habitat along the stream.

9.3 Traffic and Transport

A Construction Transport Assessment has been prepared, which is attached in full as **Appendix N.** The purpose of this assessment is to provide an assessment of the impact of construction traffic on the transport network around where the Eastern Hills Reservoir is being constructed. No operational traffic effects will be generated by the project.

A number of mitigation actions are proposed to minimise traffic effects, including:

- Development of a Construction Traffic Management Plan (CTMP) which will be informed by the final construction details, to be certified by HCC. This would include procedures for management measures such as traffic control, the use of spotters and ongoing monitoring.
- A temporary speed limit of 30km/h speed limit will be imposed on Summit Road, Tilbury Street and Balgownie Grove for the duration of the construction project.
- Temporary removal of some on-street parking to enable better traffic flow, reduce delays and improve safety.
- Early and ongoing communication with residents.

Overall, and with appropriate management and mitigation actions as outlined above, the traffic effects of the reservoir construction are expected to be minor.

Table 21 outlines the effects considered. Further details can be found in **Appendix N**.

Table 21: Summary of Construction Transport Effects

Effect	Proposed Mitigation	Rating (with mitigation)

Effect	Proposed Mitigation	Rating (with mitigation)
Road network effects Summit Road and around At the busiest stage of the project there is expected to be 120 Heavy Commercial Vehicles (HCVs) per day accessing the Summit Road reservoir site. This may restrict two-way traffic along sections of Summit Rd and Tilbury St and cause minor delays to road users. Due to low traffic volumes on these streets, it is expected that they have capacity to absorb additional vehicle movements. Effects will be **minor.**	Early, and ongoing, communication with residents. Adherence to Traffic Management Plan (TMP), including: • Reduced speed limits • Use of spotters. • Traffic control during busy stages of project. • Temporary removal of some on-street parking • Monitoring of effects	Minor
Road network effects: Balgownie Grove HCV movements on Balgownie Grove will be less than Summit Road, and as such the road effects are much lower. There is expected to be a total of about 60 HCV movements over the course of 1-2 months. At times HCVs may block part of the cul-de-sac, preventing vehicles from doing a full turning circle and necessitating the temporary removal of some car parks. Property and pedestrian access will be maintained. Due to low traffic volumes, it is expected that the surrounding streets will have capacity to absorb additional vehicle movements without causing delays. Effects will be **negligible**.	Early, and ongoing, communication with residents. Adherence to TMP, including: • Reduced speed limits • Use of spotters. • Traffic control during busy stages of project. • Temporary removal of some on-street parking • Monitoring of effects	Negligible
Road safety Heavy Commercial Vehicles pose a greater risk to road users, particularly when travelling with downhill momentum. There will be increased exposure to HCVs on Sumit Road, Tilbury St and Balgownie Grove. Effects will be **minor.**	Adherence to TMP, including: • Reduced speed limits • Use of spotters. • Traffic control during busy stages of project. • Temporary removal of some on-street parking • Monitoring of effects	Minor
Parking removal: Summit Road Summit Rd is narrow and winding and will not be able to safely accommodate HCVs while retaining on-street car parking. Some parking will need to be temporarily removed during construction to facilitate safe vehicle movements and reduce delays. Effects will be **minor.**	Early, and ongoing, communication with residents, many of whom have access to off-street parking. Monitoring of effects.	Minor
Parking removal: Balgownie Grove The end of the cul-de-sac between #5-6 is required to be closed with approximately 4 car parks temporarily removed to facilitate construction of the delivery pipeline. Effects will be **negligible.**	Early, and ongoing, communication with residents, many of whom have access to off-street parking. Monitoring of effects.	Negligible

Effect	Proposed Mitigation	Rating (with mitigation)
Track closure Construction works require the closure of the Summit Road firebreak track for the duration of works for health and safety reasons. Signage will be provided advising of the closure and alternative routes and will be communicated in advance to the local community. Effects will be **minor.**	Advance signage at turn-off points and map boards. Early, and ongoing, communication with residents and local track user groups.	Minor

9.4 Recreation and Amenity

Effects on recreation and amenity are covered in detail in the Recreation Assessment Report in **Appendix O**. Table 22 summarises effects on recreation and amenity and assesses the level of effect in RMA terms.

Overall, the recreation assessment concludes that minor adverse effects on recreational use and values will be generated during the construction phase as a result of restrictions on access to the Firebreak Track and Waiwhetū streamside at Balgownie Grove cul-de-sac, and noise effects for recreational users of the Waddington Winder trail. Following mitigation, and during the operational phase of the Project, the impact of the Project on recreational use and values are assessed as positive. This is due to the improved amenity of the recreation areas associated with the Project areas.

Table 22: Summary of Recreation and Amenity Effects

Effect	Proposed Mitigation	Rating (with mitigation)
Recreational Use During Construction The existing Summit Road Firebreak Track past the existing, and proposed, reservoirs will be closed for public access through the construction period. The firebreak track is able to be accessed from other public roads. Construction of the outlet pipes through Waiwhetū Stream will create disruption to proximate residents on Balgownie Grove. Construction activities and access restrictions to the stream will result in the temporary disturbance to the quiet enjoyment of the stream environment for a period of 7-9 months during construction. Effects will be **minor.**	Clear communications to keep the public informed of the status of the Project, timing, and alternative ways recreational users can continue to access and enjoy the track network.	Minor

Effect	Proposed Mitigation	Rating (with mitigation)
Recreational Values During Construction Construction noise is likely to have a temporary adverse effect on the quiet enjoyment of the Eastern Hill Reserve for those recreation users in close proximity to the Project works. Vegetation removal will not have an impact on the enjoyment of the bush setting during construction as users will not have access to the area during construction. Effects will be **minor.**	Construction hours are generally restricted to 0700 – 1800 Monday to Saturday, with no works occurring on Sundays or public holidays. Public access is restricted during construction.	Minor
Recreational Use During Operation At the conclusion of construction, the Summit Road Firebreak track will be reinstated, extending from the site entrance to the top end of the site around the reservoir. When recreation users are close to the reservoir there is potential for the reservoir, given its size, to create an overbearing effect and also limit sightlines. This may lead to actual or perceived issues around personal safety. As part of the works on the new track, seating and signage will be provided. Currently there is little to no seating within the subject site. Effects will be **positive.**	Reinstatement of a 5m wide access track to bypass the existing and proposed reservoirs along their eastern side. The reinstated track will be to a better standard than existing. It is proposed to keep the new track at least 3-3.5m away from the wall of the reservoir to retain sightlines. Provision of a rest area on the north-east side of the Eastern Hills Reservoir with rest facilities including seating. Information and wayfinding signage will be provided at the Summit Road entrance to the track. Reinstate pedestrian access to Balgownie Grove cul-de-sac on the north side of Waiwhetū Stream, with rest facilities including seating, and low native riparian planting and open grassed areas,	Positive
Recreational Values During Operation The large earthworks and fill batters will initially create scars on the landscape where the cut and fill is visually dominant, resulting in an adverse effect on recreational enjoyment. Effects will be **neutral.**	With the establishment and growth of planting, adverse effects will diminish over time as planting grows and blends with the surrounding vegetation cover.	Neutral

9.5 Mana Whenua Values

A Cultural Impact Assessment was prepared that assessed the potential cultural impacts associated with the proposal (**Appendix K**).

The CIA confirmed that the proposed reservoir site has no identified Māori sites of significance in the vicinity with no known Pa, kainga, urupā or ngakinga (traditional garden clearings) nearby. The site is not located on any of what were known as the New Zealand Settlement Company Native Tenths Reserves or McCleverty Blocks identified in 1848.

Overall, no impacts are considered to be generated on cultural values as a result of the Project.

9.6 Social Impacts

Social effects arising from the construction and operation of the reservoir are covered in detail in the Social Impacts Assessment Report in **Appendix L**. Table 23 summarises the effects on social values and how those effects are concluded from a social perspective (as per the conclusions in the SIA attached as **Appendix L**), and then assesses the level of effect in "RMA terms" (as assessed by the authors of the AEE, relying on the SIA and discussions with the author as well as their own judgment).

For social impacts, the approach employed is to assess the level of potential social effect assuming the mitigation proposed by the relevant technical specialist has been adopted. The residual effect is then assessed from a social perspective and a social effects rating applied.

During construction, social impacts will be experienced by residents in close proximity to the construction works – Tilbury Street, Summit Road (and associated cul-de-sacs), and Balgownie Grove. Notably, this means that the level of social impact experienced by receivers is restricted to a small portion of nearby receivers and that those effects will only be temporary for the duration of the construction of the Project. Some impacts will be moderate following mitigation, namely:

- Perceptions of restricted traffic movement;
- Disruption to daily movements due to a loss of parking; and
- Reduced quality of the environment.

Loss of access to recreational facilities, increased road safety risk and reduced wellbeing can be reduced or maintained at a low significance with the application of identified mitigation measures.

The operational phase is characterised by positive social effects. Namely, the reservoir will result in improved future water security and resilience, enhanced enjoyment of the reserve area and overall positive visual impact as a result of the proposed landscape planting.

Table 23: Summary of Social Impacts

Effect (as per SIA)	Proposed Mitigation	Rating as concluded in the SIA (with mitigation)	RMA Effect
CONSTRUCTION PHASE			

Effect (as per SIA)	Proposed Mitigation	Rating as concluded in the SIA (with mitigation)	RMA Effect
Restricted traffic movement During the construction phase there will be a significant increase in heavy vehicle traffic on Summit Road and the immediate local road network. The peak of HCV movements (120 per day) is a significant increase from the current heavy traffic experienced. This has the potential to result in disruptions to traffic movements and traffic flow resulting in delays and extended travel times. There will be heavy vehicle traffic on Balgownie Grove during the construction phase. The presence of HCVs has the potential to restrict the traffic movements within Balgownie Grove. Social impact effect will be **High**	The TMP will ensure prioritisation of emergency vehicles requiring access to Tilbury Street, Summit and Balgownie Grove. Development of a Communication Plan for affected residents to advise them of the anticipated HCV movements, timing and duration. This will allow people to plan and adjust their behaviours to reduce the potential impacts on their everyday movements. Procedure to be provided for public enquiries and complaints during the construction phase.	Moderate	Minor effect on the residents of Tilbury and Summit Roads and Balgownie Grove
Disruption to daily movements During the construction phase, residents of Tilbury and Summit Road will experience a loss of on-street parking. Residents, visitors and service providers need to park in surrounding local roads, which may put additional pressure on on-street parking availability nearby. Social impact effect will be **High**	Development of a Communication Plan for affected residents to advise them of on-street parking changes. This will allow residents to plan in advance and make alternative parking arrangements. Procedure to be provided in the Construction Environmental Management Plan (CEMP) for public enquiries and complaints during the construction phase relating to the loss of parking.	Moderate	Minor effect on the residents of Tilbury and Summit Road
Loss of access to recreational facilities During the construction phase, access to the Eastern Hills Reserve for recreation purposes will be disrupted by the closure of the Summit Road firebreak track for the duration of construction (2.5 years). Recreational access to the reserve and stream due to pipeline related works at the end of Balgownie Grove will also be inhibited for a period of 7-9 months. Social impact effect will be **Low**	Clear communications to keep the public informed of the status of the Project, timing, and alternative ways recreational users can continue to access and enjoy the track network.	Low	Less than minor effect on the local area

Effect (as per SIA)	Proposed Mitigation	Rating as concluded in the SIA (with mitigation)	RMA Effect
Increased road safety risk During the construction phase, there will be an increase in HCV's which has the potential to increase road safety risk for road users on Tilbury Street, Summit Road and Balgownie Grove. Social impact effect will be **Low**	Development of a Communication Plan for affected residents to advise them of the anticipated HCV movements, timing and duration. This will allow people to plan and adjust their behaviours to reduce the potential impacts on their everyday movements. Procedure to be provided for public enquiries and complaints during the construction phase.	Low	Less than minor effect on the site and surrounding area (Tilbury Street, Summit Road, Balgownie Grove)
Reduced quality of the environment Reduced quality of the environment as a result of traffic, noise, vibration, air emissions and visual effects on amenity. Visual effects may be experienced, however due to the topography of the local area, these impacts are not likely to be experienced by those located within the immediate area surrounding the site. The duration of the impact will be temporary (7-9 months) for the Balgownie Grove area, and short term (2.5 years) for Tilbury Street, Summit Road and surrounds. Social impact effects will be **High**	Development of a Communication Plan for affected residents to advise them of the likely traffic, noise and vibration that may be experienced. This will also identify specific residents required to be engaged with respect to effects generated by certain activities. Procedure to be provided for public enquiries and complaints during the construction phase.	Moderate	Minor effect on site and surrounding area
Reduced wellbeing Leading up to and during construction, residents in close proximity to the site may experience reduced wellbeing as a result of stress and anxiety regarding the extent to which they may be affected by construction related activities. The extent of the impact of reduced wellbeing is likely to be experienced by residents in close proximity to the construction site. Social impact effect will be **Moderate**	Development of a Communication Plan for residents affected by proximity to ensure the provision of information prior to and during construction. Procedure to be provided for public enquiries and complaints during the construction phase.	Low	Less than minor on site and surrounding area

OPERATIONAL PHASE			
Improved future water security and resilience The proposed reservoir will contribute to a reliable and resilient water storage and supply system for Lower Hutt. The extent of the improved future water security and resilience will be experienced at a regional scale, with many affected for a permanent duration. Social impact effect will be **Extreme (Positive)**	None required	N/A	Positive
Change in the character of the area The completion of the reservoir and pipeline infrastructure has the potential to result in a change in the character of the area and visual changes throughout the operational phase. Given the existing urban environment, the change to the landscape, natural character and visual effect can be accommodated. There is an opportunity for an improvement in natural character and visual effects with planting and other management measures. Social impact effect will be **Low (Positive)**	None required	N/A	Positive
Enhanced enjoyment of recreational area There is the potential to enhance the enjoyment of the Eastern Hills Reserve during the operational phase of the project. The Summit Road Firebreak Track will be reinstated and will result in improved recreational outcomes for local residents using this facility. Social impact effect will be **High (Positive)**	None required	N/A	Positive

9.7 Landscape and Visual

A Landscape and Visual Effects Assessment has been prepared, which is attached in full as **Appendix E**. The purpose of this assessment is to evaluate the landscape, natural character and visual effects of the proposed reservoir during its construction and operation.

The following key actions are proposed to minimise landscape, natural character and visual effects.

The proposed mitigation of effects during construction are:

- Reinstate construction areas around the site by redistributing any leftover fill (if useable) and shaping the ground to integrate with the surrounding landform.

- Locate construction yard compound, stocking piling areas and machine storage area away from residential properties, and roads as far as practicable.
- Provide hoardings around the boundaries of the site compounds that face onto adjacent landowners and open spaces to provide visual screening.
- Where possible, require lighting during nighttime works to be directional lighting directed away from residential boundaries of the site to prevent glare/spill light falling on residential properties.
- Retain suitable slash or native stems/branches to be used within landscape planting areas to provide immediate erosion management and habitat for invertebrates and lizards.
- Adoption of the proposed landscape planting plan. The proposed planting plan was developed in conjunction with the Project's ecologist so that the native species selected were those appropriate for the re-establishment of lizard habitat. Additionally, vegetation has been selected that will be quick growing so as to assist with mitigating the visual effects of the Project during operations.
- Revegetation of the 2m clearance buffer zone and small hill section north of the Naenae reservoir with native vegetation.
- Revegetation planting is to occur in stages. Where possible, fast growing plants will be planted in the earlier stages to allow for quick visual mitigation to occur. This will then enable slower growing species to grow over time.
- Revegetation to occur along the delivery pipe clearance zone.
- Earthworks will be contoured in a natural manner to reflect the surrounding landform.
- Plants selected for revegetation should be native and eco-sourced. The exposed nature of the site shall be taken into consideration when selecting species to ensure that the plants will not become stunted due to the existing environmental conditions.

The proposed mitigation of landscape, natural character and visual effects during operations are:

- Planting of taller indigenous broadleaved hardwoods to the west, northeast and east of the reservoir will mitigate visual effects of the reservoir and cleared vegetation for the proposed pipeline once planting is established. This will take approximately 5-10 years to establish dependent on the realised growth rates.
- A five-year maintenance period for the proposed planting is recommended to ensure successful establishment of vegetation, including any replanting that may be required.
- Revegetation of the stream banks near the outlet pipe, with native vegetation. This will take approximately 5-10 years to establish dependent on the realised growth rates. Faster growing shrub species will provide initial screening after 5 years, this will be supplemented by taller, but slower-growing tree species longer term.

Overall, the reservoir construction and operational activities will result in landscape and visual effects. Once reinstatement and mitigation is complete and planting is established over time, the residual effects are considered to be, at most, minor.

Table 24 summarises the landscape, natural character and visual effects during construction and operation, and assesses the level of effect in RMA terms.

The diagram in section 6.39 of Te Tani a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines (TTatM) has been used to translate the seven-point landscape and visual assessment ratings into RMA terms (Figure 14) in Table 24.

The natural character effects during operations were assessed by WSP Landscape Architects as Low Adverse based on this rating system. As this rating straddles two possible RMA effects (Less than minor and Minor) a conservative approach was taken and the effects are considered to be Minor.

Figure 14: TTatM Assessment Ratings

Table 24: Summary of Landscape, Natural Character and Visual Effects

Effect	Proposed Mitigation	Rating (with mitigation)
CONSTRCTION EFFECTS		
Landscape Effects Physical changes to the landscape arising from the construction of the reservoir include construction of the large concrete reservoir and pipework, bulk earthworks, vegetation clearance, ancillary works adjacent to Waiwhetū Stream and temporary closure of the firebreak track. Effects will be **Moderate Adverse.**	• Reinstatement of construction areas around the site by redistributing any leftover fill & shaping the ground to integrate with the surrounding landform. • Locate construction yard, stock piling areas and machine storage areas away from residential properties, and roads as far as practicable. • Retain suitable slash or native stems/branches for use within landscape planting areas to provide immediate erosion management and habitat for invertebrates and lizards. • Adopt the proposed landscape planting plan to assist with mitigating the visual effects during operations. • Revegetation of the 2m clearance buffer zone and small hill section north of the Naenae reservoir with native vegetation. • Contour earthworks where possible in a natural manner to reflect the surrounding landform.	More than minor
Natural Character Effects Natural character effects are likely to arise from the clearance of vegetation, erosion and sediment controls, as well as construction activities including construction machinery and site management practices such as dust mitigation via watering. These effects will be temporary. Effects will be **Low-Moderate Adverse**		Minor
Visual Effects The visual effects during the construction phase are expected to arise from temporary alterations to the existing environment. These effects are likely to include the presence of construction machinery, security fencing, and vegetation removal. These effects are temporary and consistent with typical construction sites. Effects will be **Moderate Adverse**		More than minor

OPERATIONAL EFFECTS		
Landscape Effects Physical changes to the landscape arising from the construction of the reservoir include; construction of the large concrete reservoir and pipework, bulk earthworks, vegetation clearance, ancillary works adjacent to Waiwhetū Stream and reinstatement of the firebreak track. Given the presence of the existing reservoir, the proposed reservoir will not introduce a completely new element to the surrounding scene. Significant change has already occurred on this site and nearby due to the construction of the existing reservoir. Effects will be **Low-Moderate Adverse**	• Planting of taller indigenous broadleaved hardwoods to the west, northeast and east of the reservoir to mitigate visual effects of the reservoir and cleared vegetation once established. • A 5 year maintenance period to ensure successful establishment of vegetation, including replanting. • Reinstate the firebreak track providing access to the wider network of trails. • Revegetation of the stream banks with native vegetation	Minor
Natural Character Effects Effects on natural character will only occur from the removal of vegetation and this will not be out of character with the existing modified environment of the Waiwhetū Stream. The proposed delivery pipe will be trenched under the stream and will not affect the natural character of the stream itself. Built elements, including residential dwellings, fencing and the existing reservoir overflow pipe are an aspect of the existing stream environment and context. Effects will be **Low Adverse**		Minor
Visual Effects Four public viewpoints have been selected to assess the existing visual qualities and the likely visual impacts of the proposed reservoir. The volume and scale of earthworks, introduction of a new built element, variance to the existing natural backdrop, and from some vantage points clear views will generate adverse visual effects. The design of the reservoir has taken into account the existing landform and integrated the reservoir into the existing backdrop. Effects will vary from **Low** to **Moderate-High Adverse**		Less than minor to Minor (level of effect varies depending on viewpoint)

9.8 Ecology

Ecological effects are covered in detail in the Ecological Impact Assessment in **Appendix G**. The following terminology in Table 25 was used when converting the effects rating in the Ecological Impact Assessment to RMA terminology, in collaboration with the WSP Ecologists who prepared the Assessment. Table 26 summarises the ecological effects identified in that report and assesses the level of effect in RMA terms[28].

Table 25: Ecology Effects Ratings and RMA Terms

Ecology Terminology	RMA Terminology
Very low	Less than minor
Low	
Moderate	Minor
High	More than minor
Very high	Significant

Mitigation proposed during construction of the Project includes:

1. Develop and implement a Bird Management Plan (BMP), Lizard Management Plan (LMP) and Vegetation Management Plan (VMP) prepared by suitably qualified experts.
2. Avoid and minimise the removal of, or impacts to, indigenous vegetation where practicable during vegetation clearance activities.
3. Stage vegetation removal activities so that vegetation clearance during nesting and fledging seasons is avoided if practicable and effects on other fauna are avoided.
4. Prepare a Bird Management Plan (BMP) that details: methodologies to determine and manage construction activities if active nests are present prior to vegetation removal during nesting and fledging season, and define the nest and fledging seasons and zone of influence for identified species.
5. Prepare a Lizard Management Plan (LMP) that details: where lizard habitat must be avoided during May – August, an Accidental Discovery Protocol (ADP) for regionally 'Threatened' or 'At Risk' species that may be encountered on site, and pest control requirements at release sites.
6. Prepare a Vegetation Management Plan (VMP) that details the volume of 'Mānuka and/or Kānuka' and 'Broadleaved Indigenous Hardwoods' cleared onsite and whether residual effects need to be addressed, where remediation of vegetation onsite will occur, confirmation that the plant species to be planted will achieve an appropriate degree of canopy closure are consistent with SNR12 and are eco-sourced and appropriate for lizard species onsite, details of the progressive planting and site stabilisation proposed as

[28] Ecological effects in the AEE are limited in scope to those effects associated with earthworks and vegetation clearance in accordance with the jurisdiction afforded to HCC as a territorial consenting authority and section 9 of the RMA.

determined by planting seasons and future construction phases, monitoring and maintenance of planting required post-construction

With the implementation of the proposed mitigation it is considered that there will be a less than minor effect on birds, lizards, terrestrial invertebrates and vegetation. Remediation of the available site with eco-sourced vegetation, suitable for the site conditions and consistent with SNR12, will improve the underlying character and composition of vegetation on site, whilst also improving the values of vegetation onsite.

Table 26: Summary of Ecological Effects

Effect	Proposed Mitigation	Rating (with mitigation)
Avifauna The actual or potential impacts to birds caused by the proposed project include the temporary (construction phase) disturbance/displacement during construction, short-term to permanent loss of nesting and foraging habitats and the potential death of protected species during vegetation clearance. Mobile adult birds are highly unlikely to be killed, however immobile eggs and chicks in the nest are at risk. The clearance of all vegetation on-site will result in a short-term to permanent loss of habitat on-site for birds. There will be a short-term loss in foraging habitat for some species and an increase in foraging habitat for others more adapted to disturbed areas and human activity. The pipeline alignment will also result in the permanent loss of mature vegetation. Effects will be **very low.**	Avoid • Avoid the removal of, or impacts to, indigenous vegetation practicable • Avoid vegetation removal Sept-Feb (inclusive) where practicable • A BMP must be developed by a suitably qualified ecologist Minimise • Staged vegetation removal is kept to a minimum to minimise impacts on the birds inhabiting the vegetation on site Remediation • Remediation of vegetation where practicable onsite with eco sourced indigenous plants	Less than minor
Herpetofauna The actual or potential impacts to herpetofauna are caused by temporary disturbance/displacement during construction, short-term to permanent loss of habitat and the potential for death of protected species during habitat clearance. Clearance of scrub along the firebreak track edge will result in the short-term loss of habitat. Long-term to permanent loss of regenerating kānuka and mature broadleaved indigenous hardwoods may affect the arboreal barking and ngahere geckos, if present. Vegetation could take up to 25 years to grow to a size where they become usable habitat for these species. The pipeline alignment will result in the permanent loss of habitat. Effects will be **very low.**	Avoid • Avoid the removal of, or impacts to, indigenous vegetation where practicable • Avoid vegetation removal during May-Sept due to lizard brumation • Development of a LMP by a suitably qualified herpetologist, including vegetation removal protocols Minimise • LMP must include an accidental discovery protocol • LMP must include pest control, suitable for lizards known to be or likely to be relocated and must occur prior to salvage within proposed release sites • Pest control must be elevated within release site if certain thresholds for each species are exceeded during the salvage operations Remedy • Remediate the site with vegetation appropriate for skink and gecko habitat	Less than minor

Effect	Proposed Mitigation	Rating (with mitigation)
Invertebrates Construction activities associated with habitat clearance pose a risk of death to terrestrial invertebrates. Vegetation clearance will also result in short-term impact to terrestrial invertebrate habitat loss. There is likely to be only a very slight change from the existing terrestrial invertebrate baseline condition. The vegetation types present on-site are contiguous with the wider surrounding landscape. Effects will be **very low.**	• Site remediation requirements detailed above for birds and lizards will result in a positive effect for terrestrial invertebrates.	Less than minor
Flora Construction of the proposed reservoir could potentially involve the complete removal of all vegetation on site (approx. 1.9ha, or 0.3% of the 670ha SNR12). Post-construction, planting is proposed consistent with the wider landscape. Fast growing and regenerating vegetation will experience a short-term loss, mature vegetation may experience a long-term loss while some areas will be permanently lost due to infrastructure. The loss of vegetation onsite is not restricted to indigenous plants as the site includes exotic plants and weeds. Effects will be **low.**	<u>Avoid</u> • Avoid the removal of, or impacts to, indigenous vegetation where practicable • Development of a VMP to avoid, minimise and remediate vegetation where practicable. <u>Minimise</u> • Minimise the extent of indigenous vegetation removed where possible • Staged vegetation removal to minimise impacts on the indigenous fauna inhabiting the vegetation on site <u>Remediation</u> • Remediation of vegetation where practicable onsite with eco sourced indigenous plants	Less than minor

9.9 Erosion and Sediment Control

The construction of the reservoir and associated pipelines will involve construction methodologies and activities which have the potential to generate sediment. This includes the following activities:

- Earthworks, including bulk earthworks, and trenching where rainfall encounters exposed earth; and
- Works in and around streams that disturb and entrain sediment.

For the creation of the reservoir and access track approximately 83,000m^3 of earthworks is required, with an additional 7,000m^3 for the delivery pipeline, over a 2.5 year timeline.

Sediment mobilisation during the construction of the Project, predominantly during the earthworks phase, will be mitigated via the use of erosion and sediment control practices which will be deployed in accordance with the draft Erosion and Sediment Control Plan (ESCP) contained in **Appendix F.** This ESCP has been prepared in accordance with the principles contained within the '*Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region*' prepared by Greater Wellington Regional Council (February 2021).

The ESCP sets out a number of core principles to manage erosion and sediment including the use of silt fences, sediment retention ponds, and a clean water diversion system. Implementation of a certified ESCP will be required prior to construction commencing.

Implementation of the erosion and sediment control measures will mean that adverse effects associated with sediment discharges during the construction of the Project can be appropriately managed. This will result in the adverse effects associated with the discharge of sediment during construction of the Project being less than minor.

A Construction Environmental Management Plan (CEMP) is also proposed to address the management of potential contaminants on site. This will also provide guidance to the contractor relating to spill procedures, areas where refuelling may occur, and detail other on-site environmental practices and procedures as required to mitigate potential adverse effects.

9.10 Noise and Vibration

Noise and vibration effects are covered in detail in the Construction Noise and Vibration Assessment in **Appendix H**.

This assessment identified the likely noise and vibration impacts generated by the project construction work, as well as potential noise effects of construction traffic on local roads in close proximity to the site.

Physical mitigation will be used to reduce noise emissions from the construction works. Activities will be guided by the following principles to reduce actual levels of noise and vibration:

- Equipment selection, operation and siting of equipment, and
- Adoption of physical barriers to block the line of sight between source and receiver.

Managerial mitigation will be implemented to reduce the effects of noise and vibration. For this site, the key managerial mitigation measures for noise and vibration are:

- Consideration will be given to the scheduling of works and duration of loud equipment operation;
- Opting for quieter and newer equipment models during all construction stages where practicable;
- Staff shall be trained to follow noise and vibration reduction procedures onsite;
- Validation measurements and noise monitoring during the construction programme to ensure compliance with noise limits and to keep a log of construction noise and activities levels for when complaints are received;
- Engagement with the local community on the likely effects of noise and vibration and working to address concerns at an early stage;
- An established site contact and effectively managed complaints handling procedure which is followed at all times; and

- Piling machines should be measured on site at the beginning of construction to ensure acoustic predictions are accurate and in line with experienced site noise levels.

A comprehensive overview of managerial mitigation measures will be developed within a Construction Noise and Vibration Management Plan (CNVMP). In practice, the Contractor will be responsible for implementing the mitigation measures where practicable and safe to do so.

9.10.1 Noise

The following terminology in Table 27 was used when converting the effects rating in the Noise and Vibration Assessment to RMA terminology, in agreement with the WSP Acoustic Engineers who prepared the Assessment.

Table 27: Noise Effects Ratings and RMA Terms

Noise Terminology	RMA Terminology
Acceptable	Less than minor
Reasonable	Minor
Obvious	More than minor
Unreasonable	Significant

Table 28 summarises the noise effects identified and assesses the level of effects in RMA terms.

Based on the selected construction equipment and mitigation methods it is predicted that construction noise levels will be compliant with acoustic criteria during site establishment and earthworks with overall noise impacts being acceptable. During pipeline and reservoir construction, predicted noise levels will be above the acoustic criteria but due to timing, location, hours of operation and mitigation measures the noise level impacts on receivers is not considered unreasonable.

Table 28: Summary of Noise Effects

Effect	Proposed Mitigation	Rating (with mitigation)
A - Site Establishment Site establishment activities with no noise mitigation in place will result in one Noise Sensitive Receiver (NSR) at 49c Tilbury Street experiencing and exceedance of 1dB, which is negligible. Effects will be **acceptable.**	• 3m tall site hoarding barriers are installed around site boundary. • Place wood-chipper / mulcher equipment in a screened area and surrounded by noise barriers when in operation. • Chainsaw and wood-chipper should not be used during 7:00am to 09:00am and should operate no more than 15 minutes of every 1-hour period in the same location on site. • Site clearance equipment should be evenly distributed around the Site and not in one location.	Less Than Minor

Effect	Proposed Mitigation	Rating (with mitigation)
B - Earthworks for Reservoir All NSRs are predicted to achieve the noise criteria without mitigation measures during bulk earthworks and the overall noise impact is predicted to be acceptable. The noise situation will also improve as earthworks progress as excavators will lower in height from the ridgeline where they will overlook site boundaries at the start of works. As the works area lowers, they will be further screened by site hoardings. Effects will be **acceptable.**	• 3m tall site hoarding barriers installed during Site Establishment should remain in place. • Follow managerial mitigation measures outlined as far as practicable. • At the end of earthworks, shift and reestablish site hoardings so as to be appropriate for future construction stages.	Less Than Minor

Effect	Proposed Mitigation	Rating (with mitigation)
C - Pipeline & Reservoir Construction –piling activities During Pipeline & Reservoir Construction with piling activities, 19 NSRs are predicted to exceed the noise criteria. After best practice specific mitigation measures are applied, 9 of the receivers are predicted to achieve the noise criteria and 10 receptors are predicted to remain above the noise criteria. Noise exceedances at 6 NSRs are by 1 to 3 dB with mitigation installed. This is likely to be imperceptible to barely perceptible above the noise criteria. Noise exceedances at 2 NSRs (2 and 7 Balgownie Grove) in the range of >10 dB will be perceptible, and are likely to cause adverse effects and noise complaints if noise levels are experienced over a long duration or during sensitive time periods. Activities that will generate these exceedances (pileing) will only occur over a handful of days during the daytime before the construction will move back to non-piling activities which are predicted to cause lower levels of noise. As such, this effect is temporary. Additionally, maximum noise events from equipment are likely to cause potential exceedances at Balgownie Grove. Maximum noise levels represent one-off events and are very much dependent on the exact activity being undertaken. Managerial mitigation measures are key to minimise adverse noise effects. Effects will be **reasonable to obvious.**	• Site barriers (minimum 3m height) shall be implemented as far as practicable to the Balgownie Grove properties. • Piling activities should aim to use quieter methods such as rotary bored piles, or using piling head covers/attachments to manage and reduce the noise emissions of the equipment. Where other methods of piling are required, such as sheet piling for pipeline construction, it is mandatory to provide screening to nearby recivers. • Undertake monitoring during piling activities or continuous noise logging.	Minor to More than minor

Effect	Proposed Mitigation	Rating (with mitigation)
D - Pipeline & Reservoir Construction – no piling activities After best practicable specific mitigation measures are applied, 2 NSRs are predicted to remain above the noise criteria. Noise exceedances at 2 NSRs by 1 to 3 dB are likely to be imperceptible to barely perceptible above the noise criteria. Effects will be **reasonable.**	• Barriers installed during Situation C shall be kept during this Situation.	Minor
D-2 - Pipeline & Reservoir Construction – night dewatering & over pumping Two pumps and a generator are to be used to dewater and over-pump Waiwhetū Stream during the night-time once piling has finished. This will continue for approximately 2 weeks, through Stage D until the pipe is installed across Waiwhetū Stream. The two pumps and generator are to be installed within an acoustic enclosure. All properties are predicted to achieve the 45 dB $L_{Aeq,T}$ noise limit at night, and therefore effects from night over-pumping and dewatering are acceptable. Effects will be **acceptable.**	• Barriers installed during Situation C shall be kept during this Situation. • Acoustic enclosures are to be installed around the pumps and generators.	Less than minor

Effect	Proposed Mitigation	Rating (with mitigation)
E – Vehicle access HCV's accessing the site could generate noise effects. HCV's will traverse local roads which have low levels of traffic, and are likely to experience a large change in the noise levels. It is impractical to use physical mitigation measures along Tilbury Street and Summit Road as they would remove access to properties, and due to the length and height of screening required. Many NSRs along this route are predicted to exceed the night-time noise criteria. The overall noise impact is predicted to be obvious. Noise exceedances at night are likely to cause adverse noise effects. The magnitude and significance of adverse effects is dependent on a variety of elements. It is noted that these predicted noise levels will be experienced on two of the four nights which night-works occur over the whole construction programme for the night-time concrete pours (1 night of concrete pour, 1 night of post-tensioning the slab, undertaken over two sets of night works) resulting in a temporary effect. Effects will be **reasonable to obvious** (daytime) and **obvious** (night time on the limited nights that this occurs).	• Site boundary barriers (3m height) will remain set up during this construction stage. • Use managerial mitigation measures to inform residents of the construction process in the months and weeks leading up the concrete pours • Within the Construction Noise and Vibration Management Plan detail specific managerial mitigation where night works are proposed including a robust consideration and requirement for the works, details of noise and vibration monitoring, enhanced communication with residents, where possible using equipment with lower noise levels and implementing mitigation where possible, scheduling the works to provide residents with respite, controls to minimise the occurrence of events generating intermittent sounds, and as a last resort offering temporary relocation to properties where effects cannot be avoided.	Daytime –minor to more than minor Night-time –more than minor

9.10.2 Vibration

All receivers are located beyond the distances within which vibration levels exceeding the proposed vibration criteria for cosmetic building damage are predicted. Considering the selection, location, and duration of construction activities it is considered that this vibration criteria will be achieved. However, it is noted that some amenity areas of Noise Sensitive Receivers may lie within the vibration set-back distance for human annoyance, and so residents should be notified of vibratory construction works.

10 Environmental Management and Monitoring

10.1 Management Plans

The attached technical reports include a number of recommendations for mitigation measures and matters to be further developed during detailed design. The key mitigation action is the preparation of, and compliance with, management plans which will be certified by HCC (or GWRC, in the case of the regional consents). Those management plans of relevant to this NoR are set out in Table 29.

Table 29: Proposed Environmental Management

Management Plan	Certified By	Contents
Construction Management Plan	Hutt City Council	• Contact details • Communication plan • Complaints procedures
Erosion and Sediment Control Plan	Greater Wellington Regional Council	• Monitoring
Construction Traffic Management Plan	Hutt City Council	• Final construction details • Procedures • Traffic control • Monitoring • Communication plan • Complaints procedures
Construction Noise and Vibration Management Plan	Hutt City Council	• Noise and vibration mitigation measures • Monitoring • Procedures for night works • Contingency measures • Community liaison • Staff training
Vegetation Management Plan	Hutt City Council	• Vegetation clearance/retention plans that clearly identify vegetation that will not be removed • Planting plans • Planting monitoring and maintenance period requirements including planting success targets • Planting specifications including the use of eco-sourced plants where available
Bird Management Plan	Hutt City Council	• Timing • Accidental discovery protocol • Pest control • Relocation details • Remediation details

Management Plan	Certified By	Contents
Lizard Management Plan	Hutt City Council	• Timing • Accidental discovery protocol • Pest control • Relocation details • Remediation details
		•
Archaeology Accidental Discovery Protocol	N/A	• Procedures • Contact details

11 Proposed Conditions

A number of conditions, provided in **Appendix B**, are proposed to be attached to the designation. These draft conditions specify the process for reviewing the designation area, the detail that must be included in the management plans proposed above, and the process for certification of the plans.

PART I: STATUTORY ASSESSMENT

12 Statutory Assessment

The following section provides analysis of the Project against the relevant legislative framework within which the designation is sought. Part D of this NoR has set out the relevant statutory framework and provisions of the RMA.

With respect to section 168A(1)(a), HCC has financial responsibility for the reservoir, which will be operated and maintained on its behalf by Wellington Water Limited.

In regard to designations whereby a notice of requirement is issued by a territorial authority, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement having particular regard to[29]:

- 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
- Whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if
    - The requiring authority does not have an interest in the land sufficient for undertaking the work; or
    - It is likely that the work will have a significant adverse effect on the environment; and
- Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought; and
- Any other matter the territorial authority considers necessary in order to make a decision on the requirement.

These items are considered below.

12.1 Consideration of Alternatives

Where a Project could generate significant effects or the requiring authority does not have a sufficient interest in the site, the territorial authority is required to consider whether adequate consideration has been given to alternative sites, routes or methods for undertaking the work.

[29] Section 168A(3), Resource Management Act 1991

Where an assessment of alternatives is required, the case law has identified that 'adequate consideration' does not mean exhaustive or meticulous consideration, but means that the consideration must be sufficient or satisfactory, and this will depend on the circumstances.[30] The Project has been subject to a detailed assessment of alternatives as set out in Section 8 and **Appendix M**. of this AEE as at the time of assessing the Project it was unknown as to the level of effect that could be generated by the Project or whether HCC would have a sufficient interest in the land to undertake the works .It has been concluded that effects of the Project will not be significant, that no other alternatives will meet the Project Objectives, and that the selected site is the preferred outscoring the other sites in the MCA process except for on the social criterion.

12.2 Reasonably Necessary

12.2.1 Necessity of Project

Section 168A(3)(c) of the RMA requires that when considering a NoR, particular regard must be had to whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought. 'Reasonably necessary' is understood as requiring something less than 'absolutely necessary' or essential. Caselaw has held that the work and designation are reasonably necessary where:[31]

- There is a nexus between the works proposed and the achievement of the requiring authority's objectives for which the designation is sought;
- The spatial extent of land is justified in relation to those works; and
- The designated land is able to be used for the purpose of achieving the requiring authority's objectives for which the designation is sought.

It is also important to note that, as a requiring authority (or territorial authority acting as project proponent under s 168A) HCC is able to establish its priorities and objectives in relation to the delivery of this Project as it relates to their functions, provided that these objectives do not predetermine the consideration of alternatives. It is considered well settled that the RMA neither requires or allows the merits of the objectives themselves to be judged by the court or territorial authority.[32]

The Project objectives are considered reasonably necessary to achieve the objectives of the requiring authority. Section 2 of this NoR has previously set out the need for the Project and the Project Objectives. The objectives of the Project, and how the Project is considered to reasonably necessary to achieve them is set out below in Table 30.

Table 30:Project objective and how the Project is reasonably necessary to achieve each.

Objective	Comment

[30] *NZ Transport Agency v Architectural Centre Inc* [2015] NZHC 1991 ('Basin Bridge'), at [137].
[31] *Re Queenstown Airport Corporation Ltd* [2017] NZEnvC 46 at [9]. While these criteria were discussed in the context of section 171(1)(c), they are considered equally applicable to section 168A(3), due to the wording being the same in the two sections.
[32] *Gavin H Wallace Ltd v Auckland Council* [2012] NZEnvC 120 at [184].

Objective	Comment
• To deliver a secure, safe and reliable water storage solution that has a 100-year design life.	• A new above ground concrete reservoir provides a reliable supply of potable water that can be kept free of contaminants and supplied to customers via gravity pipes to the wider potable water network. • The reservoir has been designed to Wellington Water design standards and New Zealand Standards and Codes: ○ Regional Standard for Water Services (2019) ○ Regional Specification for Water Services (2019) ○ NZS 3106:2009 Design of concrete structures for the storage of liquid ○ NZS 1170.5 Earthquake Loadings Standard ○ SNZ PAS 4509 Code of practice for firefighting water supplies. Through implementation of these design standards the constructed reservoir will be secure, safe and reliable. • The reservoir has been designed with the durability and strength to have a 100-year design life.
• To integrate the chosen solution into the Lower Hutt Central WSA network in a cost effective manner.	• The Project will be able to be incorporated into the WSA network in a cost effective manner. Cost effectiveness is achieved by the Project as it is possible to supply water to the reservoir through using the existing main connection from the Waterloo WTP from the existing Naenae Reservoir. Further, the connection to the bulk water main network from the Project is able to utilise a gravity fed system which will not require additional pumps, further contributing to the cost effectiveness of the Project.

Objective	Comment
• Address the current storage shortfall and ensure sufficient storage for future growth in the Lower Hutt Central and Taita Water Storage Areas (WSA) ○ To ensure disaster resilience of the Lower Hutt Central and Taita WSA by providing a seismically resilient water supply capable of meeting Wellington Water's target level of service of the WSA of 7 days (day 8 to day 15) supply under a survival and stability stage following a significant water supply disruption event. • To ensure the Lower Hutt Central and Taita WSA are operationally resilient by providing sufficient secure, safe and reliable water storage to supply 48 hours of water to residents, businesses and critical water users (including Fire and Emergency NZ) under normal operating conditions, based on projected demand with appropriate consideration of population growth.	Wellington Water is responsible for the operation and delivery of the regions water assets. Part of this role comprises planning for the communities future needs to achieve an appropriate level of service. The Project positively contributes towards this objective as: • It will result in the development of a new 15 ML reservoir that will positively contribute toward the WSAs resilience levels. • The 15 ML storage capacity will provide for a 15-day recovery time (or less) following a seismic disaster event). The reservoir has been designed with a governing storage requirement based on average daily demand over a 48 hour period. The fire scenario was further considered, and it was concluded that the storage requirements for fire fighting were less than that of the governing scenario.

It is concluded that the Project is reasonably necessary to achieve the objectives of the requiring authority for the reasons set out above and that the Project will thus achieve these objectives.

Benefits from the Project include addressing the current storage deficit that exists in the potable water supply network, enabling future growth and development within the WSA, the provision of operational, network and hazard resilience to the water network, and supporting the redevelopment of other reservoirs within the WSA though providing additional capacity.

12.2.2 Necessity of Designation

Consideration was given to whether a designation was the appropriate (reasonably necessary) mechanism or 'planning tool' for delivering the Project instead of obtaining a land use consent. The designation was considered the appropriate planning tool and therefore 'reasonably necessary' for achieving the Project Objectives because:

- Protects the land from other development – no other party can undertake an activity on the designated land that might affect the reservoir without HCC's approval;
- Provides certainty that the Project can be operated and maintained in the future;
- Because it will be included in the district plan, provides certainty to the community and nearby residents as to the nature, scale and location of the proposed works; and
- Enables confirmation of the Project footprint prior to further detailed design occurring, with the ability to consider effects further through the outline plan process and any regional consents that may be required.

The footprint of the designation has been confirmed through the development of the reservoir design. This has included confirming that there will be adequate room to construct the Project and undertake ancillary construction activities, provide for access for maintenance purposes to be maintained at all times, and sufficient room to provide for future activities associated with the operation of the Project to occur subject to an Outline Plan approvals process. The supporting pipeline has also been provided for within a designation corridor ~14 m wide, so that the necessary maintenance can occur without requiring activities to occur outside of the designation footprint.

12.3 National Policy Statements

Section 168A(3)(a) requires a territorial authority to have particular regard to any relevant provisions of a national policy statement, a New Zealand coastal policy statement, a regional policy statement or proposed regional policy statement, a plan or proposed plan. There are currently eight National Policy Statements (NPS) in effect:

- National Policy Statement on Urban Development
- National Policy Statement for Freshwater Management
- National Policy Statement for Indigenous Biodiversity
- National Policy Statement for Renewable Electricity Generation
- National Policy Statement on Electricity Transmission
- National Policy Statement for Greenhouse Gas Emissions from Industrial Process Heat
- National Policy Statement for Highly Productive Land
- New Zealand Coastal Policy Statement (NZCPS)

Those considered to the Project are outlined in sections 12.3.1 and 12.3.2.

The NPS's for Renewable Electricity Generation, Electricity Transmission, Greenhouse Gas Emissions from Industrial Process Heat, Highly Productive Land and the New Zealand Coastal Policy Statement are not relevant to this Notice of Requirement.

The NPS on Urban Development recognisees the national significance of well-functioning urban environments[33]. The proposed reservoir will improve HCC's water supply network with the benefits set out in Section 2. This contributes to the provision of available water supply within the WSA that will in turn support the well-functioning of the Hutt Valley urban environment including future development as provided through the District Plan. Overall, the proposal is consistent with the objectives and policies of the NPS Urban Development and will support future urban growth.

12.3.1 National Policy Statement for Freshwater Management

The fundamental concept of the NPS Freshwater is Te Mana o te Wai, this concept refers to the fundamental importance of water and recognises that protecting the health of freshwater protects

[33] Objective 1: New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future. National Policy Statement on Urban Development, 2020.

the health and well-being of the wider environment. With this concept in mind, the NPSM contains policies and objectives grouped into the following relevant topics as set out in Table 31[34].

Table 31: Relevant objectives and policies of the NPS-FM for the Project.

Provision	Comment
Objective (1) The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises: (a) first, the health and well-being of water bodies and freshwater ecosystems (b) second, the health needs of people (such as drinking water) (c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.	The effects of the project on water quality will be addressed by the regional council. However, in response to this objective it is noted that the Project will positively contribute to an improvement of the health and wellbeing of the Waiwhetū Stream through the proposed riparian planting which will result in habitat creation along the riparian margin. The Project will not adversely affect the health needs of people through impacts on sources of natural drinking water, with the Project conversely contributing toward delivering increased water resilience within the WSA. This will contribute toward the community's ability to provide for its social and economic wellbeing. Cultural values of importance were identified through the CVA and have been subsequently addressed and recognised.
Policy 1: Freshwater is managed in a way that gives effect to Te Mana o te Wai.	Wellington Water has engaged with mana whenua over the scope, scale and nature of the Eastern Hills reservoir Project. A cultural values assessment was also prepared that identified those values of importance to mana whenua, and how these could be appropriately recognised by the Project (such as the name). No issues or concerns were raised by mana whenua with respect to impacts on freshwater values.
Policy 2: Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.	
Policy 3: Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.	Integrated management has been achieved by implementing erosion and sediment controls during the construction of the Project so that stormwater is treated prior to discharge. Post construction, stormwater will be treated prior to discharge.
Policy 6: There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.	The Project design has taken into consideration the extent of the identified inland wetlands, and implemented design changes so as to avoid these areas. Within the stream, effects will only be temporary whilst the pipe is installed. Following construction, there will be no ongoing effects associated with the presence of the pipeline, nor the loss of freshwater habitat.
Policy 7: The loss of river extent and values is avoided to the extent practicable.	
Policy 9: The habitats of indigenous freshwater species are protected.	

- **Natural Wetlands**

The Project has been subject to design refinement so as to avoid the loss of, or minimise material effects on, natural inland wetlands. Within a close proximity to the Project, there are 4 identified

[34] Note: A more fulsome assessment of the Project as it relates to the requirements of the National Policy Statement for Freshwater Management will be provided within the application for resource consent as sought from Greater Wellington Regional Council as per their functions set out in Section 30 of the RMA.

inland natural wetlands in close proximity to the proposed pipe alignment. As a result of the Project design refinement the proposed pipeline alignment has been designed to be greater than 10m away from any of the identified inland natural wetlands, and construction works and related disturbance will also occur greater than 10m away from these areas. This means that through application of the effects management hierarchy the first two steps, being avoid and minimise, have been applied. Consequently, it is concluded that the works will not result in the loss of extent, or values, of the natural inland wetland.

The effects of the Project, notably the proposed pipe alignment, on the identified inland natural wetlands is addressed in more detail within the application for resource consent submitted to Greater Wellington Regional Council.

- **Streams**

Consideration has also been given to whether the Project meets the subclause exemption under clause 3.24 of the NPS FM[35]. It is considered that the Project meets the policy exemption as:

- There is a functional need for the pipe to cross Waiwhetū Stream to connect to the bulk water supply network. Trenching through the stream is the most practicable option because:
    - It is not possible for the pipe to be trenched down Summit Road given the engineering and constructability restrictions[36];
    - A pipe bridge could have impacts on the hydrological functioning of the stream and surrounding land uses as well as health and safety implications given the height it would be required to be above ground to achieve an appropriate freeboard (approximately 4m); and
    - Directional drilling the pipe underneath the stream will require large drilling pits to be constructed on either side of the stream. This will require dewatering which in turn could generate effects on the identified natural wetlands.
- It is not possible for the pipe to avoid the stream given the operational requirement for the pipe to travel down the hill toward Balgownie Grove; and
- The effects management hierarchy has been followed with respect to activities associated with the installation of the pipe within the stream as detailed in Section 9 of this Notice of Requirement.

The effects associated with the installation of the pipeline through Waiwhetū Stream will be no more than minor and have been addressed in more detail within the application for resource consent submitted to Greater Wellington Regional Council.

- **Summary**

The location of the Project requires the new bulk watermain pipe and overflow pipe to run down the step escarpment to the north of the new reservoir toward Balgownie Grove. The pipe alignment will

[35] This is enabled in teh Regional Policy Statemen via Policy 18 and Policy KkW7. Compliance with tehse policies is discussed in Section 7.4.
[36] Section 5.1, Pipe Options Report, Appendix P.

travel within close proximity to the identified natural inland wetlands, and will be installed under the bed of Waiwhetū Stream. In support of this proposal, it is noted that:

- The pipe alignment selected has been designed so as to avoid being located within 10m of any identified inland natural wetlands;
- Geometric design requirement require the pipeline to follow the route proposed, and there is an operational need for the pipe to follow this alignment;
- Due to the functional need for the Project, effects cannot be entirely avoided on the wetlands and stream; and
- The effects management hierarchy has been followed for those effects as they relate to wetlands and streams.

12.3.2 National Policy Statement for Indigenous Biodiversity

The purpose of the National Policy Statement for Indigenous Biodiversity (NPS-IB) is to maintain, and not reduce, the values of existing indigenous biodiversity throughout New Zealand as well as to protect those identified values from future development. The NPS-IB contains objectives and polies to address this as set out in Table 32.

Table 32: Relevant objectives and policies of the NPS-IB for the Project.

Provision	Comment
Objective (1) The objective of this National Policy Statement is: (a) To maintain indigenous biodiversity across Aotearoa New Zealand so that there is at least no overall loss in indigenous biodiversity after the commencement date; and (b) to achieve this: (i) through recognising the mana of tangata whenua as kaitiaki of indigenous biodiversity; and (ii) by recognising people and communities, including landowners, as stewards of indigenous biodiversity; and (iii) by protecting and restoring indigenous biodiversity as necessary to achieve the overall maintenance of indigenous biodiversity; and (iv) while providing for social, economic and cultural wellbeing of people and communities now and in the future.	This Project will result in the removal of vegetation within an SNR in the HCDP, which has the status of a SNA under the transitional provisions of the NPS-IB. This is to provide for the construction of regionally significant infrastructure that will positively contribute to the social and economic needs of the community now and into the future. It has been identified that the vegetation to be removed comprises a mosaic of exotic and indigenous vegetation with low ecological values. To mitigate the effect of the Project, replacement planting is proposed which will utilise indigenous species. Consequently, the Project will not result in a net loss of indigenous biodiversity values at the site following the completion of construction.

Provision	Comment
Policy 2: Tangata whenua exercise kaitiakitanga for indigenous biodiversity in their rohe, including through: (a) managing indigenous biodiversity on their land; and (b) Identifying and protecting indigenous species, populations and ecosystems that are taonga; and (c) actively participating in other decision-making about indigenous biodiversity.	Provision has been made for mana whenua to comment on, and influence, the outcomes of the Project including through preparation of a CVA as well as being provided with the opportunity to influence species utilised as part of the planting package to be delivered as mitigation for the Project.
Policy 3: A precautionary approach is adopted when considering adverse effects on indigenous biodiversity.	The applicant has undertaken significant ecological survey work so as to comprehensively understand the scale, nature and composition of the indigenous biodiversity that may be impacted by the Project.
Policy 7: SNAs are protected by avoiding or managing adverse effects from new subdivision, use and development.	A mitigation package commensurate with the scale of the effects generated has been proposed so as to appropriately manage the adverse effects associated with the proposal.
Policy 10: Activities that contribute to New Zealand's social, economic, cultural, and environmental wellbeing are recognised and provided for as set out in this National Policy Statement.	The Project will deliver a piece of regionally significant specified infrastructure which has an operational requirement to be located within an identified SNA. Consequently, it is considered to be provided for through the NPS-IB, notably as an exception to clause 3.10 as specified in clause 3.11.
Policy 13: Restoration of indigenous biodiversity is promoted and provided for.	The comprehensive mitigation/remediation package will provide for the restoration of indigenous biodiversity values within an area that is currently dominated by exotic species with low values.

- **Significant Natural Areas**

Elements of the Project are proposed to occur within the identified SNR (which as set out in Table 5 and section 5.3.1 constitutes an SNA as per the definition provided in the NPS-IB) resulting in an assessment against clause 3.10 of the NPS-IB being required.

Clause 3.10(2) requires that certain kinds of adverse effects on an SNA are to be avoided, except as provided in clause 3.11. Within the NPS-IB, clause 3.11 provides exceptions to clause 3.10(2) for the construction of specified infrastructure that provides significant national or regional public benefit. The Project meets the definition for specified infrastructure[37] and will deliver a significant regional

[37] The Wellington Regional Policy Statement defines Regionally Significant Infrastructure as '*Regionally significant infrastructure includes: .. the local authority water supply network and water treatment plants'.* (Wellington Regional Policy Statement, Appendix 3: Definitions, Page 194.
Specified infrastructure is defined in the NPS-IB as *'Specified infrastructure means any of the following: (a) infrastructure that delivers a service operated by a lifeline utility (as defined in the civil Defence Emergency Management Act 2002): (b) regionally or nationally significant infrastructure identified as such in a National Policy Statement, the New Zealand Coastal Policy Statement, or a regional policy statement or plan'.*
The Project will result in the construction of an asset that forms part of the local authority water supply network so it is considered to meet the definition of Regionally Significant Infrastructure as defined in the Regional Policy Statement.

public benefit. The Project will deliver a significant regional public benefit as it will contribute towards the Hutt Valley's water resilience following a significant natural hazard event. Following a natural hazard event, the rapid re-establishment of portions of the water supply network will enable the functioning and recovery of services within the community. Restoration of services within the Hutt WSA will enable resources to be focused elsewhere within the region, contributing positively towards the Wellington region's restoration and recovery. From a resilience perspective, this is considered to be a significant regional public benefit.

As such, the exclusion provided by clause 3.11 is considered to be applicable to the Project. The pipeline down the steep hill, towards Balgownie Grove is also considered to meet the exception provided for in clause 3.11(1)(b) as there is an operational need for the development to occur following the proposed alignment as:

- The pipeline alignment down Summit Road would experience significant constructability challenges which render it impracticable, and the Pipe Options Report (**Appendix P**) concludes that there are no other practicable alterative pipe routes that would avoid the SNA];
- The level of effect that would be generated on residents for an extended duration from a social, noise and vibration, and access perspective from constructing the pipeline within Summit Road would be significant; and
- The reservoir requires an outlet main and overflow/drain pipeline for operational purposes.

Because of the inability for the pipeline to run down Summit Road, and due to the operational requirement to have an outlet main and overflow/drain pipeline for the effective functioning of the reservoir, it is considered that the proposed alignment that will traverse the identified SNA meets the operational need test as specified within the NPS-IB[38]. There has also been further design refinement of the proposed alignment through the SNA so as to reduce the level of impact generated. The operational need for the pipeline to follow this alignment is set out in further detail within the pipeline alignment report included within this NoR as **Appendix P**.

Consideration has also been had to the application of the effects management hierarchy where effects are generated on the SNA as required by Clause 3.10(3) for those activities provided for under the exception in clause 3.11. Further, clause 3.10(4) requires the application of the effects management hierarchy to be demonstrated including how each step of the effects management hierarchy will be applied[39] and where biodiversity offsetting is applied that it has been done so through application of the principles within Appendix 3 and 4 of the NPS-IB[40]. A detailed assessment of the level of effects generated within the identified SNA is provided in Section 9 of the AEE. Further, the Ecological Impact Assessment has considered the application of the effects management hierarchy for those activities within the SNA[41].

Further, the Project will be operated by a lifeline utility operator. Because of this, the Project is considered to be Specified Infrastructure as per the definition provided in the NPS-IB through compliance with clauses (a) and (b).

[38] Clause 3.10(1(b)) – NPS-IB

[39] Clause 3.10(4(a)) – NPS-IB

[40] Clause 3.10(4(b)) – NPS-IB

[41] Section 7, Ecological Impact Assessment, Appendix G.

12.4 Regional Policy Statement for the Wellington Region

The Regional Policy Statement (RPS) sets the direction for the future management of the Wellington Region's natural and physical resources and became operative on 24 April 2013. Its purpose is to promote the sustainable management of natural and physical resources through establishing a framework to manage them.

As part of the implementation of national direction, the Greater Wellington Regional Council has notified Plan Change 1 to the RPS. This Plan Change seeks to:

- Enable urban development and infrastructure in appropriate locations;
- Develop objectives to manage the regions waterways with Mana Whenua;
- Respond to the climate emergency; and
- Strengthen the provisions to protect indigenous ecosystems and biodiversity.

Currently Plan Change 1 is subject to a hearings process with councils required to then give effect to the policy direction through their District Plans. Whilst the Hutt City District Plan has not yet been updated to address Plan Change 1 to the RPS the proposal is considered generally not inconsistent with the new direction established through this document.

The objectives and policies of the operative RPS seeks to avoid, remedy or mitigate adverse effects on habitats and the quality of water and its impacts on amenity. Additionally, it contains provisions which recognise and protect the social, economic and environmental benefits of regionally significant infrastructure and provides for the interests and responsibilities of tangata whenua.

Table 33: Relevant objectives and policies of the RPS for the Project.

Objective/Policy	Compliance
Air Quality	
Objectives 1 & 2 and **Policies 1 & 2** seek to manage potential effects and ensure that discharges of odour, smoke and dust to air (including fine particulate matter) do not adversely affect amenity values or people's health and well-being.	The Draft Erosion and Sediment Control Plan (**Appendix F**) includes strategies for minimising the production of dust from open earthworks area including progressing stabilisation and dampening with water. Implementation of these strategies as required will avoid dust generation and minimise potential effects.
Energy, Infrastructure and Waste	
Objective 10 and **Policies 7 & 39** seek to recognise and protect the social, economic, cultural and environmental benefits of regionally significant infrastructure.	The Hutt Valley Water Supply Network is regionally significant, and the proposed reservoir will be a key component in ensuring the on-going operation and resilience of that network. The social benefits of the proposed reservoir are significant and are considered to outweigh the potential effects of its development, which are largely short-term in nature.
Objective 11 and **Policy 65** seek to minimise the quantity of waste disposed of and promote the efficient use and conservation of resources	Waste will comprise of excess cut material. Where possible this will be re-used on site, however where this is not possible it will be disposed of at an appropriate landfill. Efforts will be made to find an alternative Project that may require additional volumes of fill.

Objective/Policy	Compliance
Fresh Water	
Objectives 12 & 13 and **Policies 15, 16, 18, 40, 41, & 43** seek to safeguard the life supporting capacity of water and aquatic ecosystem function and health. The effects of earthworks and vegetation clearance should be minimised including by promoting discharges to land.	The Draft Erosion and Sediment Control Plan (**Appendix F**) sets out proposed controls that, when implemented, will minimise the discharge of sediment to fresh water and therefore minimise the potential effects on aquatic ecosystems. Monitoring of outlets from sediment control devices will provide early warning of sediment discharges. Where possible, treatment devices will discharge to land.
Indigenous Ecosystems	
Objective 16 and **Policies 23, 24 & 47** seek to identify, protect, maintain, and restore indigenous ecosystems and habitats with significant biodiversity values.	The Hutt City District Plan identifies parts of the Project footprint as being within a SNR. This overlay is used to identify those areas whereby there are significant botanical or zoological values present. Because of this, areas of the Project footprint are considered "*areas of significant indigenous vegetation and significant habitats of indigenous fauna*" as outlined in the Ecological Impact Assessment (**Appendix G**). Neither the native planted communities nor the introduced exotic communities are considered to be significant The assessment provided in the Ecological Impact Assessment (**Appendix G**), concludes that the reservoir construction will have Very Low level of effects following mitigation provided for vegetation. This is assessed in Section 9 of this NoR.
Landscape	
Objective 17 seeks to identify and protect outstanding natural features and landscapes.	The site does not include any outstanding natural features or landscapes
Objective 18 and **Policies 27 & 28** seek to identify, maintain, and enhance those landscape values that contribute to amenity and the quality of the environment.	The proposed site within the Eastern Hutt hills differs from the wider landscape. The presence of human interventions, such as the firebreak track and the existing square concrete reservoir, signify the influence of human activity in this particular area. Although there will be landscape and visual effects (including effects generated on amenity) during construction, following the completion of the works and implementation of mitigation effects will range from low adverse to low positive.
Natural hazards	
Objectives 19 & 21 and **Policy 52** seek to make communities more resilient and minimise the adverse effects of natural hazards.	The proposed reservoir will improve the operational and hazard resilience of the Lower Hutt Central and Taita Water Storage Areas.
Tangata Whenua	

Objective/Policy	Compliance
Objectives 23-28 and **Policies 48, 48 & 66** recognise and provide for matters of significance to tangata whenua including kaitiakitanga, the mauri of coastal and freshwater, mauri of coastal and freshwater, and the cultural relationship of Māori with their ancestral land.	A Cultural Impact Report confirmed that the proposed reservoir site has no identified Māori sites of significance in the vicinity. An Accidental Discovery Protocol will be implemented in the case of any archaeological finds. The proposed mitigation measures, including the Draft Erosion and Sediment Control Plan, will manage potential effects on the mauri of coastal and fresh water.
Soils and Minerals	
Objective 29 and **Policies 15, 41 & 68** seek to minimise the effects of earthworks and vegetation clearance in relation to soil erosion.	The Draft Erosion and Sediment Control Plan (**Appendix F)** sets out proposed controls that, when implemented, will minimise soil erosion within the site.

This assessment concludes that the NoR is consistent with the relevant objectives and policies.

12.5 Hutt City District Plan

The list of considerations for Notices of Requirements, as set out in Section 168A of the RMA, includes having particular regard to any relevant provisions of a plan or proposed plan. The NoR relates to the land managed under the provisions of the Hutt City District Plan (HCDP). A detailed assessment of the proposal against the provisions of the Greater Wellington Natural Resources Plan and Proposed Plan Change 1 to the Natural Resources Plan is provided within the application for regional resource consent. That assessment has not been duplicated here.

The HCDP sets out objectives, policies and rules that promote the sustainable management of natural and physical resources in Lower Hutt. The matters of particular relevance are those contained in the General Residential, Passive Recreation Activity Area, Utilities, Noise, Significant Natural Resources and Earthworks chapters. Details of the relevant rules for the Project, had resource consent been sought, are provided in **Appendix Q**. It is recognised that when a Project is designated through a NoR, the District Plan requirements not apply. However, understanding the conditions of permitted activities and matters to be considered where land use consent is triggered is valuable for considering the focus of specialist assessments as well as considering the relevant objectives and policies the project will be assessed against.

12.5.1 Objectives and Policies

- **Network Utilities**

The Utilities Chapter of the District Plan recognises that the successful functioning of the City depends on network utilities, and that it is therefore very important that construction, maintenance, upgrade and operation of these services be effectively provided for.

Recognition needs to be given to the technical and geographical constraints on the operation of network utilities and the services they provide, however the associated environmental effects still need to be appropriately avoided, remedied or mitigated.

Part G of this report demonstrates how adverse effects will be avoided, remediated or mitigated both during construction and in the long-term. The vast majority of the effects identified will occur during construction and the long-term effects are considered no more than minor.

Overall, the proposed reservoir is consistent with the Objectives and Policies of the Utilities Chapter as set out in Table 34.

Table 34: Relevant objectives and policies in the network utilities chapter of the HCDP.

Objective/Policy	Compliance
Objective 13.1.1 Regionally significant network utilities To recognise and protect the benefits of regionally significant network utilities	The Project will result in the construction and subsequent operation of a regionally significant network utility that will deliver positive outcomes for the communities that it services.
Policy 13.1.1 (i) To identify regionally significant network utilities within the City on Council planning maps, as practicable. (ii) To recognize the national, regional and local benefits of regionally significant network utilities.	
Policy 13.1.2 (i) To avoid, or as appropriate, remedy or mitigate, the potential for any adverse effects, including reverse sensitivity effects on regionally significant network utilities from incompatible new subdivision, use and development occurring under, over or adjacent to regionally significant network utilities.	During construction, a comprehensive mitigation package has been proposed so that effects are not generated on the nearby residential area (thus minimising the potential for construction related adverse effects).) Following construction, it is noted that the reservoir is sited in such a location that on-going effects are not anticipated, nor would future land uses be incompatible with the Project.
Objective 13.1.3 Recognizing and providing for network utilities To recognise and provide for the sustainable, secure and efficient use, operation and development of network utilities within the city.	The site will be designated which will provide for the ongoing operational

Objective/Policy	Compliance
Policy 13.1.3 (a) To recognize and provide for the: • Need for new and the maintenance and upgrading of existing network utilities • Technical and operational requirements and constraints of network utilities in assessing their location, design, development, construction and appearance and • Benefits that network utilities provide to the economic, social and cultural functioning of the city. (b) To enable the efficient construction, installation, operation, upgrading and maintenance of network utilities. (c) To ensure that the provision and operation of utilities that cross jurisdictional boundaries is managed in an integrated manner. (d) To encourage the appropriate use of designations for new network utilities and extensions to existing network utilities that are not designated.	requirements of the reservoir. The reservoir will contribute to the efficient functioning of the WSA that it services. It has also been designed to provide network resilience whilst other reservoirs within the WSA are upgraded following the completion of construction.
Objective 13.1.4 Managing environmental effects To manage any adverse effects on the environment resulting from the design, location, operation, upgrading and maintenance of network utilities	This NoR has been supported by a number of technical reports that have assessed the potential adverse effects associated with the construction and then subsequent operation of the reservoir. With appropriate mitigation being implemented it is not envisioned that adverse effects will be generated on the environment.
Policy 13.1.4 (a) To ensure that network utilities are designed, located, developed, constructed, upgraded, operated and maintained to avoid, remedy or mitigate any actual or potential adverse effects on the environment. (b) To manage effects on health and safety by ensuring network utilities are designed, located, upgraded, operated and maintained to comply with relevant national environmental standards and to meet other nationally recognized standards and guidelines. (c) To enable the co-location or multiple use of network utilities where this efficient, technically feasible and practicable and assists with avoiding, remedying or mitigating adverse effects on the environment (d) To require the underground placement of new network utilities unless • There are natural or physical features or structures, or technological and operational constraints that makes underground placement impractical or unreasonable • They are of a temporary nature and required for emergency purposes or critical events; and • They are of a nature that they can only operate above ground (e) To encourage the use of roads as network utility corridors in accordance with national code of practice for utility operators; access to transport corridors (f) To encourage network utility providers to consult with local communities, landowners and the Regional Council (where relevant) on the appropriate placement, location and design of new network utilities.	

- **Noise**

The Noise Chapter of the District Plan identifies those values of importance within the district that could be impacted by noise. The Project is considered to be consistent with the values set out in the relevant noise objectives and policies as detailed in Table 35.

Table 35: Relevant objectives and policies in the noise chapter of the HCDP.

Objective/Policy	Compliance
Objective 14C1.1 Maintaining or enhancing health and amenity values To maintain or enhance the amenity value of all activity areas by ensuring that the adverse effects of excessive noise on the environment are avoided or mitigated	A technical noise and vibration assessment has been prepared in support of the NoR. During construction noise levels will differ to operational noise and as such a Construction Noise and Vibration Management Plan is proposed to mitigate construction related noise effects. During the operation of the reservoir there are no noise related effects anticipated.
Policy 14C1.1 1. To recognize that background noise levels are markedly different throughout the city 2. To recognize that acceptable noise levels will vary according to the nature of the principal activities occurring within activity areas 3. To ensure that residential activity areas are protected by establishing appropriate noise levels at the interface between residential activity areas and non-residential activity areas. 4. That maximum noise levels are established within each activity area to ensure that amenity values are protected. 5. To make provision for those situations where there has already been considerable history to the establishment of specified noise conditions. 6. To recognise that noise levels may be different through a construction phase. 7. To recognise that Noise Management Plans may be appropriate to manage matters beyond those addressed in this District Plan	

- ## Significant Natural Resources

Significant natural resources within the Hutt City District Plan have been used to identify those areas which feature botanical and zoological values of importance and significance. The Proposal is not considered to be inconsistent with the direction set out in the relevant objectives and policies as discussed in Table 36.

Table 36: Relevant objectives and policies in the significant natural resources chapter of the HCDP.

Objective/Policy	Compliance
Objective 14E1.1 Protection of significant natural, cultural and archaeological resources To identify and protect significant natural, cultural and archaeological resources in the City from inappropriate subdivision, use and development.	The Project is not considered to be an inappropriate use of land which features a significant natural resource as it will result

Objective/Policy	Compliance
Policy 14E1.1 • That a schedule of significant natural, cultural and archaeological resources within the City be compiled. • That it be recognised that new significant natural, cultural and archaeological resources may be discovered, and added to the schedule of significant resources. • That any activity or site development shall not modify, damage or destroy a significant natural, cultural or archaeological resource. • That any activity or site development shall not compromise the natural character or visual amenity values of a significant natural, cultural or archaeological resource. • All buildings, structures and activities shall preserve the natural character, visual amenity values and landscape values of the significant natural, cultural or archaeological resources including the identified coastal environment. • The scale, height, location and design of all buildings and structures shall protect the amenity values, especially landscape values, of the identified coastal environment. • That any activity or site development will take into account new findings of significant natural, cultural and archaeological resources. • That the cultural significance of these natural resources be recognised and protected. • That any activity or site development shall not modify, damage or destroy the intrinsic values of the ecosystems of a significant natural, cultural or archaeological resource.	in the construction and subsequent operation of a regionally significant piece of infrastructure. In addition, as detailed in the ecological assessment, the identified significant natural resource features a mosaic of indigenous but predominantly exotic vegetation. To address the effects associated with the Project, a comprehensive mitigation package is proposed to address this (Refer to details in **Appendix G**).

- **Earthworks**

Significant earthworks are required to support the Project. Within the HCDP, objectives and polices establish how earthworks may be provided for within the district. The Project is consistent with the relevant objectives and policies as set out in Table 37. It is noted that the earthworks provisions of a district plan do not generally apply to network utilities, instead being addressed by the network utility provisions.

Table 37: Relevant objectives and policies in the earthworks chapter of the HCDP.

Objective/Policy	Compliance
Objective 14I 1.1 To ensure that earthworks are designed to maintain the natural features that contribute to the City's landscape.	The volume of earthworks required to support the Project has been minimised as much as

Objective/Policy	Compliance
Policy 14I 1.1 (a) To ensure that earthworks are designed to be sympathetic to the natural topography (b) To protect significant escarpments, steep hillside areas, and the coastal area by ensuring that earthworks are designed to retain the existing topography, protect natural features and prevent erosion and slips.	possible, as well as being designed so as to best follow the natural contours of the site where possible. It is acknowledged that the volume of earthworks will have an impact on a ridgeline, yet with the proposed landscaping mitigation it is considered that the Project will blend into the surrounding environment. Appropriate measures will be in place to prevent future erosion and slips.
Objective 14I 1.3 To ensure that provision is made for earthworks to be carried out for services which are essential to the health and safety of the community.	The earthworks will provide for the construction of a reservoir which is an essential community resource.

12.5.2 Section 168A(3)(d) – Other Matters

Section 168A(3)(d) of the RMA provides that, when considering an NoR, a territorial authority must have particular regard to 'any other matter the territorial authority considers reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought. Other matters that may be identified as relevant are typically other statutes and consideration of non_RMA planning documents. Matters considered directly relevant to the Project are considered below.

12.5.2.1 Civil Defence Emergency Management Act 2002

The Civil Defence Emergency Management Act 2002 seeks to:

- Improve and promote the sustainable management of hazards in a way that contributes to the social, economic, cultural and environmental well-being and safety as well as the protection of property;
- Provide for planning and preparation for emergencies and for response and recovery in the event of an emergency;
- Require local authorities to coordinate Civil Defence Emergency Management (CDEM) through regional groups across the "4Rs" (reduction, readinesss, response and recovery) and encourage cooperation and joint action between those groups; and
- Encourage the coordination of emergency management across the range of agencies and organisations with responsibilities for preventing and managing emergencies.

As required by the Act, HCC has responsibilities as a lifeline utility provider, which includes ensuring that they can continue to function to deliver these services as best as practicable during and after an emergency and have considered and be planning for this. The Project will contribute towards HCCs responsibilities to provide water, a lifeline utility, following a natural disaster.

12.5.2.2 Getting the basics right: Our 10-year plan 2021 - 2031

The 10 year plan for HCC sets out the initiatives and services that HCC plan to fund in the next 10 years. Throughout the plan there is an emphasis on providing funding towards three waters infrastructure to address pressures associated with a growing population and climate change. Further, resilient infrastructure assets are identified as a cornerstone for supporting future growth.

The Project, being the new reservoir and associated pipe work, is identified as a water supply key project. It is identified as responding to growth and demand, as well as the effects of climate change and natural hazards. Further, funding for the Project is identified as necessary as the Project will support growth in the Valley Floor and provide for the existing shortfall in water storage in the Central Hutt WSA. The Project is thus consistent with the vision established in the long term plan.

12.5.2.3 Reserves Strategic Directions 2016 – 2026

Within the Reserves Strategic Direction, the site is identified as a Natural HCC Managed Reserve within the Valley Floor/Eastern Hills reserve network. Key actions for these reserves include clear wayfinding to natural areas in the Eastern Hills, pest plant and animal control in and around bush reserves, and the restoration of the natural character and increasing habitat for aquatic life in streams through riparian planting. The Project will introduce some new wayfinding signage for users of the Eastern Hills, deliver pest plant and animal control within areas impacted by the Project, and introduce riparian planting along the banks of a portion of Waiwhetū Stream. Consequently, it is concluded that the proposal is consistent with this document.

12.6 Part 2 Assessment

Part 2 of the RMA defines the purpose and the principles of the RMA which are to promote the sustainable management of natural and physical resources. It outlines the matters of national importance that shall be recognised, other matters that particular regard must be had to, and the principles of the Treaty of Waitangi that shall be taken into account by those exercising function and powers as authorised by it.

Whilst the Project will result in some minor adverse effects on the environment, when considering these effects within the context of the regional and local benefits to be achieved by the Project as well as in the context of the substantial mitigation proposed, it is considered that the Project achieves the purpose and principles of the RMA.

12.6.1 Section 5 – Purpose

The purpose of the RMA is established in section 5(2) and is to “promote the sustainable management of natural and physical resources”. In achieving the purpose of the RMA, consideration is required to a wide range of environmental, social, and cultural values which the Project may adversely impact. The Project seeks approval for a designation that will provide a public network utility. Consideration of the local and regional benefit is required against any adverse effects that may be generated on the receiving environment.

The Project will result in a significant regional benefit through provision of additional water storage for the Lower Hutt WSA which in turn provides for future development and population growth within the region. Further, the Project will help provide for the economic and social wellbeing of people and communities, and their health and safety while appropriately avoiding, remedying and mitigating the effects of the Project on the environment. The proposal meets the purpose of the RMA.

12.6.2 Section 6 – Matters of National Importance

The Project recognises and provides for the relevant matters in section 6 of the RMA. In particular, the Project recognises the following:

- The Project does not affect the coast, or any outstanding natural features and landscapes. Where the project has interacted with a natural watercourse (i.e. the stream and wetlands), substantial mitigation planting is proposed or the design has been altered so as to avoid these areas. A comprehensive landscape plan has also been proposed for the Project.
- Public access along the banks of the Waiwhetū Stream will be maintained following completion of construction of the Project.
- Where the Project intersects with the identified significant natural resources a comprehensive mitigation package has been proposed which will improve underlying character and composition of vegetation at the site.
- Wellington Water acknowledges that the environment is a taonga that must be managed carefully and that Māori have a kaitiaki responsibility and obligation of care over their communities and environments. Wellington Water has worked with the relevant iwi throughout the development of this Project to ensure that their values have been recognised and provided for.
- Concerns relating to natural hazards have been addressed through the seismic design of the reservoir, and it is acknowledged that the Project will contribute positively towards the resilience of the community. This contributes positively towards the management of significant risks from natural hazards.

12.6.3 Section 7 – Other matters

The Project has had particular regard and responded to the matters in section 7 of the RMA. In particular:

- Kaitiakitanga and the ethic of stewardship of tangata whenua have been recognised and addressed through the engagement process followed and involvement of Taranaki Whānui in the site selection process.
- The maintenance and enhancement of amenity values and the quality of the environment is recognised in the assessment of effects. Potential adverse effects on amenity values including landscape, noise and air will be managed through implementation of construction management plans, adopting best practice techniques, and proposed integrated ecology and landscape design and mitigation.
- The Waiwhetū stream is not identified as an important habitat for trout and salmon.

12.6.4 Section 8 – Te Tiriti o Waitangi (Treaty of Waitangi)

The Project has addressed the requirements of section 8 of the RMA through engagement with Taranaki Whānui who have identified themselves as mana whenua with an interest in the affected area. The matters raised by the iwi and within the cultural values assessments have been addressed in the design to date. It is anticipated that iwi will continue to be involved in the implementation of the Project.

Additional engagement with Ngāti Toa has been carried out given that there are potential impacts to the Waiwhetū Stream. Ngāti Toa have statutory recognition in the treaty settlement legislation regarding the Hutt River and tributaries. Ngāti Toa identified no concerns, and acknowledged that they would support Taranaki Whānui where needed with respect to this proposal.

13 Conclusion

This Assessment of Environmental Effects has been prepared by Wellington Water on behalf of HCC to support a Notice of Requirement for the construction, operation, and maintenance of a new water reservoir adjoining an existing reservoir in Fairfield, Lower Hutt.

The AEE and the attached technical reports have concluded that:

- A sufficiently robust consideration of alternative sites, routes and methods has been undertaken. This has concluded that the method proposed and location is appropriate.
- The work to construct the new Eastern Hills Reservoir and the designation required to provide for this are reasonably necessary to achieve the objectives of the requiring authority.
- The proposal will generate positive effects associated with resilience within the WSA, recreation, improvements to habitat, and ecological benefits associated with the improvements in underlying character and composition of vegetation on site.
- Adverse effects associated with the construction of the reservoir are able to be appropriately managed through a suite of proposed mitigation. Conditions of consent require the preparation of management plans that will set out in detail further actions to be followed to avoid, remedy and mitigate effects.
- Those effects that are identified as more than minor will only be temporary, are able to be managed by conditions, and will reduce to an acceptable level following the completion of construction and permanent establishment of landscape planting.
- The proposal is consistent with the relevant planning documents including the Hutt City District Plan and Regional Policy Statement for the Wellington Region.

Appendix A: Design Plans and Designation Plans

Appendix B: Proposed Conditions

Appendix C: Preliminary Design Report

Appendix D: Construction Methodology

Appendix E: Landscape and Visual Impact Assessment

Appendix F: Erosion and Sediment Control Plan

Appendix G: Ecological Report

Appendix H: Noise and Vibration Assessment

Appendix I: Contaminated Land Study

Appendix J: Archaeological Risk Check

Appendix K: Cultural Impact Assessment

Appendix L: Social Impact Report

Appendix M: Site Selection Report

Appendix N: Construction Transport Assessment

Appendix O: Recreation Assessment

Appendix P: Pipe Alignment Report

Appendix Q: Schedule of Relevant Provisions

HCC District Plan Provisions