

27 January 2023

Hounsell Holdings Limited

Attn: Adriaan Vlok

Cc: Fraser McNutt, B&A Urban and Environmental

Rotokauri Greenway and Arterial Route Fast Track Referral Application - Ecology

Introduction & Project Description

The proposed project for which a fast-track application under the COVID-19 Recovery (Fast-track Consenting) Act 2020 is being applied for is the consenting and construction of:

- The Rotokauri Greenway (the Greenway);
- The Minor Arterial roadway (the Minor Arterial);
- The bulk watermain under the Minor Arterial and other roads;
- The wastewater rising main, and
- Strategic wastewater pipeline and pump station.

The purpose of this project is to provide the necessary infrastructure pertaining to stormwater management and discharge along with critical roading connectivity to enable the residential development of part of the Rotokauri growth cell, a 'live' zoned residential growth cell in Hamilton north. The Rotokauri growth cell has a planned capacity of approximately 7,000 homes for approximately 20,000 people (noting this could increase with the recent proposed changes under HCC's Plan Change 12). Appropriate and necessary infrastructure is required to enable the balance of this growth cell to be developed. The key objective of this project is to design, consent and enable high-quality infrastructure which supports well-functioning urban development and that can provide for the social, cultural and economic well-being of the community and wider Waikato region

As highlighted above, there are two key components to this proposal, the Greenway and the Minor Arterial, which integrate and need to be designed and consented in parallel. Both pieces of infrastructure are critical features of the existing Rotokauri Structure Plan contained in the Hamilton City District Plan and certified Rotokauri Integrated Catchment Management Plan (ICMP).

The Greenway is a multi-purpose ecological corridor that will also provide for stormwater management, open space and an active transport network, traverses a range of adjacent land uses and offers a range of opportunities including ecological restoration, water runoff treatment, recreational activities and cultural re-instatement. The Greenway will include a fluvial system of swales, artificial wetlands and ponds as well as extensive planting of indigenous species along the length of the corridor. The approximately 4.7km length corridor will run between Lake Waiwhakareke (high point) and Lake Rotokauri (low point) to effectively manage and attenuate stormwater within the area, treating stormwater prior to discharge to enhance the water quality and surrounding natural environments and ecosystems. The overarching purpose of the Greenway is to provide treatment, conveyance and storage of flows from Lake Waiwhakareke at the upper extent of the catchment, to Lake

Rotokauri approximately 4km north. Construction of the Greenway includes major re-alignment and re-contouring of the existing Rotokauri Drain, as well as an upgrade to the culvert below Exelby Road and the construction of check dams in the lower reaches to assist in managing flows. The Greenway includes a 5-metre-wide shared path on the southern side and a 3-metre-wide secondary path on the north side.

The Minor Arterial is a key piece of enabling infrastructure that promotes a housing development within Rotokauri. The Minor Arterial extends 3.8km in length connecting Te Wetini Drive to the northern boundary of Hounsell Holdings land, including the collector road to the Chalmers Road underpass and the underpass that links to Te Kowhai East Road. The Minor Arterial would support three water infrastructure which is sized to cater for the wider catchment and includes:

- The bulk watermain under the Minor Arterial;
- Wastewater rising main;
- Strategic wastewater pipeline, and
- Pump station.

The Minor Arterial will prioritise and enable active transportation with wide footpaths and separated cycleways, supported by planted medians to improve safety. There will be public transport connections provided, which will connect to the Rotokauri Transport Hub (1km east of the project area), with bus stops along the length of the corridor.

Ecological Solutions are engaged to undertake terrestrial and aquatic ecological assessments to support the application for a referred project. This letter provides a high-level review of the ecological aspects of the proposal, including:

- Summary of the project;
- Summary of work completed to date;
- Site description and high-level ecological assessment of proposal including potential effects.

For the purposes of this report, 'the project area' includes the proposed Minor Arterial and Rotokauri Greenway footprint plus a 150m buffer as well as the extent of the area modelled as exceeding 0.25m drawdown in the Beca groundwater model report (Beca 2022) as shown in Figure 1. A 150m buffer was used as a conservative project footprint for the earthworks within the footprint of the proposed Minor Arterial and Rotokauri Greenway (in the design phase and yet to be finalised) as well as capturing any wetlands within 100m of the proposed earthworks.

Existing urban areas and areas known to be the subject to existing earthworks consents were also excluded from the project area. These consented earthwork areas are not shown in Figure 1

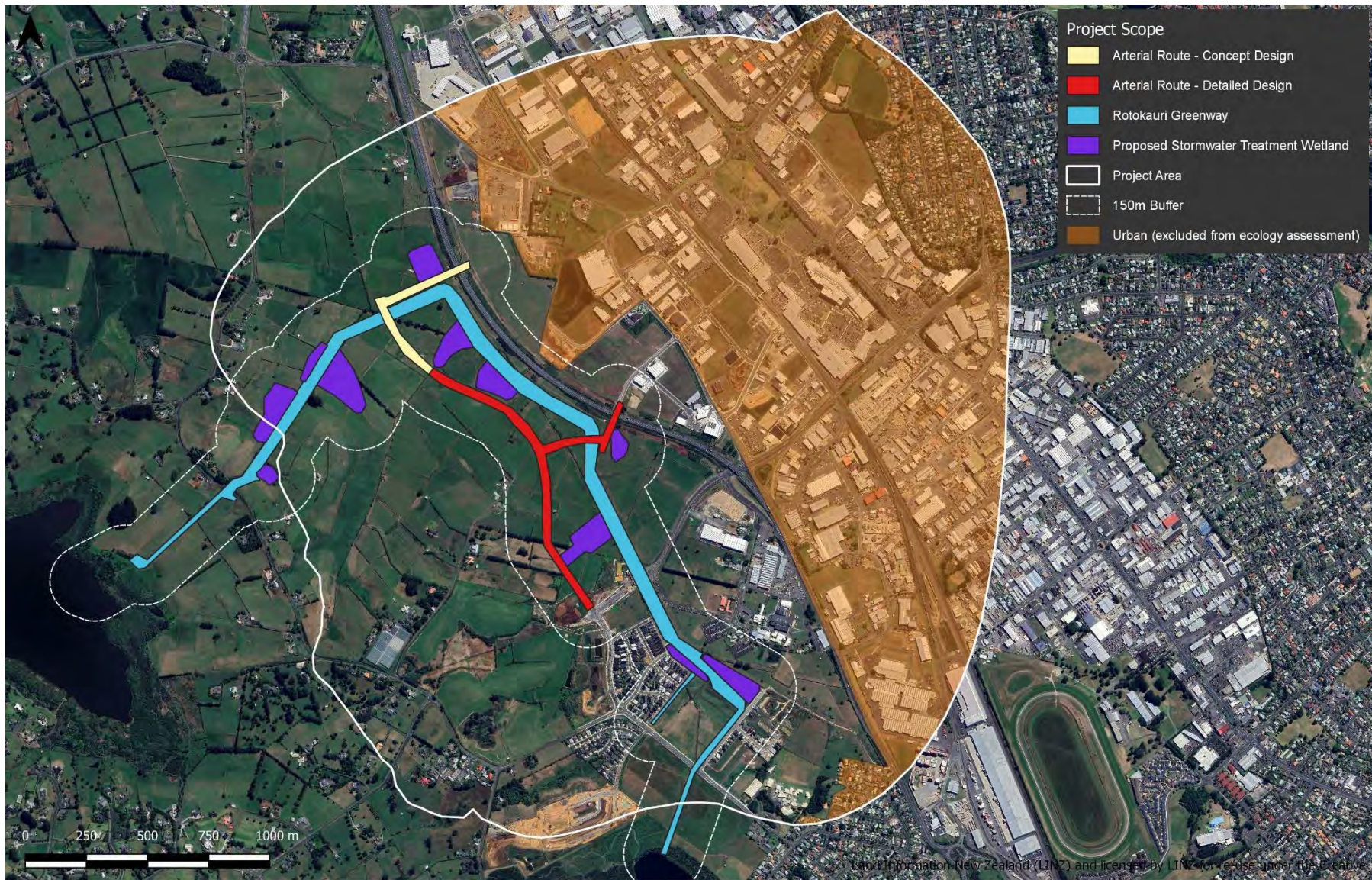


Figure 1. Rotokauri Greenway and Arterial Route project area.

Anticipated Scope

Ecological Solutions will deliver all of the ecological outputs for the project through to consenting including a description of the current ecological values, an assessment of ecological effects and methods to avoid, remedy, mitigate and offset those effects and the preparation of management plans (or in the case of black mudfish, the updating of the management plan) required to address any effects on ecological values.

Once the necessary resource consents are obtained, Ecological Solutions may also assist with implementation of the environmental management plans as required.

Background Analysis and Receiving Environment

The ecological values of the project area have been identified and quantified using existing ecological databases (New Zealand Freshwater Fish database, Department of Conservation Bioweb and eBird), relevant historical reports and multiple site walkovers. The entire project area has been surveyed for wetlands which have been delineated following Ministry for the Environment guidance¹ and indicatively mapped. Both freshwater and terrestrial ecological values have been described throughout the project area.

The ecological features of the site have also been reviewed against the framework of the National Environmental Standards for Freshwater Regulations (NES-F), the National Policy Statement for Freshwater Management (NPS-FM) and the draft National Policy Statement for Indigenous Biodiversity (NPS-IB).

The existing land use within the project area is agricultural, and extensive artificial drainage networks have been established historically in order to enable these farming activities. The lack of indigenous vegetation and the modified and degraded nature of watercourses and wetlands reflect this history.

Terrestrial Ecological Values

Almost no native vegetation is present within the project area. Vegetation and habitat for native fauna (birds, lizards and bats) is limited to fenced weedy areas adjacent to drains, exotic shelterbelts comprising mainly pine and macrocarpa and isolated individual (exclusively exotic) trees.

With respect to fauna within the project area, native birds present include exotic and common native species typical of rural and semi-urban areas. Waterbirds, including species of conservation interest, are associated with lake habitats but would not be significantly affected by the proposal. Copper skinks (*Oligosoma aeneum*) have been recorded historically, but if still present are likely to be restricted to small areas of suitable habitat throughout. Mature and senescent exotic trees, particularly within the shelterbelt areas, may provide foraging and roosting habitat for bats, but bat surveys undertaken to date have failed to detect bat presence.

Wetland Values

Existing artificial wetlands occupy approximately 5.5ha within the project area and generally provide for stormwater treatment and storage and farming activities. These areas are shown in orange in Figure 2.

All natural wetland areas have been affected by historic drainage and livestock access, are highly modified and degraded and comprise mostly exotic species. Wetland vegetation is

¹ Ministry for the Environment. 2020. Wetland delineation protocols. Wellington: Ministry for the Environment.

generally dominated by introduced pasture, rushes and herbs. These areas are shown in green in Figure 2.

For the purposes of identifying natural wetlands, we have undertaken field surveys in the area modelled as exceeding 0.25m drawdown in the Beca groundwater model report (Beca 2022). The projected drawdown is in the process of being updated and calibrated by WGA based on recent drilling, hydraulic testing and flow monitoring data associated with the Te Wetini dewatering. Our assessment of wetland effects should be read in conjunction with WGA Technical Memorandum WGA221352 dated 26 January 2023 (the WGA technical memo).

The project area includes isolated and discrete, remnant wetland fragments that are defined as natural inland wetlands according to the NPS-FM. In the WGA technical memo, WGA have divided these wetlands into three categories based on their hydrogeology and therefore their likely level of effects. Excluding the wetlands which are within the footprint of the Greenway or Minor Arterial (3.1ha), the extent of these wetlands is as follows:

- Low-Lying wetlands (7.7ha, approximately 1.2ha of which has a component overlying relatively low permeability Walton Subgroup geology)
- Hill-Fed wetlands (7.2ha)
- Lake-Edge wetlands (3.7ha)

Together these three categories of wetland cover approximately 18.6ha.

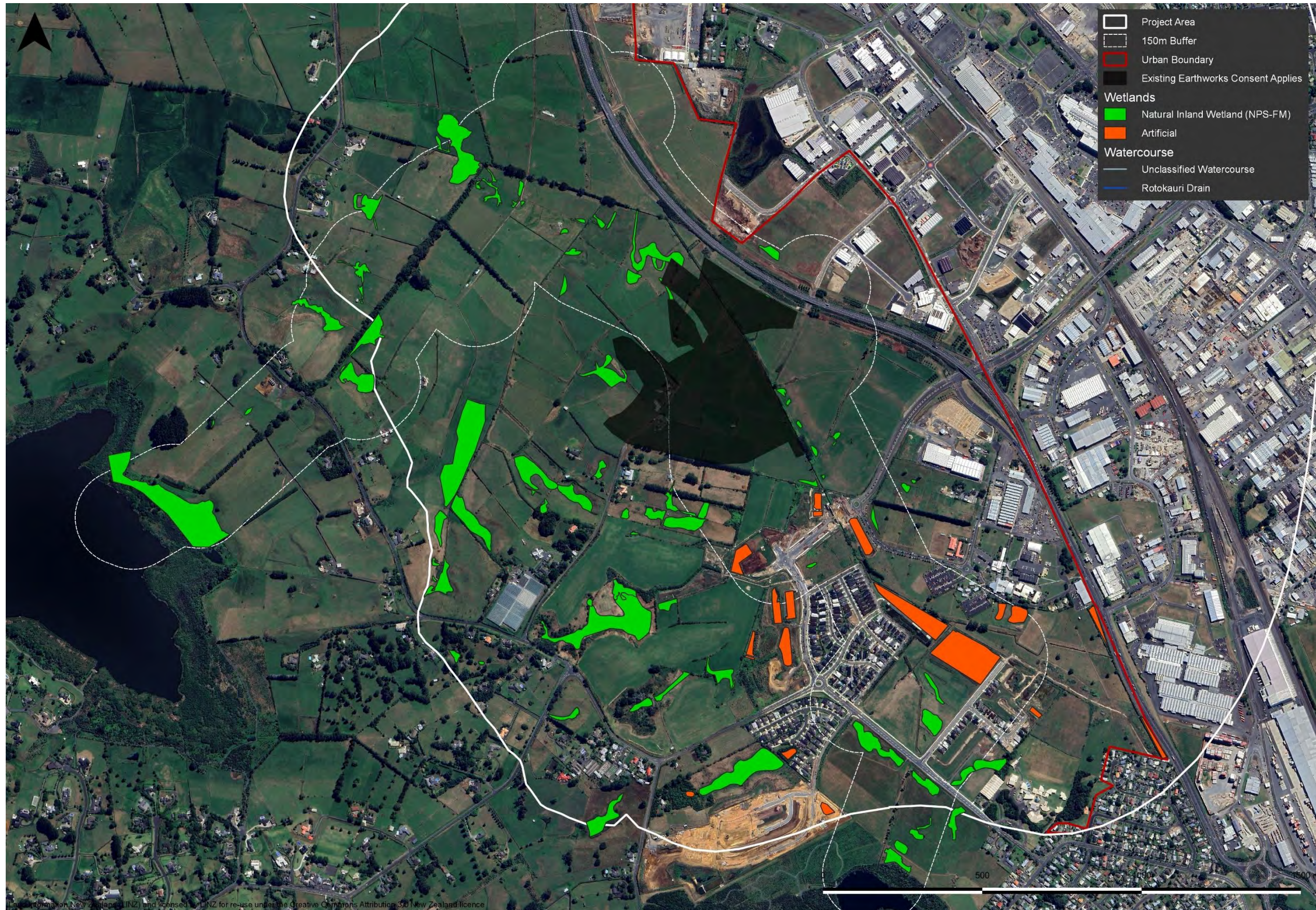


Figure 2. Wetlands within the Project area.

Freshwater Ecological Values

Freshwater habitats within the project area include:

- The Rotokauri Drain. Rotokauri Drain (~3.7km) is a highly modified and artificially constructed watercourse, but is nonetheless significant when considered against the Waikato Regional Policy Statement Significance Criteria. Rotokauri Drain provides an important connection between Lake Waiwhakareke and Lake Rotokauri, is the only remnant of the formerly large area of bog and marsh that originally existed between the two lakes, contains populations of native fish of conservation interest (i.e., giant kokopu, long fin eel, inanga) and is important for fish movement.
- At least 24km of artificially constructed drains (all within the Rotokauri Drain Catchment), most of which have very low ecological value. Some drains contain localised populations of black mudfish, which are of conservation interest.

Lake Rotokauri is outside the project area, but within the catchment, and is the receiving environment for the project area. Lake Rotokauri drains via the Waipa River to the Waikato River. Lake Rotokauri and its surrounds contain the largest area of wetland dominated by indigenous vegetation in the vicinity of the project area and supports a diverse range of waterfowl and other wetland birds. The lake itself is characterised by poor water quality, but provides habitat for giant kokopu, which is of conservation interest.

Key Actual and Potential Effects

The construction of the Greenway and Minor Arterial will involve significant works which have the potential for adverse effects if not managed appropriately. Anticipated effects include:

- Removal of poor quality, predominantly exotic terrestrial vegetation and habitat and the effects of this loss on any terrestrial fauna resident within the project area.
- Reconfiguration of the existing Rotokauri Drain habitat and the associated low-value riparian habitat (where present). Although the medium- to long- term effects are expected to be positive due to the proposed restoration efforts, effects on fish living in the drain will need to be managed through the reconfiguration process. Overall, in the medium – long term, the freshwater and riparian habitat over the ~3.7km stretch of this watercourse will be improved compared to its current state.
- Unavoidable loss of low-quality wetland habitat (via groundwater draw down and/or earthworks), which triggers the need for consent under the NES-F.
- Unavoidable loss or modification (via groundwater draw down and/or earthworks) of artificial drains supplying the Rotokauri Drain which provide habitat for black mudfish and native fish such as eel.
- Potential adverse effects on water quality and aquatic life due to the sediment and/or contaminant discharge.
- Depending on timing, the potential disturbance of fish migration and spawning during the works.
- The potential for restriction of fish passage by the proposed check dams, unless fish passage is specifically provided for.
- The potential for additional weed species to be introduced to the site.

The approach to addressing each of these effects is set out in the following section.

Approach to Addressing Effects

- The removal of predominantly exotic vegetation (or habitats) can be managed to avoid adverse effects on native fauna. A management plan approach is proposed to address any effects on birds, lizards and bats so that they are avoided or adequately mitigated. Management of fauna would be subject to the provisions of the Wildlife Act 1953 and will likely require specific authorisation under that legislation.
- Effects due to the reconfiguration of the Rotokauri Drain on native fish can be addressed via the timing of any instream works, stream diversions, fish relocation and aquatic habitat creation in the new watercourse.
- Effects on wetlands would include total removal for the 3.1ha of wetlands within the project footprint, and varying degrees of effect due to groundwater draw down in other wetlands. As set out in the WGA technical memo, lake edge and hill slope wetlands are not expected to be affected by groundwater drawdown resulting from the proposal, whilst low-lying wetlands, including some of those wetlands overlaying Walton Subgroup geology, may be affected to varying degrees. Having considered the relevant geology, topography, ground water and other matters set out in the WGA technical memo, we estimate that up to 7.7ha of wetlands could be affected to some degree. That does not mean that this extent of wetland would be 'drained' (i.e., removed), just that up to 7.7ha could be affected to some degree which requires detailed quantification through the resource consent process as well as appropriate mitigation, remediation, offsetting or compensation, as explained in more detail below. Of those 7.7ha, 3.2ha are considered 'possibly' affected and 4.5ha 'unlikely' to be affected.
- The loss of low quality natural inland wetland habitat will be addressed via avoidance where practicable, and where loss cannot be avoided, remedied or mitigated in accordance with the effects management hierarchy, biodiversity offsetting and/or aquatic compensation will be implemented. In addition to any specific offsetting or compensation, stormwater treatment wetlands constructed as part of the new Rotokauri Greenway would be designed to maximise their ecological value as habitat for native species. The potential for wetland loss and the approach to wetland offsetting is discussed in further detail in the following section.
- The loss of mudfish habitat will be addressed via the Black Mudfish Management Plan which was prepared as part of the Greenway Notification of Requirement process (Tonkin & Taylor Limited 2022). This plan will be updated as required to avoid, remedy or mitigate effects.
- The magnitude of adverse effects on water and aquatic habitat quality (and ultimately fish and invertebrates) due to sediment discharges and sediment and contaminant deposition during construction will be reduced by the current poor quality of water and habitats within the Rotokauri Drain. Nonetheless, effects can be substantially reduced further via best practice approaches to the timing of works and through careful construction methodologies and erosion and sediment control measures implemented in accordance with existing Waikato Regional Council guidelines.
- Construction of the Greenway will involve instream works and physical habitat changes which have the potential to disrupt migration and spawning for native fish species for the duration of the works. This is of particular relevance for giant kokopu which are of conservation interest and may be spawning within the drain. These effects will be reduced by managing the timing of the works and use of well-designed temporary diversion channels as required to allow fish passage around any current works. This approach would also provide for fish passage outside the spawning season.

- There is the potential for fish to be directly affected during construction of the Greenway as habitat is temporarily removed. Timing the works to ensure new habitats are created before existing habitats are removed, diversions are in place and fish capture and transfer can be used to manage the direct impacts of habitat loss on native fish. These effects, including on black mudfish, would be addressed via dedicated management plan(s).
- If inappropriately designed or installed, the proposed check dams have the potential to affect fish passage. To address this, fish passage will be designed in accordance with best practice solutions, drawing on the New Zealand Fish Passage Guidelines (NIWA, 2018).
- The potential for weed introduction can be managed via a weed management plan which includes site biosecurity protocols (e.g., for earthworks machinery entering the site) and including weed management as part of planting and restoration.

Potential Wetland Loss and Offsetting Approach

As shown in Figure 2, there is approximately 21.6ha of natural inland wetland within the project area, 3.1ha of which will be removed and up to 7.7ha of which may be affected to some degree.

Figure 3 overlays the mapped extent of known natural inland wetlands alongside the proposed Minor Arterial route, Greenway and stormwater treatment wetlands and the extents of modelled groundwater drawdown levels (measured in metres) taken from Tonkin & Taylor Rotokauri Greenway Mudfish Management Strategy, Figure 1 (July 2022) and based on the Beca (2022) groundwater modelling. The WGA technical memo discusses the limitations of the Beca model and their reasons for why the level of drawdown indicated by the model is expected to be significantly overstated, including that the much deeper excavations at Te Wetini created a drawdown which extended only approximately 600m to 800m from the excavation rather than the radius of influence exceeding 2km as indicated by the Beca Model.

The reconfiguration of the Rotokauri Drain, construction of the Minor Arterial route and associated stormwater treatment wetlands will result in the direct removal of 3.1ha of natural inland wetland which is located directly within the footprint of these features. Effects will likely extend beyond the footprint due to groundwater drawdown, which will affect up to an additional 7.7ha of wetlands to varying degrees. Importantly, this type of effect is not a 'direct' effect, rather it is an indirect effect relating to changes to the hydrogeological regime. Options to remedy these indirect effects through water re-charge and other mechanisms may be available.

Once the extent of groundwater drawdown has been confirmed, the options for remedying and mitigating any effects have been identified and more detailed surveys and/or monitoring have been completed within both affected wetlands and any potential restoration sites, the extent of offsetting required will be calculated using a transparent modelling tool such as the Biodiversity Compensation Model (Baber *et al.* 2021). The goal of offsetting is to achieve a net gain in wetland biodiversity. Best practice restoration activities for wetlands include a combination of the following activities:

- Retirement from livestock grazing/access.
- Fencing to exclude livestock.
- Planting of ecologically appropriate species.
- Weed control.
- Animal pest control.

- Formal legal protection (covenanting or similar).

As a conservative, worst-case scenario, up to 7.7ha of wetlands could be affected by the proposal with 4.5ha considered 'unlikely' to be affected and 3.2ha considered 'possibly' affected.

In our experience of wetland offsetting elsewhere, wetland offset modelling requires a loss:offset ratio for badly degraded wetlands of 1:3 – 1:4. Taking a worst case / most conservative assessment, and not allowing for any remediation or mitigation actions, that would mean that between 23ha and 31ha of wetland habitat would be required to be restored to offset the loss of 7.7ha of wetland within the project area and achieve a net gain of biodiversity. If only the 3.2ha considered 'possibly' affected is used, the extent of wetland required to offset effects is between approximately 9ha and 13ha.

Up to 10.9ha of wetland could be available for offsetting purposes within the project area (where wetland habitat is unaffected and agreement with landowners can be reached) and some affected wetlands may also be able to be remediated/managed and restored, depending on their particular attributes and effects. Depending on the extent of overall effects, additional wetlands elsewhere in the wider Waikato Region (i.e., off-site) may be required. If offsite wetland restoration is required, opportunities will be sought via regional and district councils as a priority, as well as conservation groups and private landowners.

The area of restoration required would be higher if the sites selected were not suitable for retirement and planting since this management action yields the greatest ecological benefit per m² compared to the other restoration activities identified above. All of the wetlands on site would be suitable for retirement and planting.

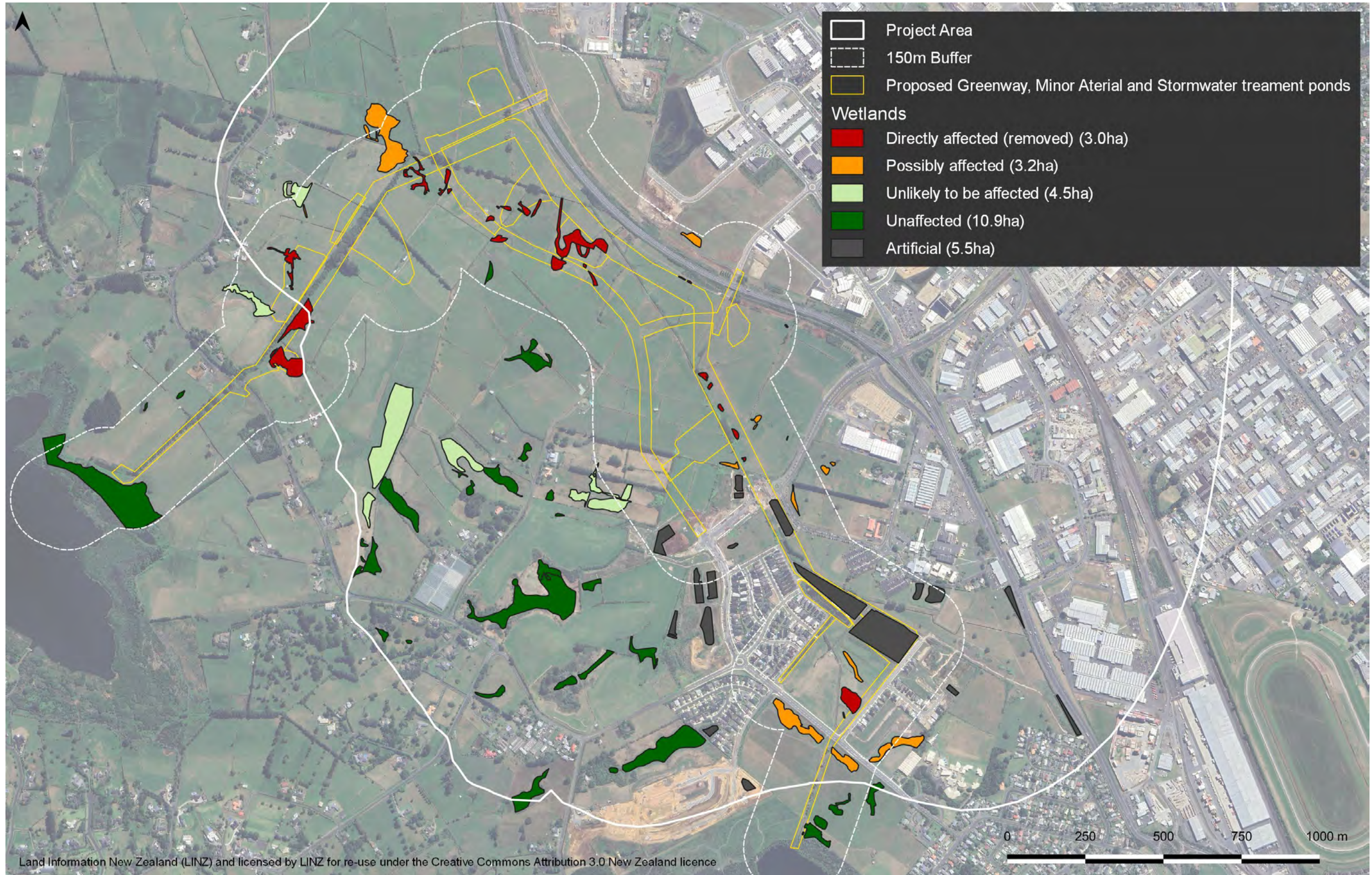


Figure 3. Wetlands within the Project Area shaded to indicate expected level of effects.

Public Good

The reconfiguration of the Rotokauri Drain and the associated riparian and terrestrial planting is expected to improve the overall ecological values (both terrestrial and aquatic) within the Greenway footprint, as well as restoring the ecological connectivity between Lake Waiwhakareke and Lake Rotokauri for both terrestrial and aquatic species. Revegetation of the riparian areas will improve habitat for terrestrial indigenous species in the medium- to long-term and improve ecological resilience and integrity as well as connectivity. Planting and management of the site in the short- to medium-term will also provide employment.

Conclusions

The anticipated ecological effects of the project are manageable through the development and implementation of suitable conditions of consent and the use of site-specific management plans for particular species (bats, lizards, mudfish) or habitats (streams and wetlands). With respect to wetlands and black mudfish, this would require biodiversity offsetting and there is ample opportunity for this to occur on site in the first instance and elsewhere in the Waikato Region if required. A detailed ecological assessment and ecological management/ offsetting plan will be included in the resource consent application, should the application be accepted as a referred project under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

Qualifications and Experience

Ecological Solutions Ltd. (formerly Freshwater Solutions Ltd and The Ecology Company Ltd) are expert freshwater and terrestrial environmental consultants with offices in Auckland, Tauranga, Hawkes Bay and Northland from where we service our national client base. The company is managed by Richard Montgomerie who founded Freshwater Solutions Ltd in 2009. Dr Gary Bramley (former owner and director of The Ecology Company, founded 2016) is the terrestrial team lead and Nick Carter is the freshwater team lead, each with more than 20 years' experience managing a diverse range of environmental projects, including significant infrastructure and housing projects, throughout the country. Gary is the project manager for the Rotokauri Greenway Project together with Becky Bodley our senior terrestrial ecologist.

Ecological Solutions has extensive experience in the Waikato region, having provided ecology services for numerous land development projects and primary sector clients there for many years. Ecological Solutions are experienced in developing appropriate mitigation and biodiversity offsets required to offset terrestrial, wetland and stream habitat loss for a range and flora and fauna, including wetlands and black mudfish. The most recent example of black mudfish offsetting they have undertaken included generation of an enhancement plan for Lake Waiwhakareke to offset loss of habitat for mudfish associated with another local project.

References

Baber, M, Dickson, J, Quinn, J, Markham, J, Ussher, G, Heggie-Gracie, S, and Jackson, S (2021). A Biodiversity Compensation Model for New Zealand – A User Guide (Version 1). Prepared by Tonkin & Taylor Limited. Project number 1017287.0000P.

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