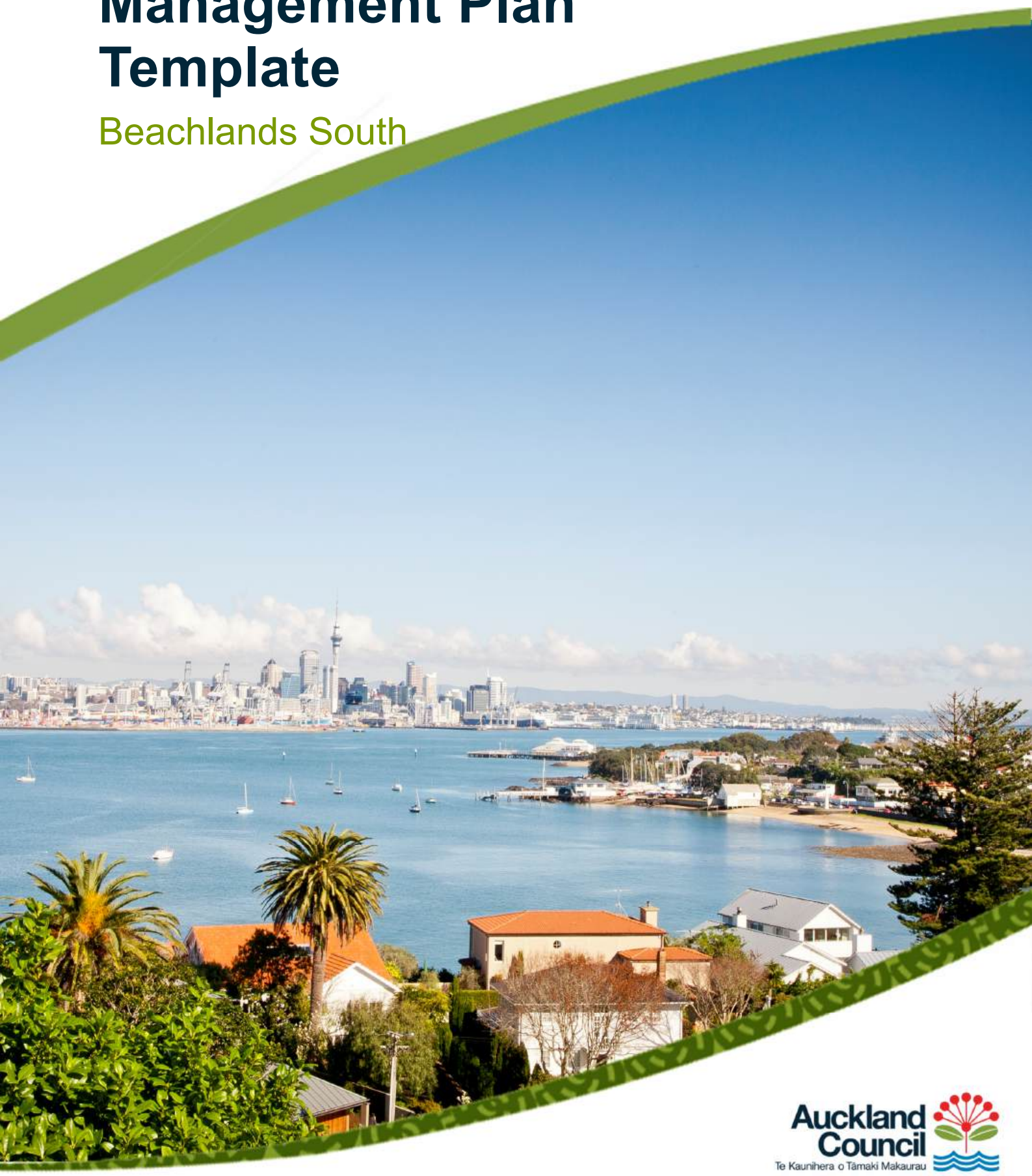
# Stormwater Management Plan Template

## Beachlands South



Auckland Council
Te Kaunihera o Tāmaki Makaurau

# Document control

**Purpose**

| | |
|---|---|
| **Purpose** | Provide Stormwater Management principles for the development of Beachlands South, consisting of the existing Formosa Golf Club 620 Whitford Maraetai Road to the south and 680 – 770 Whitford Maraetai Road. |

**Document**

| | |
|---|---|
| **Document Name** | Beachlands South |

**Version History**

| | |
|---|---|
| Ver. 1 | PC88 – Draft Stormwater Management Plan |
| **Ver. 2** | SMP in support of Fast Track Application |

**Approval**

| **Author of the Stormwater Management Plan** | | |
|---|---|---|
| Author | T. Gilbert | Date 24/06/2026 |
| Reviewed | C. McGregor | Date:24/06/2026 |
| Approved | C. Maday | Date:24/06/2026 |

# Table of contents

# Executive summary

This report has been prepared in support of a substantive application submitted by Beachlands South Limited Partnership (BSLP) under the Fast-track Approvals Act (FTAA). The Project name is 'Beachlands South' and is included in Schedule 2 of the FTAA as a Listed Project with significant regional or national benefits. The Project location or Site is located across approximately 159.58 hectares of live zoned land and approximately 108.6 hectares Future Urban zoned land at 110 Jack Lachlan Drive, and 620, 712, 758 and 770 Whitford-Maraetai Road, Beachlands.

In summary, the Project will provide for the development of live zoned land at Beachlands into a comprehensively planned and public transport focussed community to achieve a well-functioning urban environment comprising residential dwellings, a hotel and conference venue, community and commercial activities, protected ecological restoration areas, walking and cycling networks, and community facilities, and enable the potential development of two schools, as well as all associated earthworks and all associated infrastructure including transport facilities, intersection upgrades and roading, telecommunications, power, and water supply, stormwater, and wastewater infrastructure (including any treatment or storage facilities, drainage, pipes, pump stations, outfalls and discharges). A portion of Future Urban zoned land will be used for wastewater management purposes.

Key elements of the Project include:

- Residential activities comprising approximately 2,200 dwellings in a variety of housing types, densities and vacant sites for future residential development;
- Establishment of a commercial local centre supported by employment opportunities within and around the periphery of the local centre and on the Whitford-Maraetai Road frontage comprising approximately 27,000 $m^2$ of commercial GFA and 30,000 $m^2$ of light industrial GFA;
- Education facilities comprising the development of both primary and secondary schools;
- Establishment of an Ecological Protected Area Network (EPAN) comprising approximately 88 hectares of land within the live zoned area being protected and approximately 55 hectares of land being replanted, restored, maintained and enhanced including preservation of streams and their margins;
- A series of open spaces including a suburban park, neighbourhood parks, the Fairway Reserve, golf course, esplanade reserve and riparian margins;
- Provision of public access to and along the coastal marine area and the creation of a quality coastal pathway;

- Public transport enhancements and integrations including expanded ferry passenger capacity;
- Staged road upgrades including the provision of pedestrian and cycling facilities along Jack Lachlan Drive, the upgrade of Whitford roundabout, a series of intersection upgrades; and
- Establishment of infrastructure to service the project including wastewater, water supply, stormwater, telecommunications and power.

This document sets out the framework and strategy for stormwater management required to facilitate the urban development as envisaged in the Auckland Unitary Plan Beachlands South Precinct (AUP I458).

The development is classified as a large greenfield site under Schedule 4 of the Regional Network Discharge Consent (NDC). The relevant NDC requirements have been identified and detailed within this document. This Stormwater Management Plan (SMP) is intended to address the proposed development on the Site in support of the FTAA application.

The stormwater management of the Site is simplified by the ridgeline running adjacent to Whitford-Maraetai Road, forming a catchment boundary, and restricting the contributing catchment to the Site itself. The Site drains to five significant sub-catchments, two of which discharge to an existing and heavily modified watercourse via culverts beneath Jack Lachlan Drive. The remaining three sub-catchments discharge directly to the estuarine environment of the Waikopua Creek.

The Project has been established using a Water Sensitive Design (WSD) approach that closely mimics existing sub-catchment boundaries and preserves valuable existing surface water features.

A combination of stormwater management devices including proprietary treatment devices and communal scale bioretention features is proposed to provide hydrological mitigation, treatment, and peak flow attenuation for runoff generated within developed areas of the Site.

The proposed stormwater management systems will manage overland flow paths within the road reserves, engineered flow paths, and existing on-site streams to mitigate the flood hazard presented to people and property both on-site and downstream. This approach carefully manages discharges to the existing watercourse north of the Site to avoid creating new flood hazards or increasing existing flood hazards, where practicably possible.

The proposed stormwater management will provide treatment for all impervious surfaces throughout the development area through implementation of eleven bioretention wetlands, and four rain gardens. Proprietary treatment devices are to be installed immediately upstream of these devices to provide pre-treatment for initial sediment loads and removal

of gross pollutants. Inert building materials to be utilised where possible to minimise contaminants generated and mobilised at source.

Erosion protection for all downstream environments will be incorporated into the storage volumes of all communal devices in accordance with Auckland Council's Stormwater Management Devices Guideline Document Version 01 (commonly referred to as 'GD01'). Additional attenuation is proposed within bioretention wetlands and existing stream basins up to the 1% AEP storm event, to ensure no additional adverse flood risk is introduced to downstream catchments to the north as a result of the Project.

Flood modelling has been undertaken to confirm the impact of the proposed live-zoned development area. The modelling concludes only marginal increases within the downstream environments, during the 50%, 10% and 1% AEP storm events but more importantly no increase in the flood hazard of these environments, as a result of the development.

The Project utilises existing culverts within the northern catchments to throttle flows to the downstream watercourse. Site-specific 2-D flood modelling concluded that no augmentation of these structures is required to mitigate flood risk impacts.

Harrison Grierson has undertaken a flood hazard assessment comparing the pre-development and post-development scenarios, which also concludes there is a negligible impact to the flood hazard as a result of the Project.

This SMP supports Auckland Council's preference for larger and fewer communal devices, such as wetlands, raingardens and proprietary treatment devices as well as smaller scale devices including rainwater tanks to manage generated stormwater locally. The use of on-site, small-scale devices throughout the catchment area are a part of the WSD approach that protects and incorporates natural site features into the plan. These devices reflect the sustainability goals outlined for this Project.

The outlined SMP for this FTAA application is based on further development of the SMP proposed as part of AUP I458 which was developed in accordance with the Auckland Unitary Plan (AUP), WSD approach and Schedule 4 of the NDC. It provides a suitable framework and strategy for the sustainability goals and best practice approaches to be met or enhanced.

# 1 Existing site appraisal

## 1.1 Qualifications and Experience

My name is Campbell McGregor and I am a Chartered Professional Engineer and Engineering Fellow of Engineering New Zealand. I hold the position of National Land Development Manager at Harrison Grierson Consultants Limited and have over 25 years' experience in land development and civil infrastructure.

I have obtained the following qualifications:

- Bachelor of Surveying – Otago University
- Masters of Engineering Studies (Hon) – Auckland University
- Postgraduate Diploma in Business Administration – Auckland University
- Chartered Professional Engineer – Engineering New Zealand
- Chartered Member of Engineering New Zealand
- Engineering Fellow – Engineering New Zealand
- Chartered Member of Institute of Directors

I am a member of the following:

- Engineering New Zealand
- Water New Zealand
- Urban Development Institute of New Zealand (Board Chair)
- Institute of Directors

My experience related to this Project is preparation of other Stormwater Management Plans most recently for projects such as Redhills, Westgate and the Te Puna Station Road Industrial development. I am also experienced in the design and construction of general civil infrastructure across multiple projects, as well as providing expert evidence both for Council hearings and Environment Court.

I confirm that I have read the Code of Conduct for expert witness contained in the Environment Court of New Zealand Practice Note and that I have complied with it when preparing this report. Other than when I state I am relying on the advice of another person, this report is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## 1.2 Summary of data sources and dates

**Table 1: Data summary.**

| Existing site appraisal item | Source and date of data used |
|---|---|
| TOPOGRAPHY | • Site topographical survey, SurveyWorx (June 2021)<br>• Auckland Council GeoMaps Viewer (June 2021)<br>• Additional Site topographical survey, Jack Lachlan Drive, Harrison Grierson (December 2025) |
| GEOTECHNICAL / SOIL CONDITIONS | • Auckland Council GeoMaps Viewer (June 2021)<br>• Geotechnical Report, Tonkin & Taylor (June 2026)<br>• Section 3.5 of Infrastructure Report, Harrison Grierson (June 2026) |
| EXISTING STORMWATER NETWORK | • Site topographical survey, SurveyWorx (June 2021)<br>• Auckland Council GeoMaps Viewer (June 2021) |

| Existing site appraisal item | Source and date of data used |
|---|---|
| | • Additional Site topographical survey, Jack Lachlan Drive, Harrison Grierson (December 2025) |
| EXISTING HYDROLOGICAL FEATURES | • Site topographical survey, SurveyWorx (June 2021)<br>• Auckland Council GeoMaps Viewer (June 2021)<br>• Additional Site topographical survey, Jack Lachlan Drive, Harrison Grierson (December 2025) |
| MEAN WATER HIGH SPRINGS | • Mean High Water Springs survey, Harrison Grierson (March 2026) |
| STREAM, RIVER, COASTAL EROSION | • Site topographical survey, SurveyWorx (June 2021)<br>• Auckland Council GeoMaps Viewer (June 2021)<br>• Additional Site topographical survey, Jack Lachlan Drive, Harrison Grierson (December 2025) |
| FLOODING AND FLOWPATHS | • Beachlands Hydraulic Modelling – Floodplain Assessment, Harrison Grierson (May 2026)<br>• Site topographical survey, SurveyWorx (June 2021)<br>• Auckland Council GeoMaps Viewer (June 2021)<br>• Additional Site topographical survey, Jack Lachlan Drive, Harrison Grierson (December 2025) |
| COASTAL INUNDATION | • Coastal Hazards NPS-NH and AUP risk assessment, Tonkin & Taylor (May 2026)<br>• Auckland Council GeoMaps Viewer (June 2021) |
| ECOLOGICAL / ENVIRONMENTAL AREAS | • Ecological Impact Assessment, Viridis (June 2026)<br>• Lizard survey memorandum, Bioresearches (May 2026)<br>• Water Quality and Sedimentation Modelling Report, Tonkin & Taylor (November 2021) |
| CULTURAL AND HERITAGE SITES | • Tapuwae Ohiti i Kahawairahi Cultural Values Assessment, Ngāi Tai Ki Tāmaki (March 2022)<br>• Ngāi Tai Ki Tāmaki – Final Statement (May 2026)<br>• Archaeological Assessment, Clough & Associates Ltd. (May 2026) |
| CONTAMINATED LAND | • Contamination Site Management Plan, Tonkin & Taylor (May 2026) |

## 1.3 Location and general information

The Project is located across approximately 159.58 hectares of live zoned land and approximately 108.6 hectares Future Urban zoned land at 110 Jack Lachlan Drive, and 620, 712, 758 and 770 Whitford-Maraetai Road, Beachlands. The Site location is shown with respect to the wider Auckland Region in Figure 1.

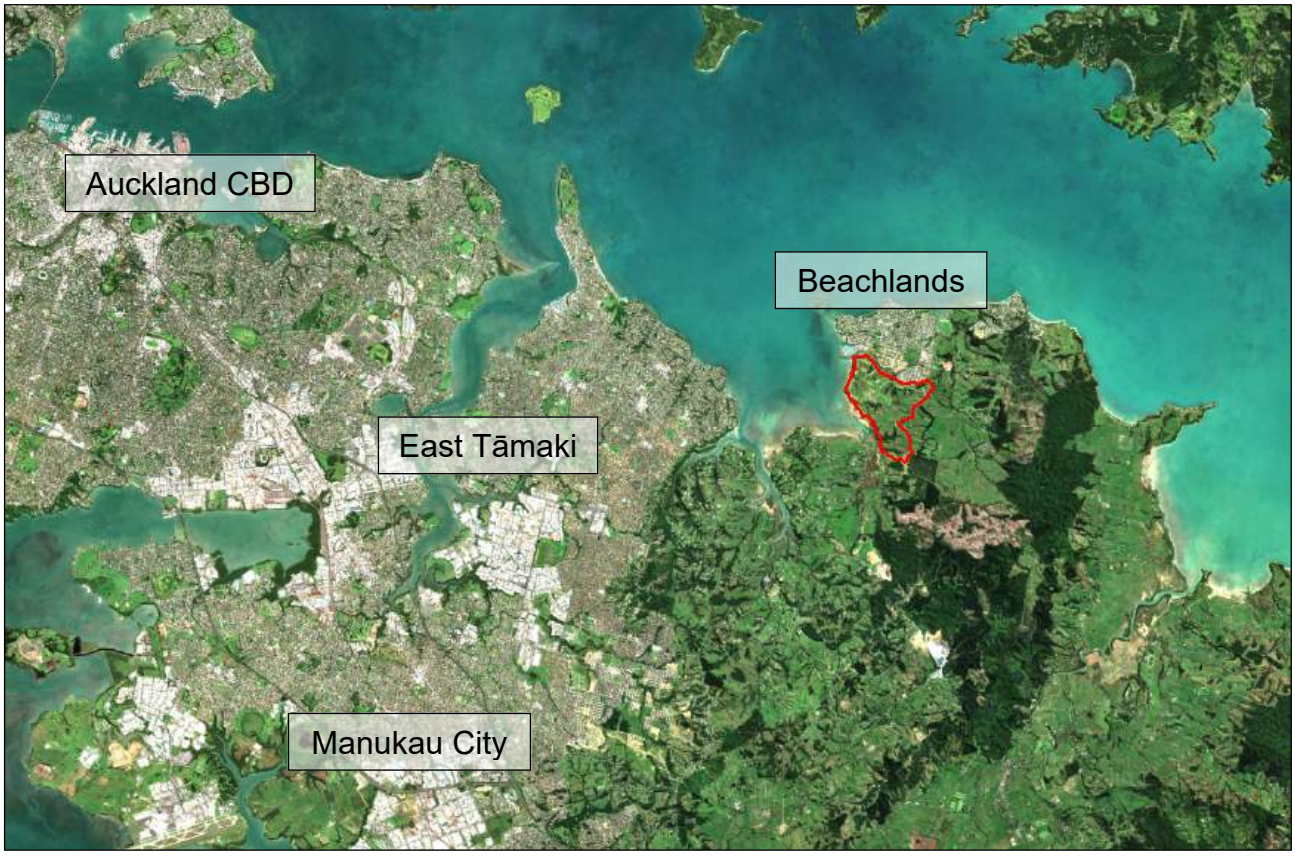



**Figure 1: Site location within the wider Auckland area.**

This SMP while containing spatial details of the wider stormwater catchment (see Figure 1), focuses on the live zoned area provided for under AUP I458. This application includes further development within FUZ land, however development within that area is limited to access roads, waste management uses and general earthworks to the east of the live-zoned area. Further details will be provided by way of revisions of this SMP as additional sub-catchments within the wider catchment area are developed. While we have provided details for the entire AUP I458 area through section 1, section 2 onwards only considers areas subject to the FTAA application.

The Site addresses and areas are outlined in Table 2 with those included as part of the FTAA application shown in bold. An illustration of the development area, and the proposed FTAA area can be seen in Figure 2.

**Table 2: Existing site elements.**

| Existing site element | |
|---|---|
| SITE ADDRESS | **Live Zone:**<br>• **110 Jack Lachlan Drive Beachlands Auckland 2571 (Formosa Golf Resort) (170.4750 ha)**<br><br>**Future Urban Zone:**<br>• **620 Whitford-Maraetai Road Whitford Auckland 2571 (79.9444 ha)** |

| Existing site element | |
|---|---|
| | • **770 Whitford-Maraetai Road Whitford Auckland 2571 (6.8665 ha)**<br>• **758 Whitford-Maraetai Road Whitford Auckland 2571 (6.1403ha)**<br>• 746 Whitford-Maraetai Road Whitford Auckland 2571 (5.7997 ha)<br>• 740 Whitford-Maraetai Road Whitford Auckland 2571 (5.1448 ha)<br>• 732 Whitford-Maraetai Road Whitford Auckland 2571 (5.0940 ha)<br>• 722 Whitford-Maraetai Road Whitford Auckland 2571 (4.9227 ha)<br>• **712 Whitford-Maraetai Road Whitford Auckland 2571 (4.7518 ha)**<br>• 702 Whitford-Maraetai Road Whitford Auckland 2571 (2.1341 ha)<br>• 692 Whitford-Maraetai Road Whitford Auckland 2571 (1.7747 ha)<br>• 682 Whitford-Maraetai Road Whitford Auckland 2571 (1.2583 ha)<br>• 680 Whitford-Maraetai Road Whitford Auckland 2571 (12.8125 ha) |
| LEGAL DESCRIPTION | **Live Zone:**<br>• **Lot 2 DP 501271**<br>**Future Urban Zone:**<br>• **Lot 100 DP 504488**<br>• **Lot 10 DP 54105**<br>• **Lot 9 DP 54105**<br>• Lot 8 DP 54105<br>• Lot 7 DP 54105<br>• Lot 6 DP 54105<br>• Lot 5 DP 54105<br>• **Lot 4 DP 54105**<br>• Lot 1 DP 208997<br>• Lot 1 DP 197719<br>• Lot 1 DP 187934<br>• Lot 26 DP 504488 |
| CURRENT LAND USE | • Golf course and resort<br>• Rural – Countryside Living |
| CURRENT BUILDING COVERAGE | • Minimal |
| HISTORICAL LAND USE | • Rural |

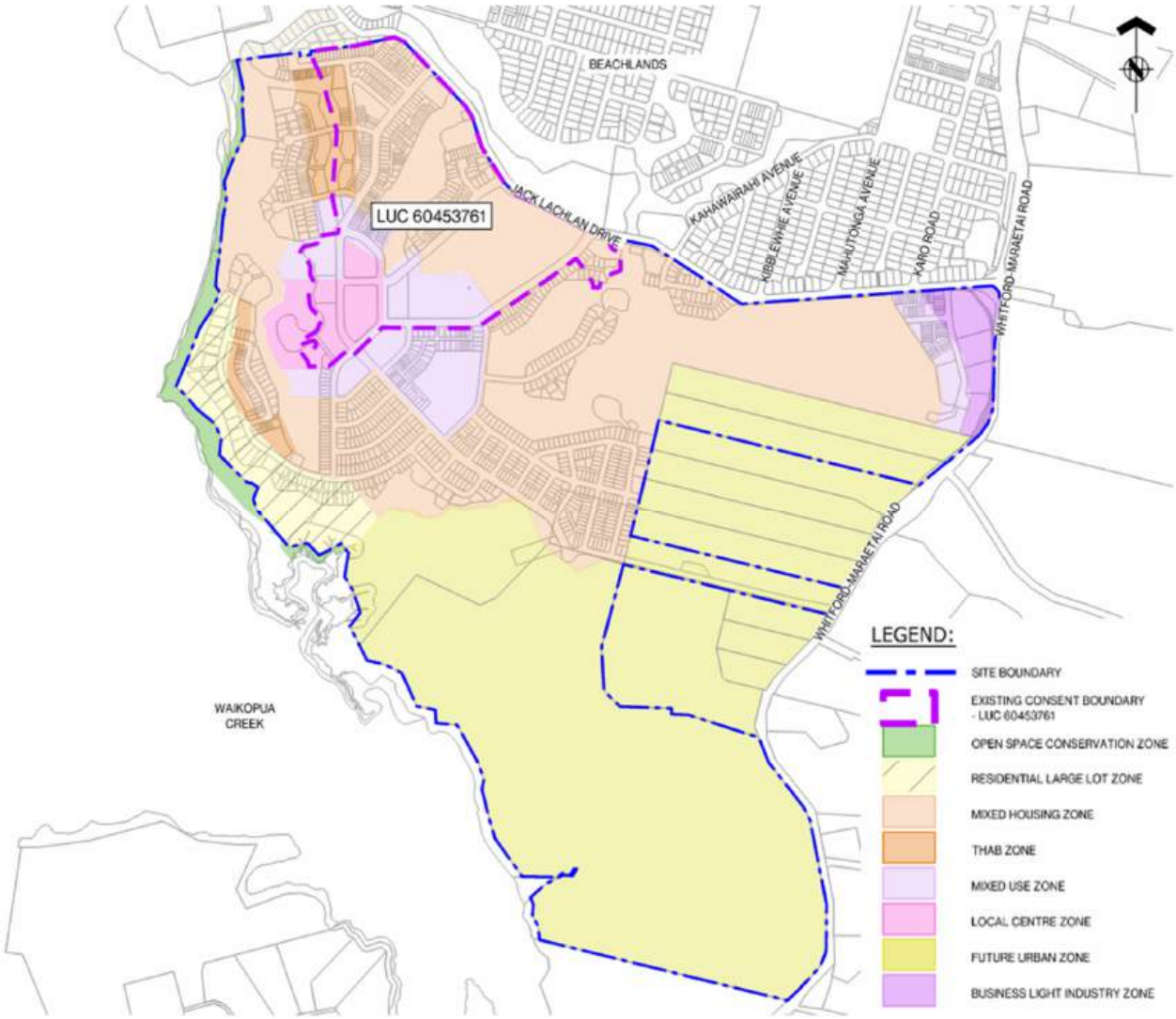



**Figure 2: Fast Track Consent Boundary and Future Urban Zone (Harrison Grierson, 2026)**

**Disclaimer:** *Whilst the following sections draw conclusions from the relevant assessments undertaken by third-party organisations, the original reports/documentation utilised for these conclusions should be reviewed and relied upon for the purpose of future decision making or referencing.*

## 1.4 Topography

The area is characterised by a ridgeline running adjacent to Whitford-Maraetai Road along the eastern boundary, forming a sub-catchment boundary (Figure 3). This ridgeline falls from around 75 m RL in the south to 60 m RL at the northern intersection with Jack Lachlan Drive. The northern site boundary follows Jack Lachlan Drive, falling gradually to around 10 m RL near the Pine Harbour Marina. The western boundary of the Site fronts onto the estuarine environment of the Waikopua Creek.

The Formosa Golf Resort makes up the northern region of the Site. This circa 170-hectare area is characterised by flat to rolling topography, minimal vegetation, extensive artificial surface water features, and well-vegetated and moderate to steep stream embankments.

The southern region of the Site is characterised by rolling to steep topography, very well-defined stream extents, steep to extremely steep stream embankments, and densely vegetated riparian margins.


**Figure 3: Existing topography surrounding the Site. (Auckland Council, 2024)**

## 1.5 Geotechnical

A geotechnical report has been prepared by Tonkin & Taylor (T&T) (June 2026) which indicates that the ground conditions are generally suitable for the proposed use under this Fast Track Consent. Assessments undertaken as part of the investigation included:

- site walkovers on 11 July 2019 and 3 July 2020.
- Previous desktop review assessment of site geology and topography, 2021
- Stage 1 Geotechnical investigation in May 2025
- Targeted site-wide geotechnical investigations from 14 to 22 April 2026

Whilst a summary of T&T's findings can be found below, for full details of the geotechnical investigation, reference should be made to the original documentation within the T+T Geotechnical Report (June 2026).

### 1.5.1 Underlying geology and soil characteristics

The site-specific investigations carried out across the development confirmed the findings of the desktop study and geological findings published in earlier T+T assessments. Review into the underlying geology identified that the ground conditions are expected to be typical of Auckland conditions, generally comprising a thin veneer of topsoil overlying very stiff to hard East Coast Bays Formation (ECBF) soils. The general formation was as follows:

- Topsoil (50 – 500 mm thickness, typically 200 mm thick)
- Historic Fill
- Tauranga Group Soils
- Residual ECBF Soils
- ECBF Rock

Localised areas of fill associated with golf course landscaping are expected and have been preliminarily mapped and investigated during investigation boreholes. The fill encountered to date has been generally less than 1m thick and comprised of site-won ECBF which were typically concluded to be very stiff to hard.

However thicker areas of historic fill were encountered to the east of the Site, where material was more variable, comprising of buried organics and greywacke gravels. Normal geotechnical investigation and design measures will still be required at subdivision and building design stages.

Groundwater was measured between 0.1 m and 4.6 m below ground level. It is typically considered that groundwater within ECBF soils becomes "perched" as water gradually seeps or cascades downwards to the permanent wate table, draining to nearby gullies or the coastline. Due to the variability of these groundwater depths, specific localised groundwater modelling should be undertaken at a particular location.

### 1.5.2 Building Foundations

As per the T+T geotechnical report, the developed Site will generally provide good ground conditions in terms of NZS 3604:2011 / NZS 4229:2013, the only exception being soil expansivity.

Testing to date shows the presence of expansive soils. Lot-specific geotechnical assessments will be required to confirm whether foundation design should follow Class M or Class H criteria under AS 2870:2011.

Where historic fill, Tauranga Group Soils and colluvium are encountered, it should be verified as suitable during construction by a suitably qualified Geotechnical Engineer. Where this is found to be inadequate, unsuitable soils are to be undercut and replaced with engineered fill.

### 1.5.3 Slope Stability and Earthworks

Landslide hazards have been assessed as part of the geotechnical assessment for the Project. This assessment included review of the following information:

- Pre-development Slopes
- Proposed Earthworks Design (provided by Harrison Grierson)
- Plan Change 120 to the Auckland Unitary Plan (PC120) Maps
- Analysis of critical and representative slope stability models

The assessment concluded that the overall risk of landslide is considered low (in terms of National Policy Statement for Natural Hazards (NPS-NH) and PC120). Most proposed slopes do not require specific engineering stabilisation measures to comply with Auckland Councils stability requirements, as per the  Code of Practice for Land Development and Subdivision, Chapter 2: Earthworks and Geotechnical, Version 2.0.

### 1.5.4 Excavations

The earthworks proposals seek to cut predominantly within areas of residual ECBF soils, although some areas of cut may encounter weathered ECBF rock which is typically comprises of extremely weak to very weak rock material.

The investigations undertaken generally conclude both types of ECBF soils are excavatable without the need for specialist plant, under typical conditions.

Where deeper cuts are proposed, more competent ECBF rock may be encountered which may include some zones of less weathered or cemented rock. These areas may require use of specialist ripping plant, such as a 20-tonne excavator with a toothed bucket or a bulldozer fitted with a rock ripper.

### 1.5.5 Liquefaction

Liquefaction assessment across the Site typically demonstrates an “insignificant” Liquefaction Severity Number (LSN) throughout the Site. Remaining investigations resulted in “Mild” LSN, with one count of beyond the “High” category. Further analysis is

recommended at this location within this area as part of detailed design to confirm suitability of these ground conditions.

Given the isolated case of adverse ground conditions, liquefaction is unlikely to present a significant hazard to the proposed development across the Site.

## 1.6 Existing drainage features and stormwater infrastructure

The wider site is located within two stormwater catchments: the Beachlands/Maraetai Catchment and Waikopua Creek Catchment. The catchment extents are shown, on Figure 4, along with OLFPs extracted from a region-wide Auckland Council dataset on Figure 5.

The portion of the Beachlands/Maraetai catchment discharging through the Site is bound to the north by Jack Lachlan Drive and to the east by Whitford-Maraetai Road. Runoff discharging through the Site is predominantly generated within the Formosa Golf Resort and neighbouring properties to the west of Whitford-Maraetai Road. The southern corner of the Site is within the Waikopua Creek Catchment, and discharges via a Significant Ecological Area – SEA Marine 1.

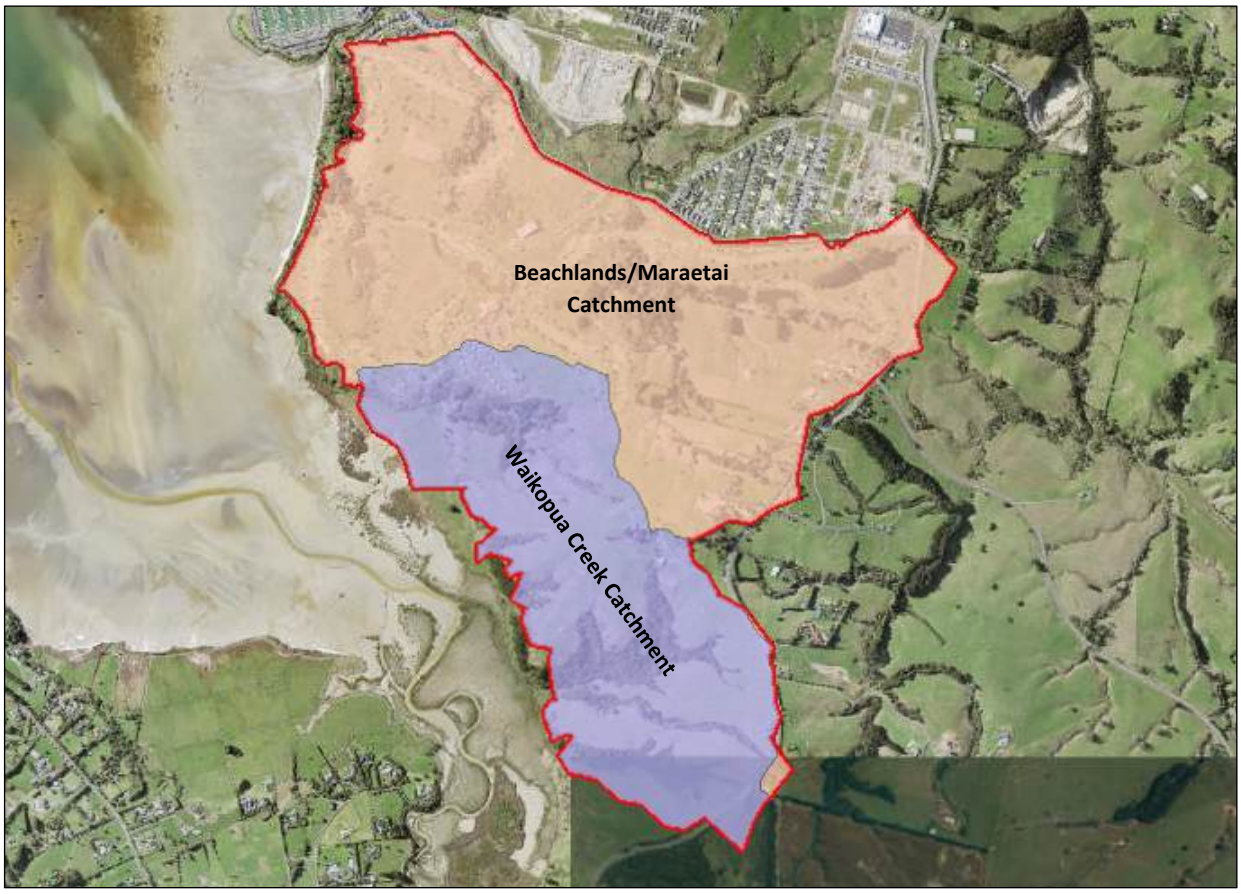



**Figure 4: Existing Beachlands/Maraetai catchment and Waikopua Creek catchments.**

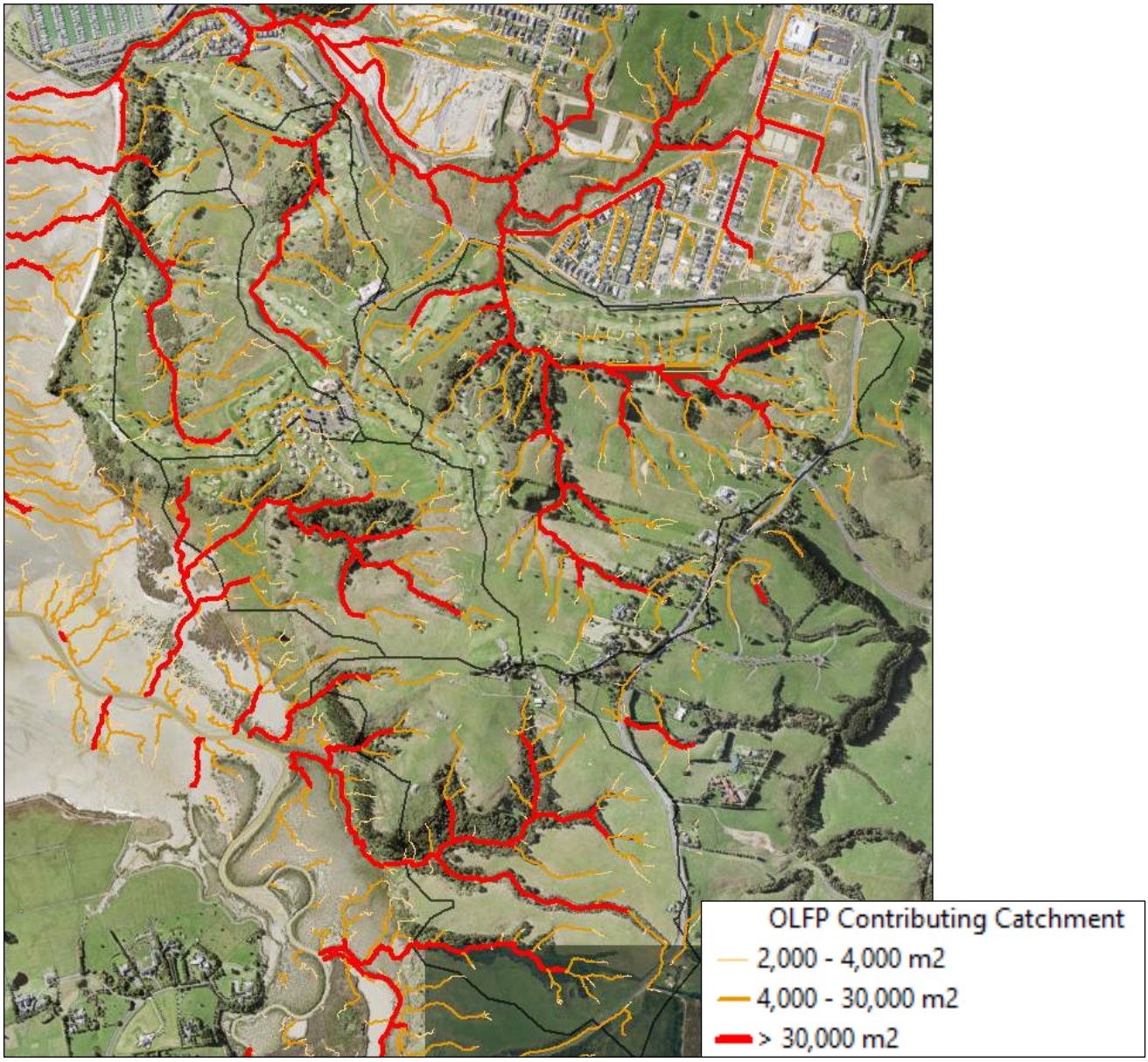



**Figure 5: Existing overland flowpaths within the development site.**

## 1.7 Receiving environment

A series of ecological assessments and reporting was completed by (Tonkin & Taylor, 2022) in support of AUP I458. In support of this FTAA, a more recent Ecological Impact Assessment (EcIA) has been undertaken by Viridis (June 2026) which assessed a variety of terrestrial, freshwater and coastal ecology values throughout the Project.

Key findings from these assessments, relevant to stormwater management, are summarised below. Reference can be made to the EcIA for further detail.

The Site discharges to the estuarine environment at the mouth of the Waikopua Creek. The receiving environment to the west is coastal SEA Marine 1 and 2.

The immediate receiving environment to the north is a heavily modified, naturalised stream receiving runoff from recent residential developments to the north of Jack Lachlan Drive.

The stream has an approximately 200 m long concrete lined section further downstream, at the rear of 167-189 Jack Lachlan Drive, followed by an approximately 420 m long rock armoured section between 189 Jack Lachlan Drive and the coastal outlet. The rock armouring and check-dams in the lower stream reaches, along with the concrete-lined section of the stream, may restrict fish passage to the Site. Discussions with Auckland Council Healthy Waters suggests the concrete-lined and rock-armoured stream reaches have insufficient capacity to convey extreme event runoff resulting in repeat nuisance flooding events. These stream reaches are indicated in Figure 6.

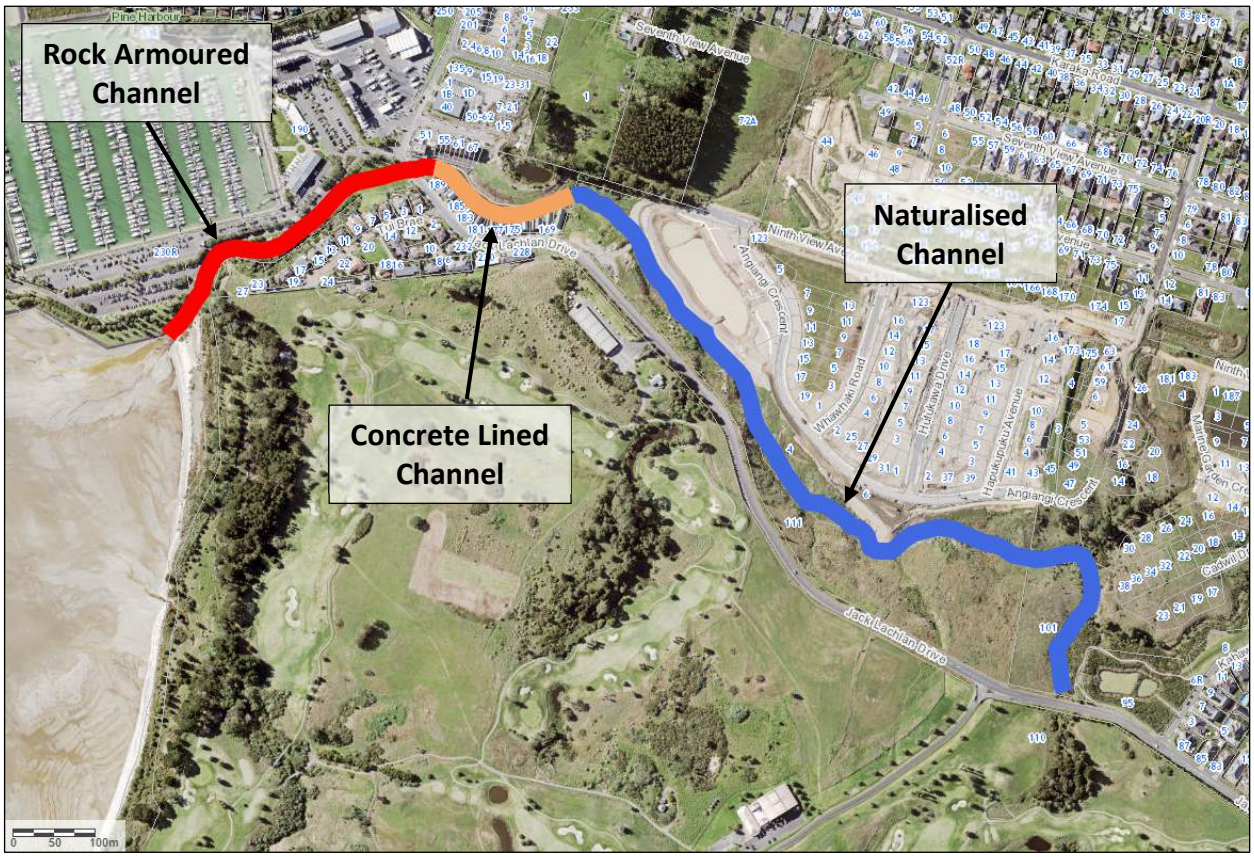



**Figure 6: Receiving watercourse and approximate extent of lined channel reaches**

The marine receiving environment is located adjacent to the Waikopua Creek and along the coastal margin to the west of the Formosa Golf Course at 110 Jack Lachlan Drive and the neighbouring property at 620 Whitford-Maraetai Road.

Waikopua Creek is a nationally and regionally significant estuarine habitat (including mangrove shrubland ecosystems), in the Hunua Ecological District and provides a complex of intertidal mud, sand and shell flats. The intertidal banks are a very rich feeding ground and important mid-tide roost for a variety of international migratory and New Zealand endemic coastal and shorebird species, including a number of ‘threatened’ and ‘at risk’ species (Viridis, 2026).

Waikopua Creek provides important habitat for fish species, including shelter and nursery grounds. The creek also provides a pathway for migrating freshwater fish that are migrating upstream or to freshwater catchments, or downstream for spawning purposes. A

2001 study of shellfish in the Whitford embayment by NIWA identified that the dominant suspension feeder in the embayment was the cockle (*Austrovenus stutchburyi*). Further assessment indicates that permanent and intermittent stream environments within the Project area provide habitat for a total of six indigenous freshwater species, including shortfin eel (*Anguilla australis*), longfin eel (*Anguilla dieffenbachii*), banded kōkopu (*Galaxias fasciatus*), giant kōkopu (*Galaxias argenteus*), īnanga (*Galaxias maculatus*) and kōura (*Paranephrops planifrons*) (Viridis, 2026).

A comprehensive assessment of the flora and fauna present throughout the development can be found in the EcIA document (Viridis, 2026) and should be referenced for all assessments related to the ecological impact of the proposed development.

## 1.8 Existing hydrological features

A combination of ‘Natural’ and ‘Constructed’ wetlands are present within the Site area. A total of twenty-seven natural, sixteen constructed wetlands/ponds and six incidental wetlands were found, all of which provide varying levels of ecological value.

Whilst smaller inland natural and incidental wetlands provide a low ecological value, the larger coastal ‘natural’ wetlands and the artificially constructed wetlands are considered to provide a ‘moderate’ level of ecological value due to size, connectivity, ecological function and restoration potential. (Viridis, 2026).

As a result of the proposed stormwater management solution, the proposal will require the reclamation of streams and natural inland wetlands as well as consideration of hydrological effects to existing wetlands that have not been physically impacted. Refer to the EcIA (Viridis, 2026), and Assessment of Environmental Effects (AEE) for full details of the ecological impacts within the development area.

Five main sub-catchments are identified within the Site, three of which discharge directly into the Waikopua Creek via streams generated primarily within the site boundary. The other two sub-catchments discharge into a watercourse running along the northern side of Jack Lachlan Drive (Figure 4 and Figure 5), which eventually discharges into the Waikopua Creek. Details of each sub-catchment are provided in Figure 7 below.

A total of 15 drainage culverts and 15 open wetlands (golf ponds or gully ponds) were identified within the Site during site visits. Asset data was recorded by SurveyWorx including inlet and outlet levels and configurations, pipe sizes, materials, and condition. Where individual data points were unavailable these were inferred based on site observations.

**Note:** The following flood maps below (Figure 7, Figure 8, Figure 10, Figure 12, Figure 15 and Figure 17), for the pre-development scenario, reflect a climate change increase of 2.1-degrees for illustration purposes only. It is acknowledged that current Auckland Council Chapter 4 Stormwater code of practice (July 2025) requires climate change provision of 3.8-degrees for the 1% AEP storm event, which has been utilised for the stormwater management design in later sections of this SMP.

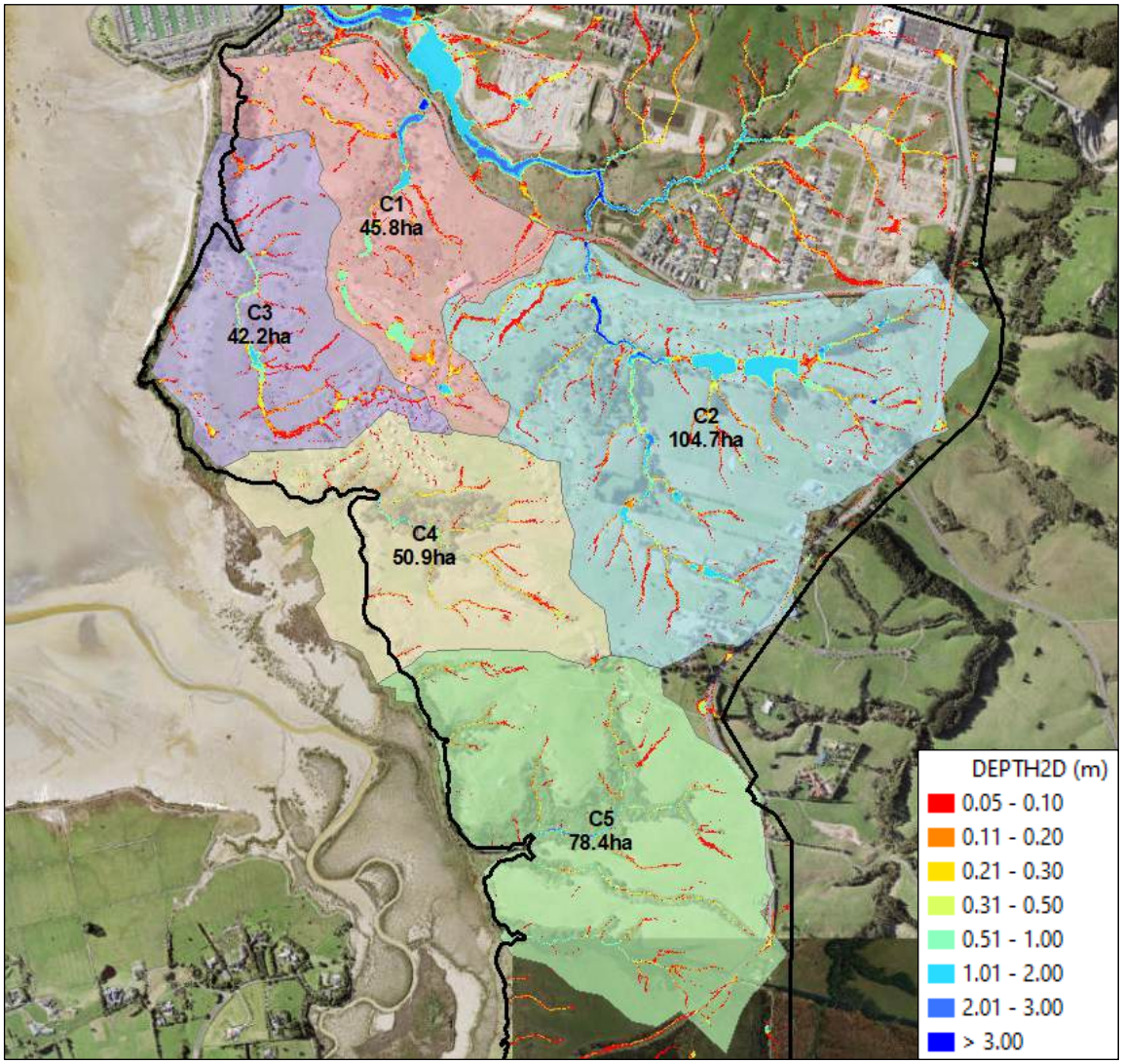



**Figure 7: Approximate boundaries of major stream sub-catchments overlaid by flood extents resulting from a 1% AEP design storm event in the existing land use scenario. Large areas along the western site boundary indicating flood depths greater than 3 metres are within the modelled coastal boundary and are not part of the on-site floodplain.**

### 1.8.1 Sub-catchment 1 (Northern)

Sub-catchment 1 is part of the Beachlands/Maraetai Catchment.

The main watercourse traversing sub-catchment 1 is heavily modified. The main water features in the upper reaches of the sub-catchment are a series of artificial water features and remnant stream reaches (Figure 8).

Basin 5 is the largest water feature within sub-catchment 1. The basin is constrained by the pedestrian walkway at the northernmost end, and discharges to basin 6 via a concrete culvert of approximately 675 mm diameter.

These basins were constructed to shape the Golf Resort but also provide a low level of depression storage attenuating peak flow runoff. These water features discharge to the main watercourse traversing the sub-catchment.

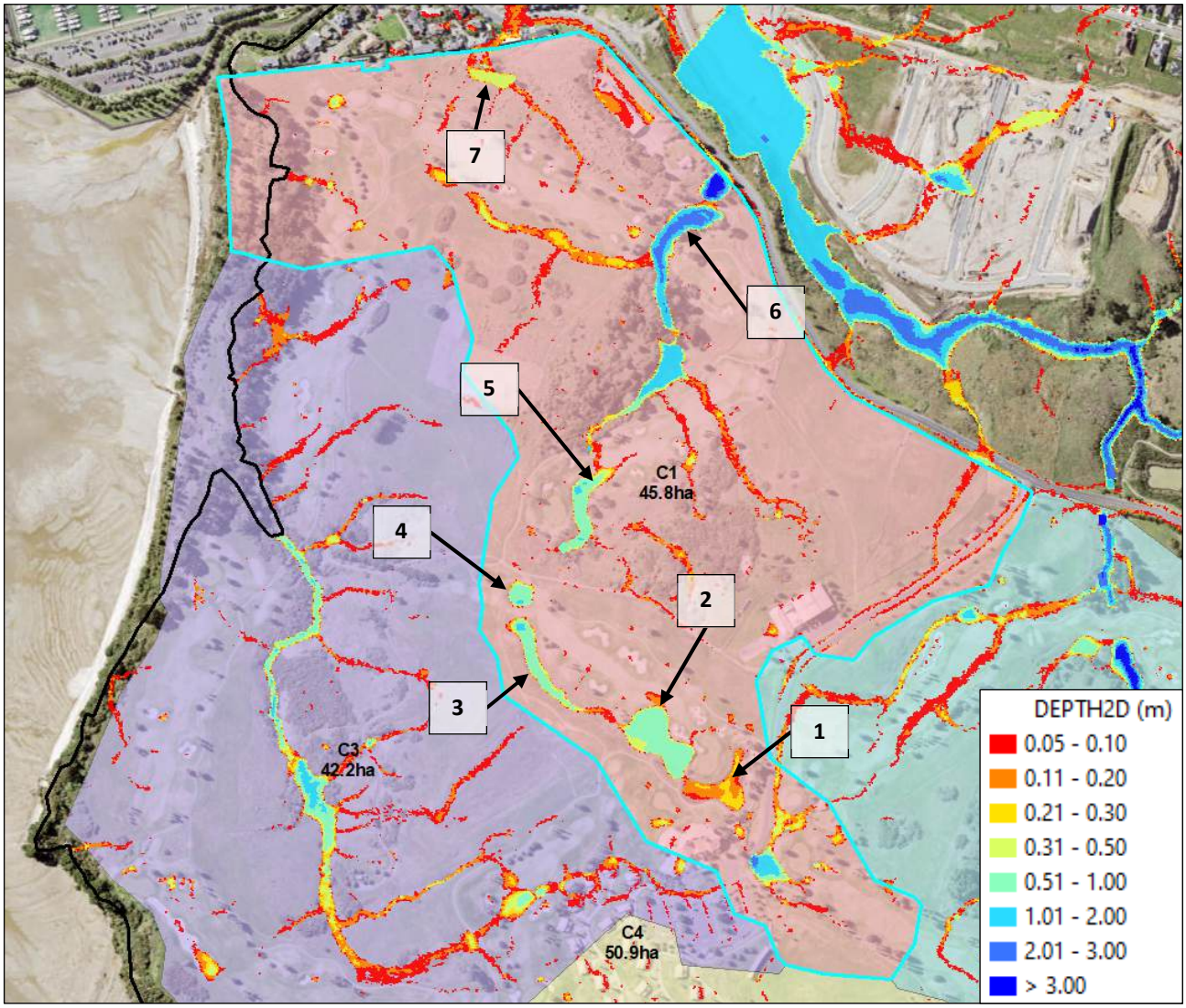



**Figure 8: Sub-catchment 1 flood data and features overlaid by flood extents resulting from a 1% AEP design storm event in the existing land use scenario.**

The lower reaches of the watercourse are heavily incised, with densely vegetated embankments. The modelled floodplain associated with the watercourse is largely contained within the streambanks. The watercourse discharges into the receiving naturalised stream reach via an 825 mm diameter culvert beneath Jack Lachlan Drive (Figure 9).

Table 3 provides some information on the outlet structures of these basins.

**Table 3: Sub-catchment 1 basin outlets.**

| Basin | Primary service outlet | Secondary outlet |
|---|---|---|
| 1 | Unknown | Overland spill to basin 2 |
| 2 | Unknown | Overland spill to basin 3 |
| 3 | 700 mm dia culvert discharging to basin 4 | Overland spill to basin 4 |
| 4 | 500 mm dia culvert to stream | Overland spill to basin 5 |

| Basin | Primary service outlet | Secondary outlet |
|---|---|---|
| 5 | 700 mm dia. culvert discharging to basin 6 | Overland spill to watercourse |
| 6 | 900 mm dia culvert discharging to Jack Lachlan Drive culvert headwater | Overland spill to Jack Lachlan Drive |
| 7 | Minor culvert | Overland spill to Jack Lachlan Drive |

Figure 9: Jack Lachlan Drive culvert.

### 1.8.2 Sub-catchment 2 (Eastern)

Sub-catchment 2 is part of the Beachlands/Maraetai Catchment.

The main watercourse traversing sub-catchment 2 is heavily modified. The main water features within the site boundary are a series of on-line golf ponds (Figure 10). These ponds were constructed as golf ponds for the Golf Resort but also provide a low level of depression storage to attenuate peak flow runoff. The ponds discharge to the main watercourse traversing the sub-catchment primarily through grated outlets, during standard operation, as illustrated in Figure 11.

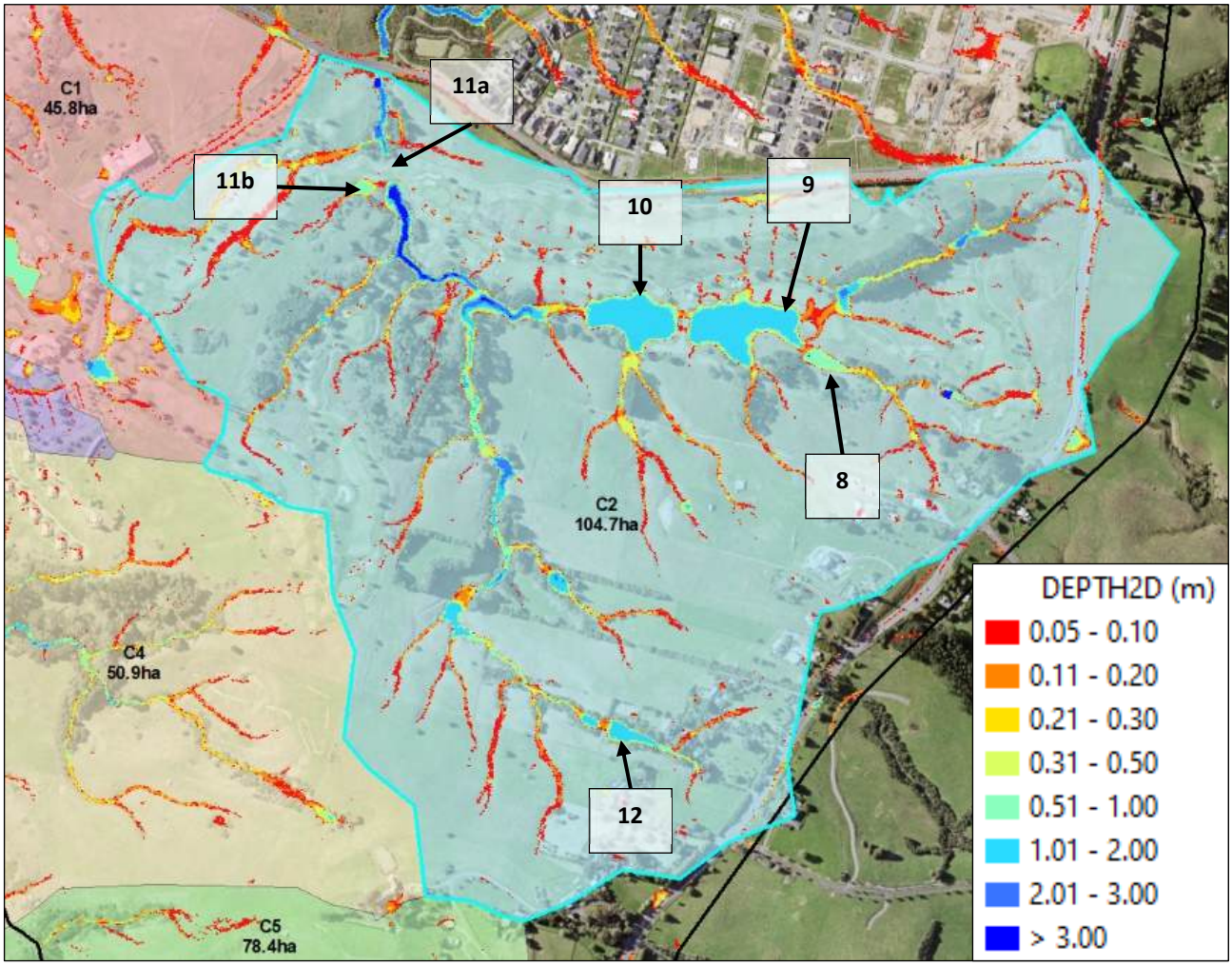



**Figure 10: Sub-catchment 2 flood data and features overlaid by flood extents resulting from a 1% AEP design storm event in the existing land use scenario.**

The middle and lower reaches of the watercourse are relatively incised and sinuous and have densely vegetated streambanks. The modelled floodplain associated with the watercourse is largely contained within the streambanks. The watercourse is conveyed beneath the walkway via an 1800 mm dia culvert and discharged into the receiving naturalised stream reach via a 2000 mm dia culvert beneath Jack Lachlan Drive.

Table 4 provides some information on the outlet structures of these basins.

Table 4: Eastern sub-catchment basin outlets.

| Basin | Primary service outlet | Secondary outlet |
|---|---|---|
| 8 | Unknown | Overland spill to basin 9 |
| 9 | Grated riser and 900mm culvert discharging to basin 10 | Overland spill to basin 10 |
| 10 | Grated riser and 900mm culvert discharging to stream | Overland spill to basin 11 |
| 11a | 1.80m culvert beneath Hole 2 towards final discharge Jack Lachlan culvert | Overland spill to stream |
| 11b | Grated riser and culvert discharging to stream | Overland spill to stream |
| 12 | Minor culvert | Overland spill to stream |
| 13 | Culvert discharging to stream | Overland spill to stream |

Figure 11: Pond 9 and 10 outlet structures.

### 1.8.3 Sub-catchment 3 (Western)

Sub-catchment 3 is part of the Beachlands/Maraetai Catchment.

The main watercourse traversing sub-catchment 3 is less incised, less densely vegetated, and flatter (Figure 13) than the watercourses in sub-catchments 1, 4 and 5. A number of pool and riffle sequences were observed along the low flow channel. A single headwater basin (Figure 12) exists in the upper reaches of the sub-catchment. The extent of flooding associated with the watercourse is also minimal. The lower reaches of the stream channel (downstream of the pedestrian bridges) are considerably steeper than the upper reaches.

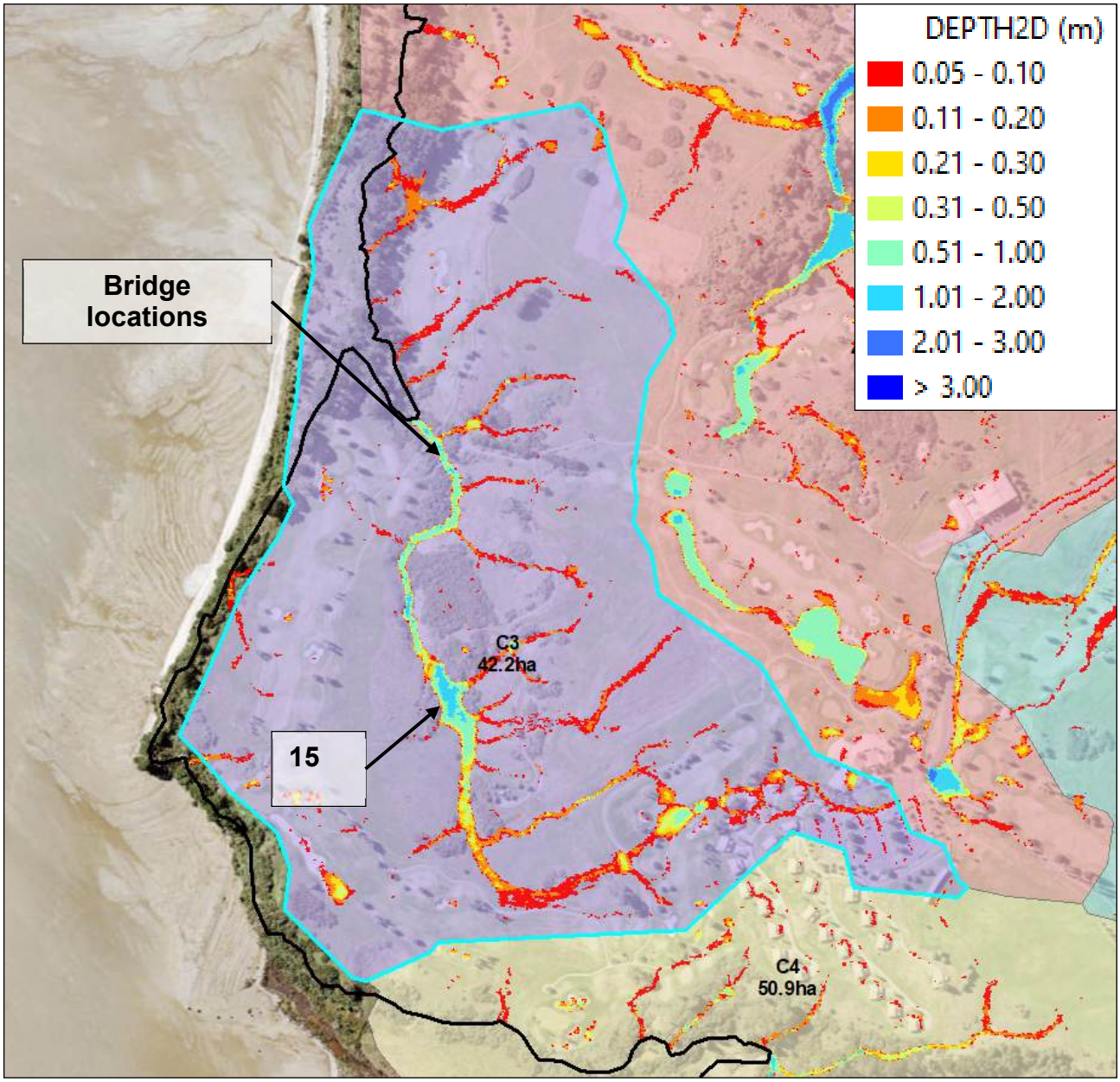



**Figure 12: Sub-catchment 3 flood data and features overlaid by flood extents resulting from a 1% AEP design storm event in the existing land use scenario.**

Figure 13: Rolling terrain surrounding the online pond 15.

The watercourse is not culverted under any pathways but is bridged in two locations (Figure 14). The concrete bridge, located further upstream, appears to be a newer structure than the timber bridge to the north. The deck level of the concrete bridge is considerably lower than the deck level of the timber bridge. Both bridge decks are significantly higher than the anticipated floodplain level in the 1% AEP, MPD scenario.

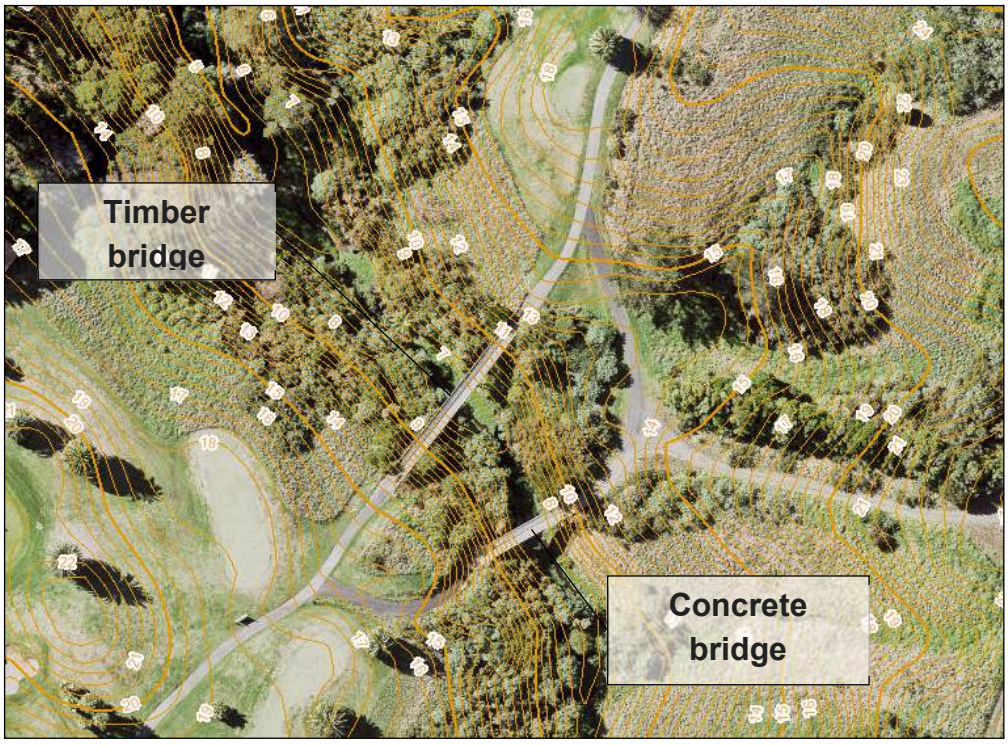



Figure 14: Lower catchment bridge structures.

### 1.8.4 Sub-catchment 4 (Southern Formosa Golf Resort)

Sub-catchment 4 (Figure 15) is a portion of the Waikopua Creek stormwater catchment. Runoff discharged from this sub-catchment is predominantly generated within the Site. The landform in this area is generally more highly elevated than other areas within the Site and falls away quickly down a steep gully towards the creek (Figure 16). The extent of flooding outside of the gully is minimal and generally of a low depth. Due to the steep terrain, high ecological value, and sensitive receiving environment, the potential development yield within this sub-catchment is relatively low.

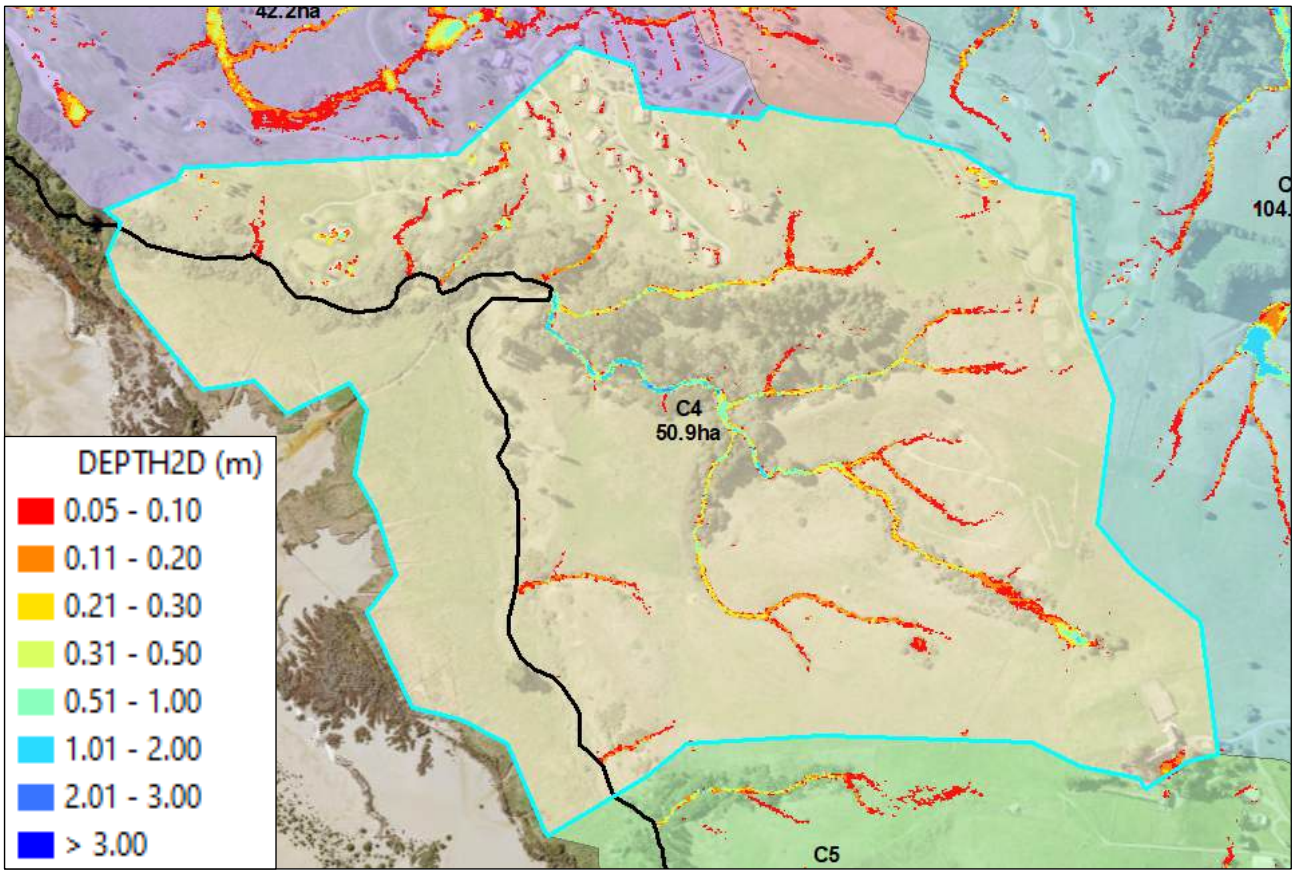



**Figure 15: Sub-catchment 4 flood data and features overlaid by flood extents resulting from a 1% AEP design storm event in the existing land use scenario.**

Figure 16: Pooling areas within the lower stream reach.

### 1.8.5 Sub-catchment 5 (Southern)

Sub-catchment 5 (Figure 17) is a portion of the Waikopua Creek stormwater catchment. Runoff discharged from this sub-catchment is predominantly generated on-site. The landform in this area is generally more highly elevated than other areas within the Site and falls away quickly down a steep gully towards the creek. The extent of flooding outside of the gully is minimal and generally of a low depth. Due to the steep terrain, high ecological value, and sensitive receiving environment, the anticipated development yield within this sub-catchment is relatively low. Stream reaches within this sub-catchment are characterised by extremely high and steep embankments.

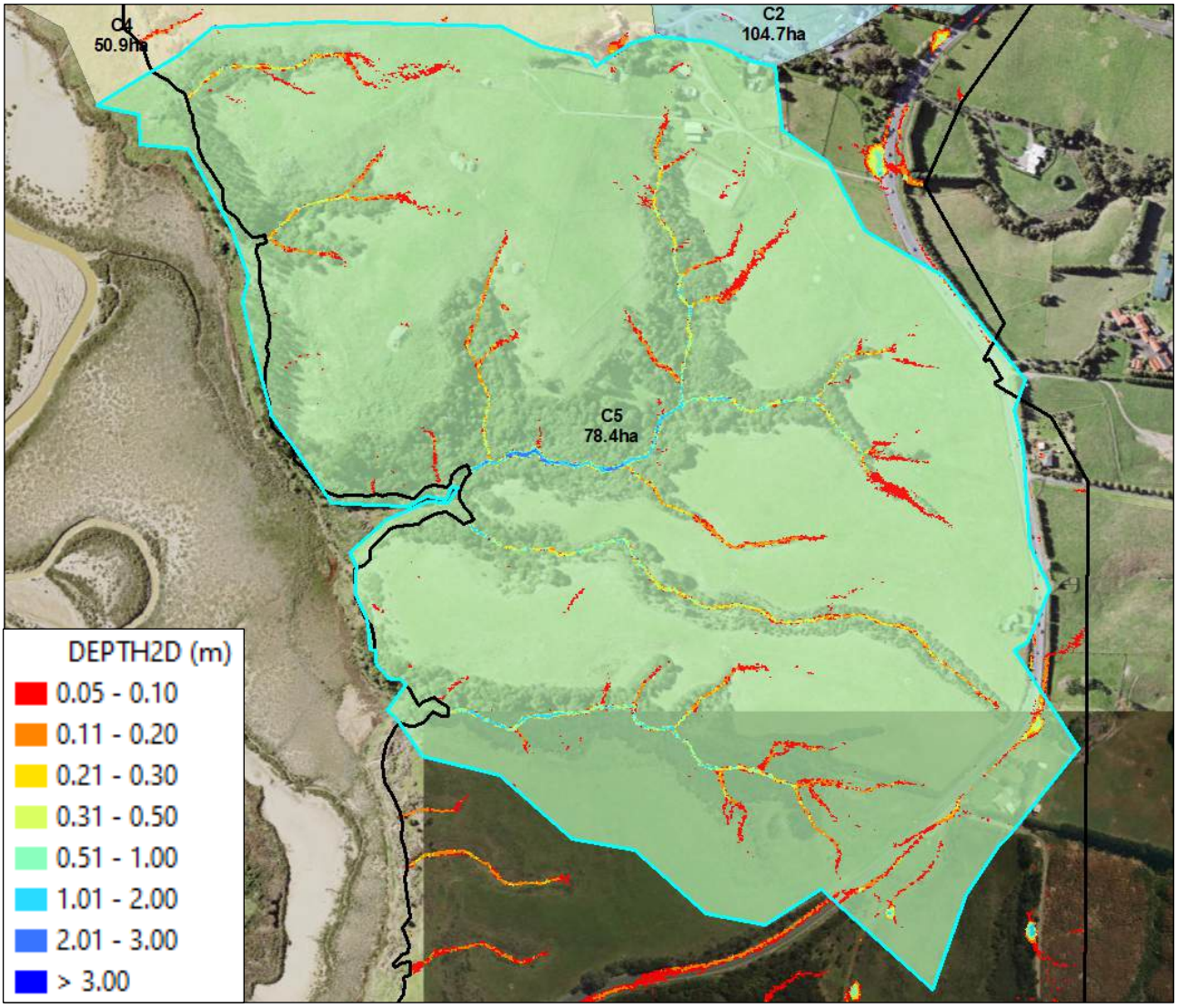



**Figure 17: Sub-catchment 5 flood data and features overlaid by flood extents resulting from a 1% AEP design storm event in the existing land use scenario.**

## 1.9 Flooding and flowpaths

The major overland flowpaths existing within the Site are shown on Figure 5. This data was retrieved from Auckland Council's GeoMaps. Modelled OLFPs and floodplain extents produced as part of this FTAA application are presented throughout this report.

## 1.10 Coastal inundation

Coastal boundaries and inundation hazards are identified on GeoMaps in terms of the 1% AEP as set out in the policy framework of E36 Natural Hazards and Flooding. Figure 18 shows the indicative coastline and the extent of coastal inundation anticipated in a 1% AEP event, allowing for 1 m of sea-level rise. This shows only small areas of the Site are directly influenced by sea-level rise.

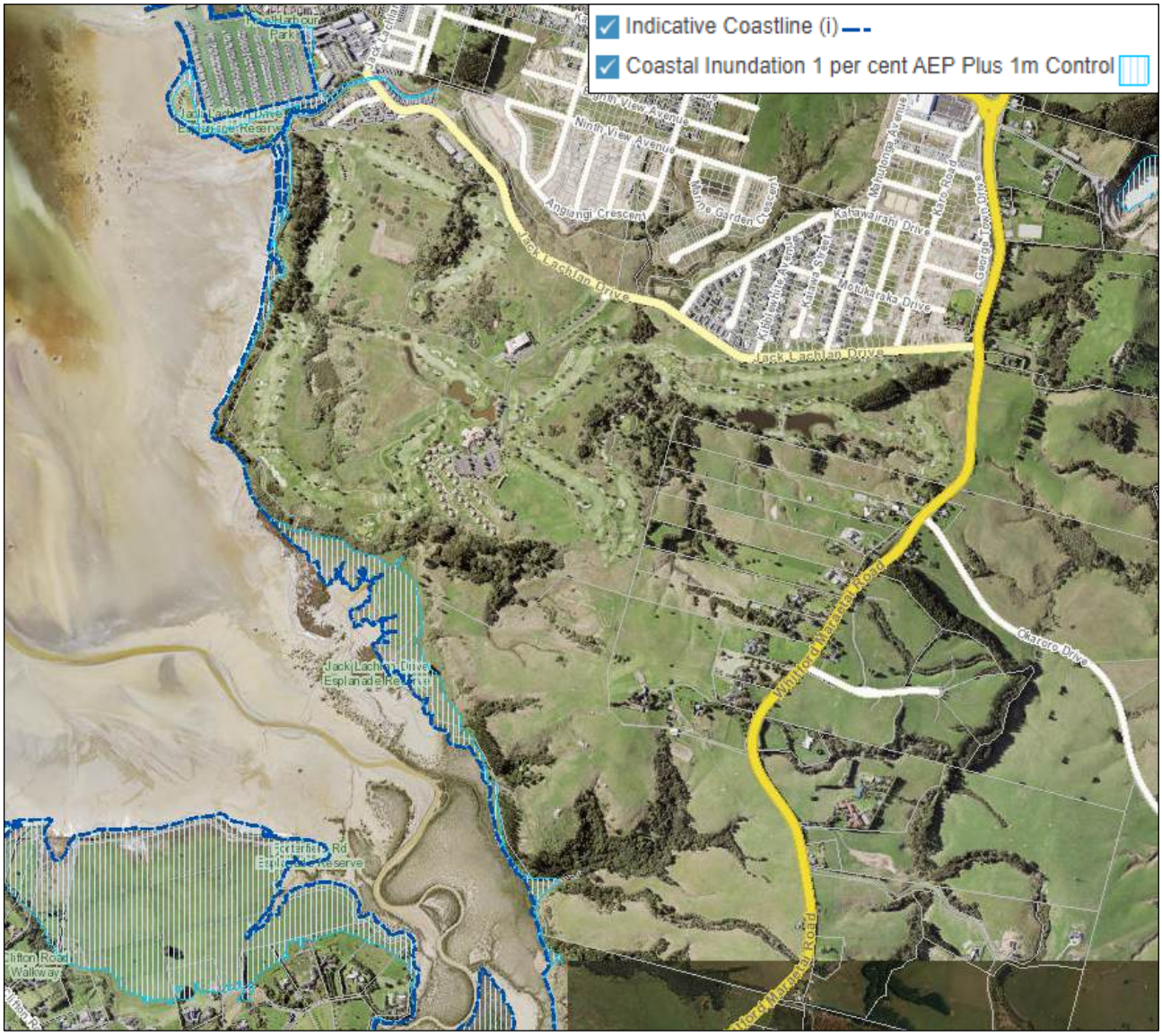



**Figure 18: Coastal inundation extents sourced from GeoMaps viewer.**

A coastal hazard NPS-NH and AUP risk assessment was completed by (Tonkin & Taylor, 2026) which produced the coastal hazards map shown on Figure 19. The assessment concludes that with the consideration of inundation impacts of up to 2 m sea level rise, the AUP framework for addressing hazards and climate change will be sufficient for addressing coastal inundation hazards and no specific mitigation is required. This 2 m SLR standard is consistent with the hydraulic modelling undertaken for this SMP.

It was concluded that no coastal inundation or tsunami hazard will occur on property parcels, key assets and infrastructure within the Project area, even considering the adjusted water level following the 2 m SLR. The proposed development being situated to avoid coastal hazards and having all property parcels, key assets, and infrastructure located landward of the 2130 area susceptible to coastal instability and erosion and tsunami hazard the proposed development will not exacerbate or accelerate any of the existing hazards present (Tonkin & Taylor, 2026).

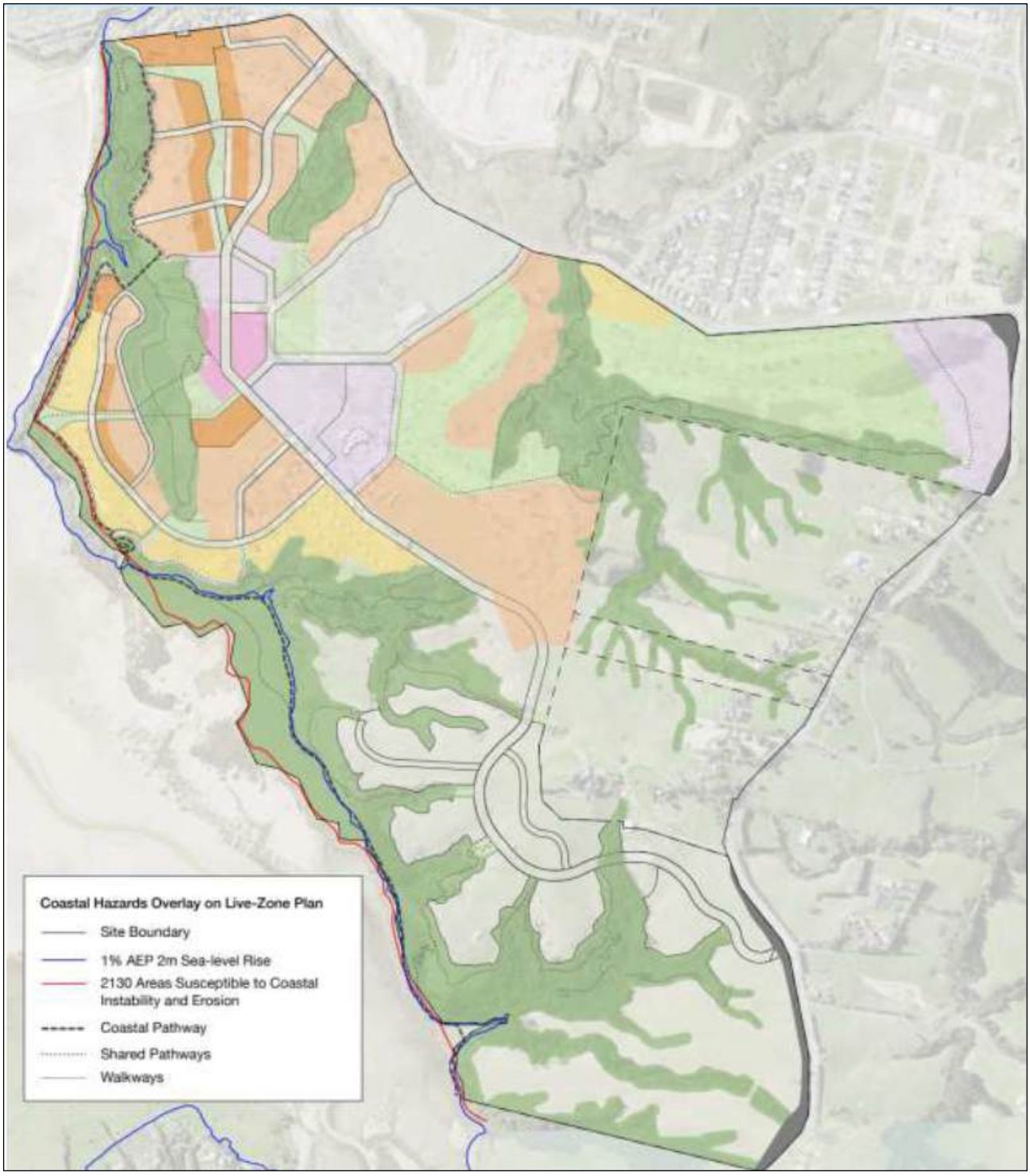



**Figure 19: Coastal Hazards Map (Tonkin & Taylor, 2026).**

## 1.11 Biodiversity

(Tonkin & Taylor, 2022) undertook four ecological assessments covering terrestrial, wetland, stream, and coastal aspects for AUP I458. This has since been superseded by the ecological impact assessment undertaken by (Viridis, 2026), which builds upon previous investigations and assessments, and provides updated field investigations, current ecological conditions and assessment of specific activities proposed under the current FTAA application.

A summary of the ecological effects has been summarised in Table 5, which considers the ecological value and magnitude before and after proposed mitigation (Viridis, 2026).

**Table 5 Overall level of effect of the project on the identified ecological values (Viridis, 2026)**

| Effect | Ecological value | Magnitude of effect before mitigation/ compensation | Magnitude of effect after mitigation/ compensation | Level of effect |
|---|---|---|---|---|
| **Effect on botanical and habitat values** | Low-Moderate | Low | Low | Positive – extensive revegetation planting, enhancement and long-term protection proposed, resulting in net gain |
| **Effect on birds** | Moderate | Moderate | Low | Low |
| **Effect on lizards** | Low-Moderate | Low | Very Low | Very Low |
| **Effect on bats** | Low | Low | Very Low | Very Low |
| **Effects of erosion and sedimentation on freshwater environments** | Low-Moderate | High | Low | Low |
| **Effects on stream value** | Low-moderate | Moderate | Moderate | Moderate – Residual effects managed through freshwater compensation |
| **Effects on stream extent** | Low-moderate | Moderate | Moderate | Moderate – Residual effects managed through freshwater compensation |
| **Effects on wetland value (excluding coastal fringe wetland)** | Low | Moderate | Low | Positive – net gain through proposed restoration of 2.943 ha of exotic wetland |
| **Effects on wetland extent (excluding coastal fringe wetland)** | Low | Moderate | Moderate | Moderate – Residual effects managed through freshwater compensation |
| **Effects on freshwater fish** | Moderate | Moderate | Low | Low |
| **Effects on freshwater fish passage** | Low-Moderate | Low | Negligible | Negligible |

| | | | | |
|---|---|---|---|---|
| **Effects of stormwater management** | Moderate | Moderate | Low | Low |
| **Effects of wastewater discharge to land** | Low-Moderate | Low | Low | Low |

For further details expanding on the summary in Table 5, refer to the Ecological Impact Assessment (Viridis, 2026) in relation to the FTAA application area.

## 1.12 Cultural and heritage sites

BSLP and Ngāi Tai ki Tāmaki have developed an ongoing relationship throughout the development throughout the development of AUP I458 and now the FTAA application. Ngāi Tai ki Tāmaki are a development partner for Beachlands South and will continue to play an integral role in the development of the plan change area into the future.

An Archaeological Assessment prepared by (Clough & Associates Ltd., 2026) identified around 19 archaeological sites within the fast track development area, recorded within a 250m buffer of the proposed earthworks extent throughout the Site. An illustration of the recorded archaeological site can be found in Figure 20 and Figure 21 below.

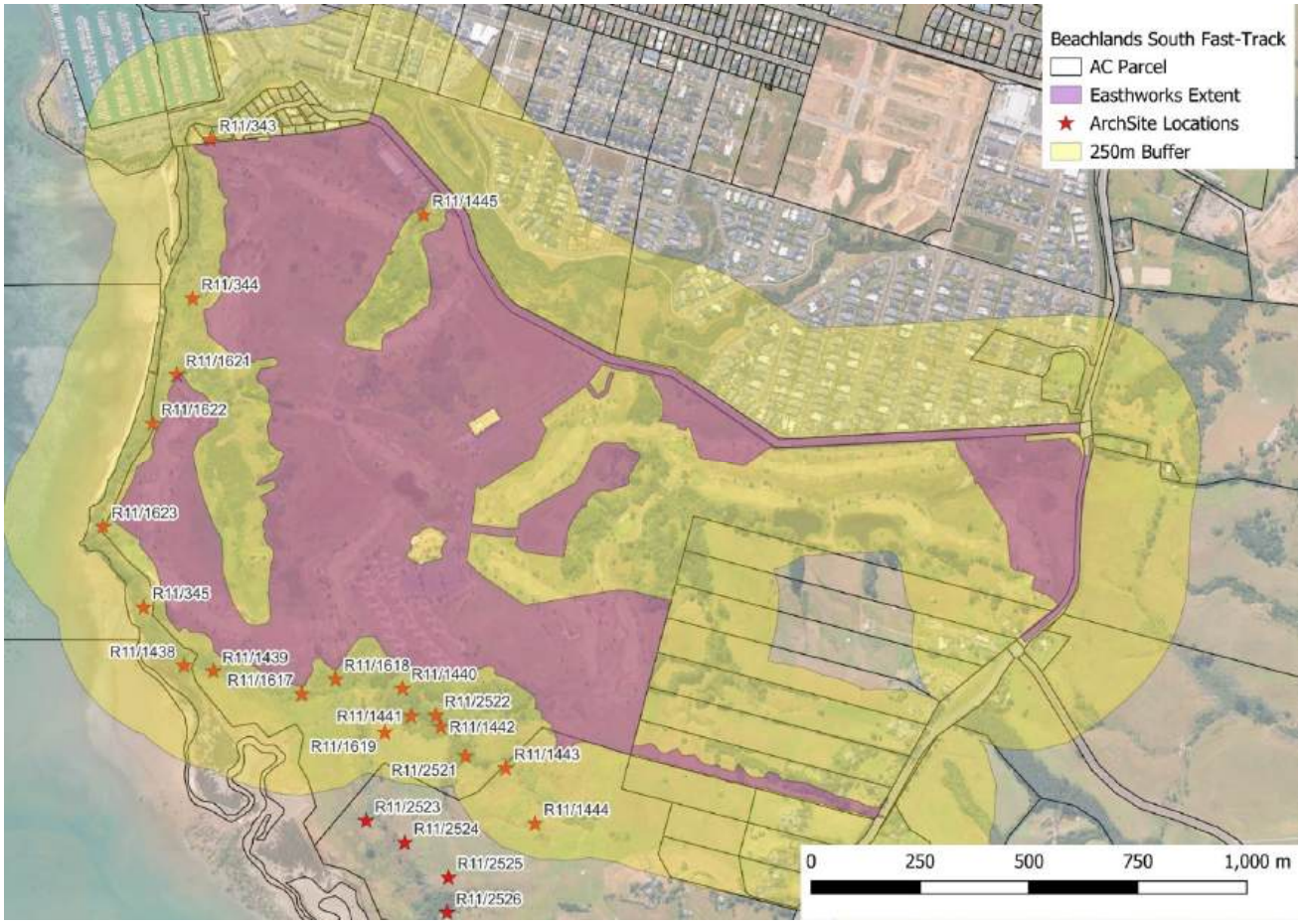



**Figure 20: Plan showing recorded archaeological sites within a buffer of 250m of project area proposed earthworks (Clough & Associates Ltd., 2026)**

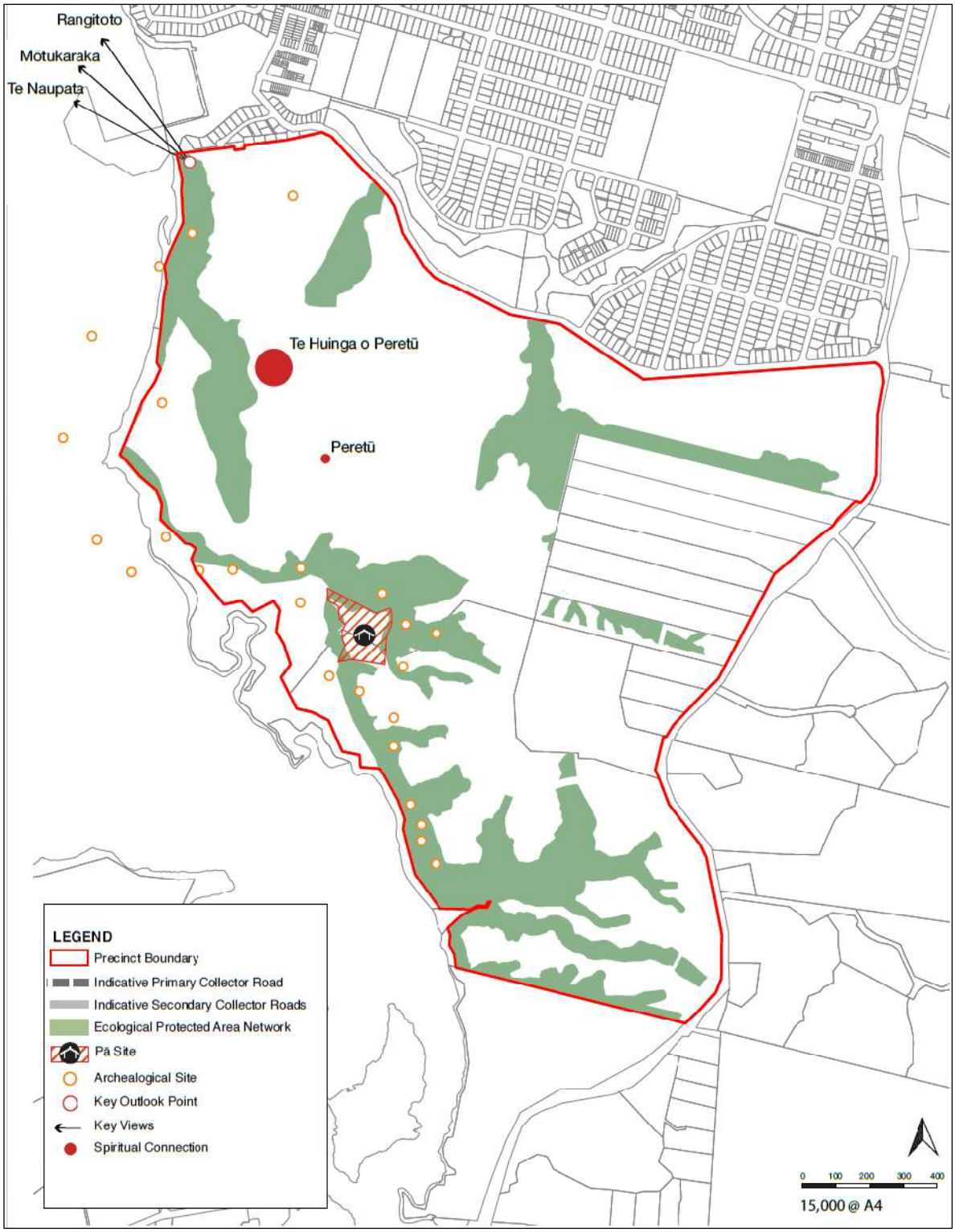



**Figure 21: Beachlands South Precinct Plan 4 – Cultural Landscape Plan (Ngāi Tai ki Tāmaki Trust, 2022).**

For further information and details on management and mitigation approaches, refer to the original 'Beachlands South Fast Track: Archaeological Assessment' (Clough & Associates Ltd., 2026).

Ngāi Tai stated in the CVA (2022) that it is essential that the pā (Figure 22) and where possible, the defensive sites, are protected from development as they cannot be replaced once destroyed. If the Ngāi Tai Take Mauri Take Hono Cultural Health Indicators were applied, the pā, defensive ditch, native trees, awa, Significant Natural Area, Waikopua Estuary, Ngā Tai e Rua, Motokaraka and air quality would equate to zero impact (Ngāi Tai ki Tāmaki Trust, 2022).

Ngāi Tai Kaitaki will perform cultural monitoring duties, which will commence with mihi and karakia (Ngāi Tai ki Tāmaki Trust, 2022). The relevant sections of the RMA include sections 6e, 7a and 8. These sections enable Ngāi Tai to maintain the relationship with their rohe under development and ensure a collaboration with the developer, project professionals and contractors during monitoring.

The Beachlands South precinct provisions also provide for the recognition, protection, and enhancement of mana whenua cultural, spiritual, and historical values within the plan change area.

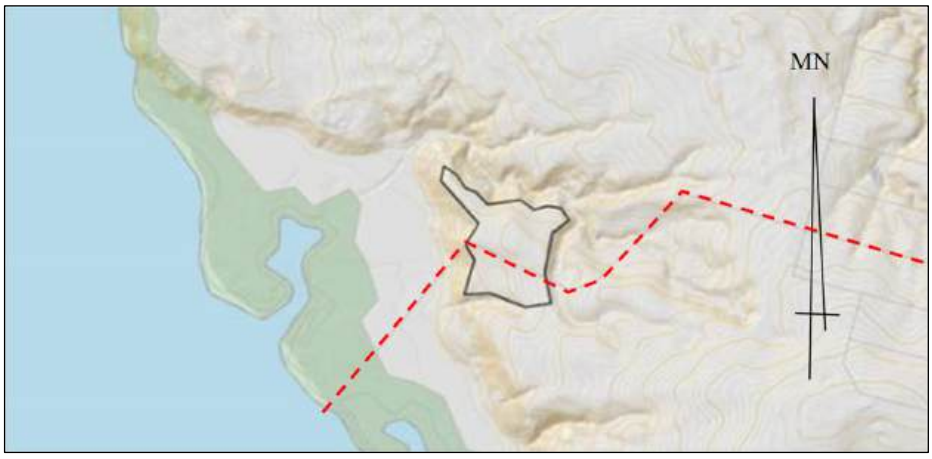



**Figure 22: Location and probable extent of the pā, R11/1619, with property boundary shown in red.**

For further details, refer to the Tapuwae Ohiti Kaharawairahi Cultural Values Assessment, Ngāi Tai ki Tāmaki Trust (March 2022).

## 1.13 Contaminated land

Tonkin & Taylor prepared a detailed Contamination Site Management Plan (CSMP) (2026) for the AUP I458. The investigation concluded that whilst there may be unexpected contamination present, there were no confirmed land contamination encountered during investigation across the Site. As a result, the risk to workers is likely to be low, however pre-works sampling will be carried out prior to earthworks in the vicinity of the wastewater treatment works to provide further confirmation.

Refer to the T+T CSMP (ref. ‘Contamination Site Management Plan, 1014358.3200 v0, May 2026) for full details of the assessment as well as contamination-specific management controls and mitigation procedures.

# 2 Development summary and planning context

## 2.1 Regulatory and design requirements

**Table 6: Regulatory and design requirements.**

| Requirement | Relevant regulatory / design to follow |
|---|---|
| AUCKLAND UNITARY PLAN – SMAF 1 HYDROLOGY MITIGATION | • Provide retention (volume reduction) of at least 5mm runoff depth for the impervious area for which hydrology mitigation is required; and<br>• Provide detention (temporary storage) and a drain down period of 24 hours for the difference between the predevelopment and post-development runoff volumes from the 95th percentile, 24-hour rainfall event minus the 5 mm retention volume or any greater retention volume that is achieved, over the impervious area for which hydrology mitigation is required. |
| HIGH CONTAMINANT GENERATING AREAS | • Treatment of runoff from high contaminant generating activities (HCGA)/High use roads (HURs) using bioretention devices sized in accordance with GD/01. |
| NATURAL HAZARDS | • Development floodplains estimated through floodplain modelling in accordance with Auckland Council technical specifications.<br>• Increases in downstream flood hazards mitigated using peak flow attenuation devices throughout the site sub-catchments.<br>• Peak flow attenuation provided to 100% of the peak pre-development rate in the 1% AEP event for catchments discharging to the existing watercourse north of the Site<br>• Free discharge for remaining catchments discharging to the western Waikopua Creek, beyond the 95$^{th}$ percentile detention volumes, via tributary watercourses within the Site. |
| AUCKLAND UNITARY PLAN PRECINCT | • Beachlands South AUP I458 precinct provisions requires stormwater management to be developed in accordance with this SMP and the Council's region-wide network discharge consent. |
| EXISTING CATCHMENT MANAGEMENT PLAN | • N/A |
| AUCKLAND COUNCIL REGIONWIDE NETWORK DISCHARGE CONSENT | • Greenfield Development under Schedule 4 of the Auckland Council Network Discharge Consent |
| AUCKLAND COUNCIL PC120 | • As part of Plan Change 120 several changes were made to chapter E36 regarding natural hazards and flooding. |

# 3 Mana whenua: Te ao Māori and mātauranga Māori

*BSLP and Ngāi Tai ki Tāmaki have developed an ongoing relationship throughout the development of AUP I458. Ngāi Tai ki Tāmaki prepared a Cultural Values Assessment (CVA) (2022) - Tapuwae Ohiti to express the explicit values and concerns of Ngāi Tai ki Tāmaki.*

## 3.1 Identification and incorporation of mana whenua values

Ngāi Tai prepared a Cultural Values Assessment to address te mauri o te whenua, te mauri o tew ai, the mana of their tupuna and to the people of Ngāi Tai ki Tāmaki today (Ngāi Tai ki Tāmaki Trust, 2022). This enables Ngāi Tai to express its identity, history, and concerns regarding the project to assist in the planning processes including cultural strategies for crisis management (Ngāi Tai ki Tāmaki Trust, 2022).

The values of the Ngāi Tai ki Tāmaki trust have been identified and assessed in accordance with AUP I458. Ngāi Tai's core values of:

- Kaitiakitanga
- Rangatiratanga
- Whanaungatanga
- Manaakitanga
- Mana Whenua
- Kotahitanga

The assessment concluded that the overall trend is that the iwi values have been positively recognised and impacted from the work the BSLP owners have undertaken so far (Ngāi Tai ki Tāmaki Trust, 2022). Ngāi Tai supports the FTAA application on the basis of the detailed technical reports prepared by BSLP and the mitigation measures offered by BSLP through these reports (Ngāi Tai ki Tāmaki Trust, 2022).

An increase in flood levels, weather bombs and heavy rainfall events have been experienced in recent years, resulting in waters carrying pollutants. The proposed measures by BSLP will help mitigate and improve the impact of stormwater run-off which affect the quality of Te Waitemata and Tikapa Moana, surrounding foreshores and tidal streams (Ngāi Tai ki Tāmaki Trust, 2022).

For further details, including the cultural values, corresponding cultural assessment and the key project issues measured should be directly referenced from the source material 'Cultural Values Assessment' (Ngāi Tai ki Tāmaki Trust, 2022).

# 4 Stakeholder engagement and consultation

*Ongoing stakeholder engagement and consultation has been a key feature of this process.*

**Table 7: Stakeholder engagement and consultation record.**

| Stakeholders | What is the reason for interest? | What engagement has been completed? | Feedback and response |
|---|---|---|---|
| Local residents | | Ongoing consultation including attendance at a community open day held on 3rd and 4th December 2021. | Generally positive response. The open day featured on the front page of the Pohutukawa Coast Times issue on 10 December 2021. |
| Ngāi Tai ki Tāmaki | Mana whenua Ngāi Tai ki Tāmaki have a strong historical connection to the area, often referred to as Kahawairahi and/or Kauriwhakiwhaki. | Ongoing partnership with Ngāi Tai ki Tāmaki over several years. | A Cultural Value Assessment (CVA) (2022) has been produced. This report concluded that the iwi values have been positively recognised and impacted from the work the BSLP owners have undertaken so far. |
| Mana whenua with registered interest in the development area as per council records. | Mana Whenua that have registered interest in the Site and surrounding area as per the Council records. | This consultation involved preparation of a letter providing an overview of the plan change application by BSLP, the key outcomes sought and confirming that Ngāi Tai Ki Tāmaki have been engaged by BSLP as a development partner for Beachlands South. | Comments were invited from other iwi groups, but no responses were received. |
| Local Board & Franklin Local Board | Local Boards provide governance at the local level within Auckland Council. Local Boards are tasked with decision-making on local issues, activities, and services, and provide input into regional strategies, policies, plans and decisions. | A high-level presentation was given to Councillor Bill Cashmore on 20 October 2020.<br>A presentation to the Local Board was also made on 29 October 2021.<br>BSLP engaged with the Franklin Local Board on 14 May 2026 to update them on the proposal. | Generally positive response - see attached meeting minutes in Consultation Summary Report capturing key items capturing those discussions.<br>The meetings positive discussion centred on the open space strategy and provision within the locality. The Local Board are keen to establish a suburban park on the land on the opposite side of Whitford Maraetai Road. The applicant has expressed support to work with the Local Board to achieve this. |

| | | | |
|---|---|---|---|
| Ministry of Education | BSLP propose two new schools, one primary and one secondary. What is the planned staging and the acquisition of land to deliver the schools. | Ongoing consultation with officers of the MoE. | At this stage MoE have indicated they are proposing to develop the primary school in 2029-2030 and the secondary school in 2030-2035. |
| Watercare Services Limited | BSLP propose alternative wastewater solutions. | BSPL has engaged with WSL on 12 May 2026 to continue discussions on the Beachlands South wastewater servicing strategy.<br>On 5 June 2026 Watercare sent BSLP a technical letter of intent for the future of the Beachlands area. | Watercare plans to provide centralised wastewater servicing for the wider Beachlands area. Watercare is committed to working collaboratively with BSLP to support the delivery and servicing of long-term sustainable wastewater solutions to the Beachlands South Project. |
| Auckland Transport | Auckland Transport plans to upgrade the Pine Harbour Marina and which roads to vest as part of the Project. | A meeting was held in person and online with Auckland Transport on 13 May 2026. | Agreement was reached on the design of internal roads and Jack Lachlan Drive. Further discussions will take place in regard to staging and timing for infrastructure upgrades.<br>In regard to the Marina, Auckland Transport plans to upgrade the Pine Harbour Ferry Terminal and enlarging it and including purchasing two new 160 seat passenger vessels. |
| Healthy Waters | How BSLP will manage stormwater discharge. | Several discussions with Healthy Waters were undertaken regarding the proposed approach to stormwater management for the Project. | Discussions were undertaken to determine whether the most appropriate approach was to manage stormwater under the Auckland Council Regionwide Network Discharge Consent or seek a separate discharge consent. |
| Auckland Council Parks Team | How BSLP will manage the EPAN and other open spaces. | A preapplication meeting was held in person and online with the Resource Consents, Parks and Auckland Transport Teams on 17 April 2026. | The purpose of this meeting was to provide Auckland Council with an update on progress of the Project including milestone dates for lodgement of the substantive application, the applicant's design team to present developments and refinements to the proposed design. The benefit of this has been to understand Council's new Open Space Policy and discuss with Council how to implement it within the development. |

# 5 Proposed development

*BSLP is seeking a Fast Track Resource Consent across live zoned and FUZ land.*

## 5.1 General development information

The Project will provide for the development of live zoned land at Beachlands into a comprehensively planned and public transport focussed community to achieve a well-functioning urban environment comprising residential dwellings, a hotel and conference venue, community and commercial activities, protected ecological restoration areas, walking and cycling networks, and community facilities, and enable the potential development of two schools, as well as all associated earthworks and all associated infrastructure including transport facilities, intersection upgrades and roading, telecommunications, power, and water supply, stormwater, and wastewater infrastructure (including any treatment or storage facilities, drainage, pipes, pump stations, outfalls and discharges).

The proposed Site layout is shown on Figure 23. This layout has been replicated in the hydraulic models used to develop stream and floodplain extents across the Site.

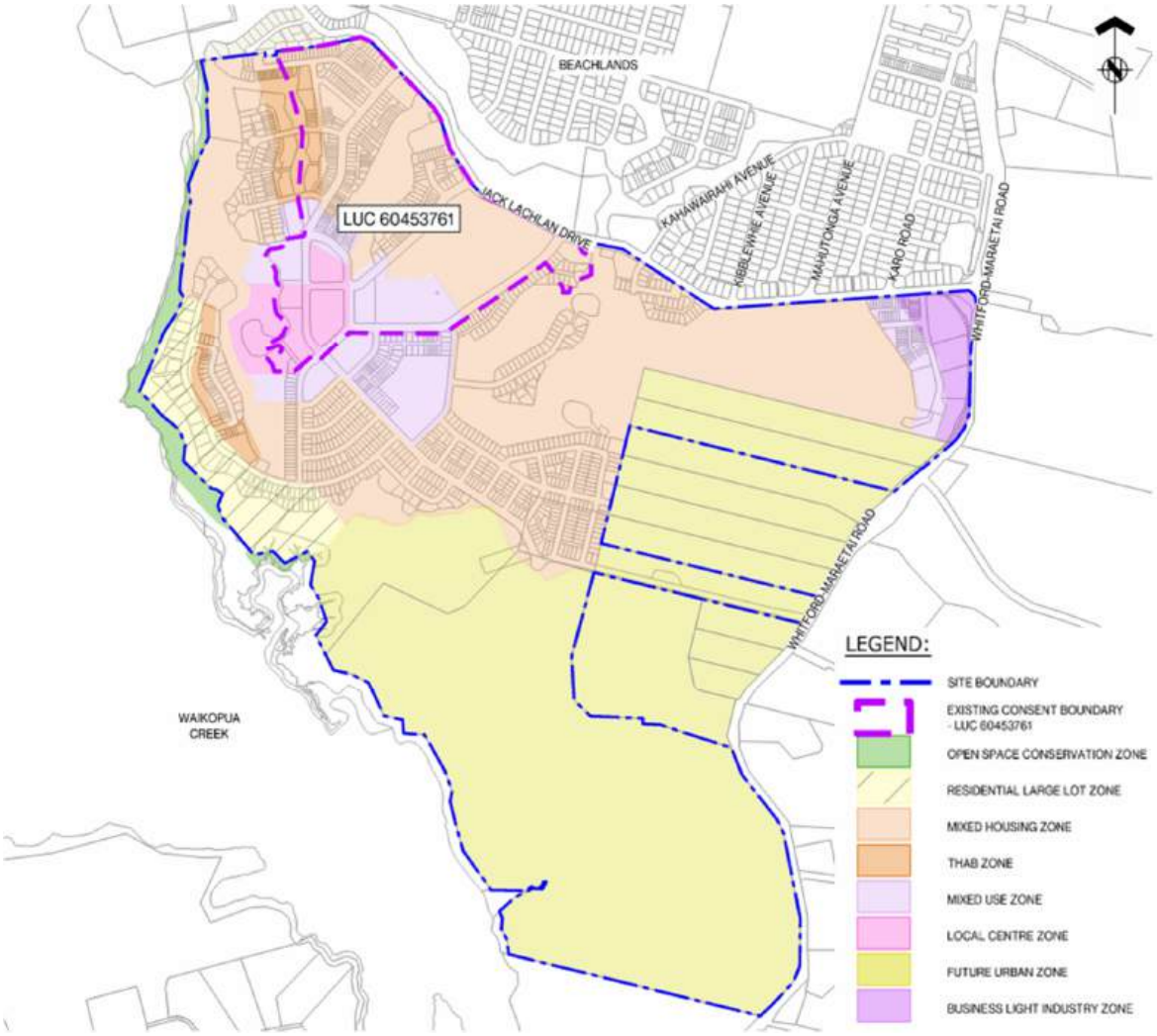



**Figure 23: Fast Track Consent Boundary and Future Urban Zone (Harrison Grierson, 2026)**

The Project layout will influence some changes in sub-catchment boundaries. This is caused by road layouts and the need for relatively flat sections of land to build upon. The extents of the post-development sub-catchments are shown on Figure 24. These indicate small changes throughout the development and a larger change in the extent of the sub-catchment discharging to the north which diverts a portion of flows towards the western EPAN area to offset the volume of runoff discharged to the northern watercourse and minimise the flood risk impact to this environment.

For further details of the sub-catchment areas contributing to the proposed primary network, refer to Harrison Grierson Drawing(s) A2515591.00-4160 to 4195 Stormwater Catchment Plans.

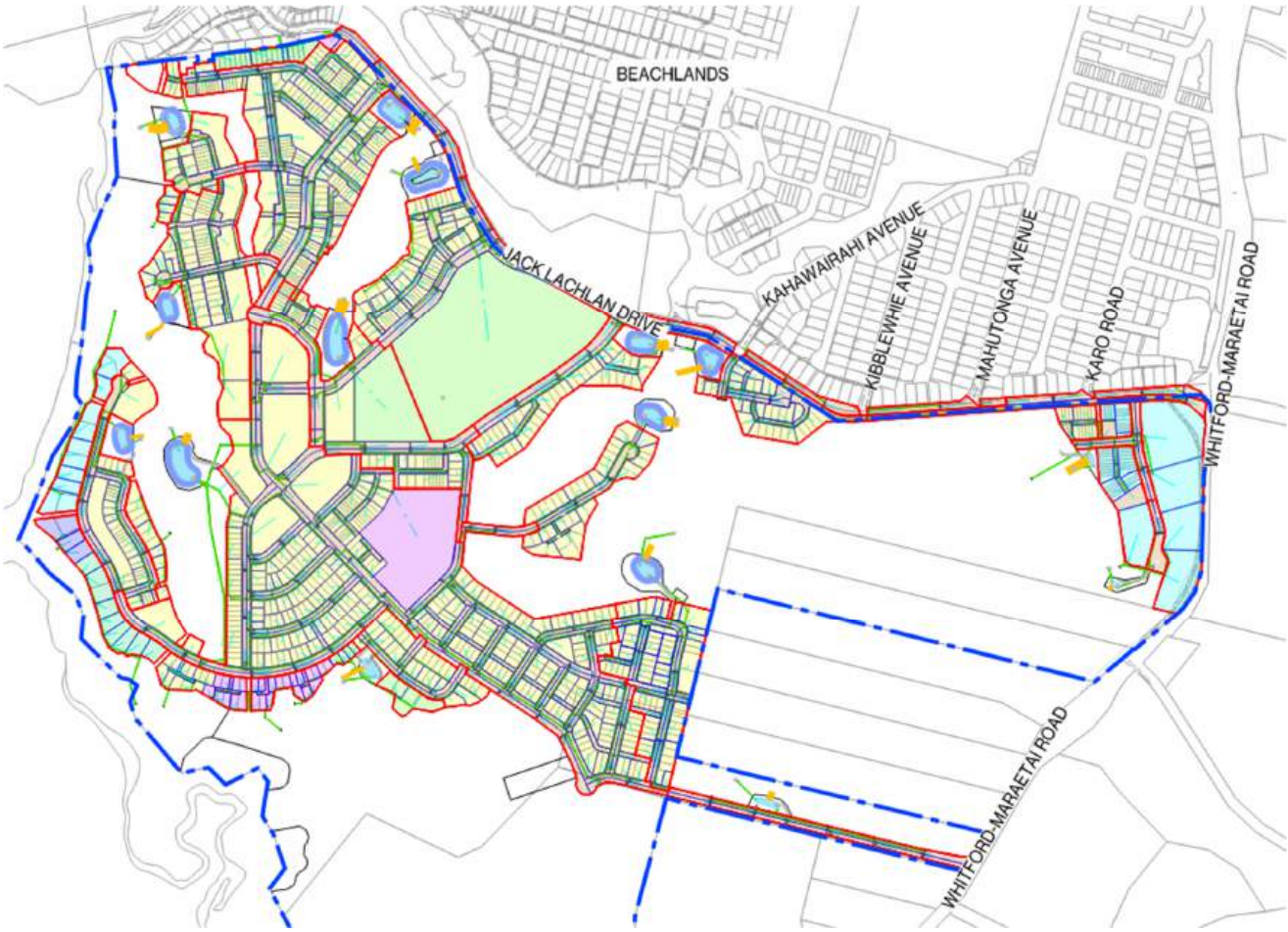



**Figure 24: Developed site sub-catchment layout plan. (Harrison Grierson, 2026)**

## 5.2 Location and area

The FTAA application covers the following areas

- Live Zone:
    - 110 Jack Lachlan Drive Beachlands Auckland 2571 (170.4750 ha)
- Future Urban Zone:
    - 620 Whitford-Maraetai Road Whitford Auckland 2571 (79.9444 ha)
    - 770 Whitford-Maraetai Road Whitford Auckland 2571 (6.8665 ha)
    - 758 Whitford-Maraetai Road Whitford Auckland 2571 (6.1403ha)
    - 712 Whitford-Maraetai Road Whitford Auckland 2571 (4.7518 ha)

## 5.3 Purpose of the development

BSLP is committed to delivering a sustainable and resilient community. The development will provide opportunities for the development of housing for the local community to grow, a local school from primary to secondary level, job opportunities and traffic improvements. These provisions aim to improve the living standards of the local community economically, socially, and environmentally.

The Beachlands South Masterplan Sustainability Strategy (2026) for the development encompasses the following aspects:

- Water management and water sensitive design
- Biodiversity and ecological regeneration
- Health, well-being and culture
- Renewable energy and energy efficiency
- Low carbon development
- Transport – modal shift and healthy streets.

An innovative and resilient three waters management strategy will aim to ensure long term benefit to the community and surrounding environment. The built environment will embody principles enabling and upholding the mental, social, cultural, and physical wellbeing of residents and visitors of the area. The natural environment is placed at the heart of the development in the concept, design, and construction phases of the project. The emissions associated with housing will be addressed through on-site carbon sequestration. Energy and water efficiency, renewable energy generation and individual lifestyle considerations will aim to reduce the impact on the environment. A transportation network that prioritises active modes of transport will make streets safer, quieter, and healthier.

Refer to the original ‘Fast Track Approvals Sustainability Assessment - 310204447’, Stantec (May 2026) for further details.

## 5.4 Site layout and urban form

The proposal includes a diverse range of residential, commercial, community and industrial developments in accordance with the underlying AUP zoning and sub-precinct.

## 5.5 Earthworks

Earthworks are required to form stormwater management devices, as well as to allow for the installation of drainage and utilities.

Earthworks will be undertaken in a manner to minimise sediment runoff and discharge into the receiving environments. Earthworks will be undertaken in stages to prevent a large area being left open at any one time, which can increase the chances of sediment runoff. The best practice Auckland Council GD05 (Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Regions) mitigation and control strategies will be followed as a minimum standard.

Further details of the Project earthworks have been discussed in the BSLP Infrastructure Report prepared by Harrison Grierson (2026) (ref. REP001-A2515591.00-CJM-1) and should be referenced where additional information is required.

# 6 Stormwater management

*The proposed stormwater management is aligned with the objectives of AUP I458.*

*The proposed site layout, riparian margins, and esplanade reserves were set out by a collaborative process between hydraulic modellers and surveyors to determine the mean annual flood based on a comprehensive site and stream survey.*

*Stormwater effects are addressed as close to the source as possible. The multi-criteria analysis and life-cycle cost assessment appended to this report consider the efficacy of different stormwater quality and quantity management interventions to meet quality, quantity, and hydrological mitigation targets. The proposed approach includes the use of proprietary treatment devices for pre-treatment of public roads and new impermeable surfaces, with additional water quality treatment, hydrological mitigation and peak flow attenuation provided within multi-purpose bioretention wetlands and rain gardens located throughout the development area. Where possible, use of existing stream basin volumes will be utilised to accommodate a proportion of the hydrological mitigation volumes prior to discharge to the northern stream. This offers environmental benefit to flora and fauna that thrive in wet/dry habitats, as well as reducing the necessity for retaining features and hard engineering solutions for new proposed attenuation features.*

*The use of on-site hydrological mitigation in accordance with the SMAF 1 controls of the AUP, particularly through the capture and non-potable reuse of roof runoff, is also supported to provide broader outcomes and improve the resilience of the stormwater management system.*

*Natural systems and processes are mimicked as far as possible. All stormwater management devices proposed are predominantly vegetated "green" devices performing a bioretention function, with the addition of inert building materials and proprietary treatment devices offering pre-treatment prior to conveyance through proposed wetland/raingarden devices. Existing catchment boundaries are preserved as far as practicably possible to avoid localised adverse effects associated with an individual discharge. Existing artificial water features created by drainage culverts will in many cases be removed and restored to a more natural state through progressive stages of remediation. Finally, the proposed development is characterised by short stormwater pipelines discharging into the stream networks in multiple locations, avoiding the excessive use of grey networks and diluting & distributing point source discharges throughout the streams.*

## 6.1 Principles of stormwater management

**Water Management and Water-Sensitive Urban Design**

An innovative and resilient three waters strategy is proposed to ensure long-term benefit to the development, the wider community and surrounding natural environment. A water sensitive design approach that avoids environmental degradation, maintains, and enhances the quality of the existing stream network, contributes to healthy soils and enhances the quality of the receiving environment by reducing the amount of nitrogen and contaminants flowing into the sea.

### Biodiversity and Ecological Regeneration

Protect and enhance existing ecological values and improve ecological connectivity through the Site and with the wider landscape to address the biodiversity crisis. This includes extensive restorative and regenerative planting, especially around waterways, creating new habitat areas for fauna and flora and a healthy environment for residents and visitors to enjoy.

Well protected, connected, and regenerative natural areas provide a wide range of benefits, including local fauna and flora habitat, positively impacting on the wider ecological network and in turn the local community. Supplementing the existing significant ecological areas (SEA) with extensive native vegetation through the extensive Ecological Protection Area Network (EPAN) spanning the Site will further attract birdsong and reinforce a sense of place and the custodianship of these spaces.

### Health, Wellbeing and Culture

A built environment that embodies principles that foster the physical, mental, social, cultural, and economic wellbeing of residents and visitors of Beachlands South. This includes design principles that align with Te Ao Māori by providing neighbourhoods with strong visual and physical connections to nature and including employment areas and public amenities that promote sustainable communities.

Access to green spaces and natural areas are associated with a wide range of health benefits such as lower levels of anxiety and depression and improved physical and mental recovery from stress and fatigue. BSLP aims to bring people closer to nature through visual and physical connections between the built and natural environment, enhancing the well-being of residents and visitors.

### Management Principles

Stormwater management has been considered across multiple storm scenarios to ensure no adverse increase in flood risk has been introduced as a result of the proposed development. A summary of the stormwater management strategy has been provided below:

- Water quality treatment proposed for all impervious surfaces throughout the development area.
- Inert building materials to be utilised to minimise contaminants generated and mobilised at source.
- Construction of communal bioretention devices to provide treatment and attenuation for sub-catchments discharging to the northern watercourse and western EPAN and coastal Waikopua Creek environment.
- SMAF 1 detention provided throughout all communal bioretention devices to protect downstream environments as per GD01 guidance.

- Localised treatment and retention/detention to also be provided by small-scale devices such as rainwater tanks and raingardens.
- Attenuation up to the 50% AEP storm to catchments discharging to the northern watercourse.
- Surplus attenuation above the 50% AEP storm, i.e. during the 10% AEP and 1% AEP storm to be attenuated within the existing stream basins upstream of the two existing Jack Lachlan culverts prior to off-site discharge.
- Proposed primary networks to manage flows up to the 10% AEP storm and convey flows towards communal treatment devices.
- All primary network flows to pass through proprietary treatment devices immediately upstream of communal bioretention devices for pre-treatment of initial sediment loads and gross pollutants.
- Secondary flows to convey entirely via the proposed road network and engineered channels/OLFPs towards communal treatment devices within the northern areas, where practicable, and towards the EPAN and coastal Waikopua Creek for western discharging catchments.

**Modelling Results**

Seven modelling scenarios have been undertaken to compare and assess the impacts of the post-development proposal against the pre-development scenario to ensure flood risk within and downstream of the development has been managed appropriately.

Results from the post-minus-predevelopment assessment concluded nominal increases in flood levels within the northern watercourse environment during the 50%, 10% and 1% AEP storm-events, utilising existing culvert arrangements to throttle discharge. Therefore, on this basis, no further constriction on discharge is proposed.

Slightly larger flood level increases were modelled within the EPAN area for western discharging catchments during the same 50%, 10% and 1% AEP storms, However the coastal nature of this downstream environment will not present a risk to property or life.

The marginal increases in flood levels shown within the resultant flood maps, throughout all catchments, are not anticipated to present a danger to property or life or adversely impact the flood risk/hazard compared to pre-development conditions.

A Stormwater Modelling and Flood Hazard Assessment Report has been prepared by Harrison Grierson (2026) (ref. REP001-A2515591.00-FAM). Refer to this document for further explanation and illustration of the impacts of flooding as well as the methodology utilised to achieve these results.

## 6.2 Proposed stormwater management

The proposed stormwater management is intended to comply with the requirements of Auckland's regionwide stormwater NDC. The strategy has been developed to demonstrate the overarching principles of how stormwater will be managed for the site proposed to be live zoned, as required by the regional NDC, AUP and SW CoP.

### 6.2.1 Network Discharge Consent

The NDC is a tool for managing and integrating land use, stormwater discharge and the region's natural water assets to mitigate the impacts of climate change and flooding (Auckland Council, 2025). It allows multiple community and environmental outcomes to be realised. Schedule 4 of the regionwide NDC outlines development requirements for greenfields developments within Auckland. The greenfields connection requirements section of Schedule 4 of the regionwide NDC is reproduced Figure 25 below for reference.

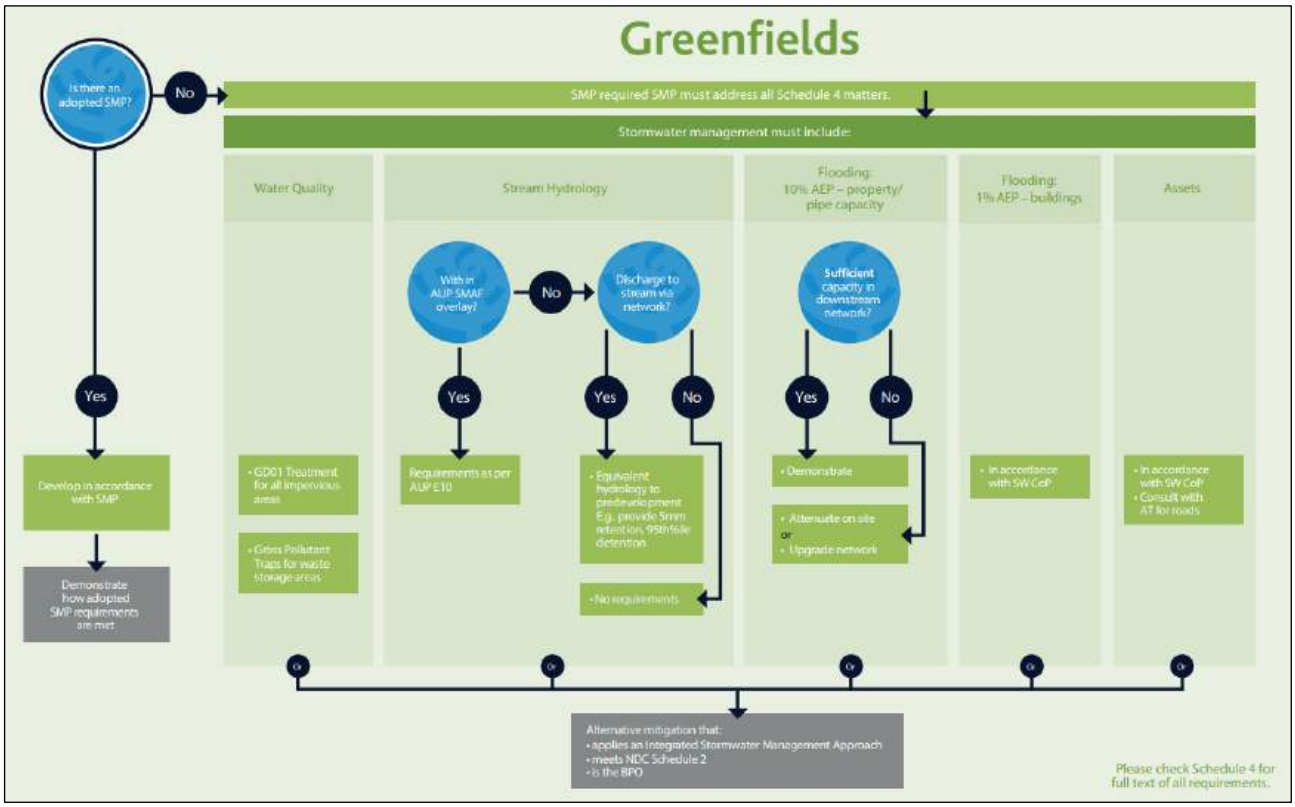



**Figure 25: Greenfields connection requirements flowchart. Schedule 4, Auckland Council Regionwide stormwater network discharge consent.**

Table 8 below summarises how the future development of the Site including the FTAA application will meet the requirements of the greenfields section of the regionwide NDC.

**Table 8: NDC Requirements for Greenfields Developments.**

| Stormwater Management Requirements | Design Approach |
|---|---|
| WATER QUALITY TREATMENT | • Water Quality Treatment to GD01 standard or equivalent for all new impervious areas, and areas with High Contaminant Generating Activities.<br>• Gross Pollutant Traps for waste storage areas and upstream of all communal wetlands for initial sediment capture and removal of floatables.<br>• Use of inert building materials (e.g. for roofs) to minimise contaminants generated at source. |
| STREAM HYDROLOGY (DISCHARGE TO STREAMS VIA THE PUBLIC STORMWATER NETWORK OUTSIDE OF AUP SMAF 1) | • Hydrological mitigation to SMAF 1 standard for all new impervious areas to GD01 standard or equivalent. This will be managed using the SMAF 1 control overlay applying across the entire precinct area. |
| EROSION PROTECTION DETENTION (95$^{TH}$ %ILE STORM) | • All communal wetlands throughout the development will detain 100% of runoff generated by each corresponding catchment during the 95$^{th}$%ile rainfall event.<br>• Outlet structures will be installed to release this volume over 24hrs as per GD01 requirements. |
| FLOODING 50% AEP – HIGH FREQUENCY EVENTS | • Attenuate stormwater runoff generated within the northern stream catchments in the 50% AEP rainfall event within the proposed communal wetlands. |
| FLOODING 10% AEP - PIPE NETWORK CAPACITY | • Attenuate stormwater runoff generated within northern stream catchments in the 10% AEP rainfall event as required to avoid adverse effects and comply with AC SW CoP requirements and AT SW CoP requirements for all existing public stormwater infrastructure draining runoff from the Site. |
| FLOODING 1% AEP – BUILDINGS | • Attenuate stormwater runoff generated within northern stream catchments 1 and 2 in the 1% AEP rainfall event as required to avoid adverse effects and comply with AC SW CoP requirements and AT SW CoP requirements for all existing public stormwater infrastructure draining runoff from the Site.<br>• Attenuation volume to be provided within the existing stream basins to the north of the development, prior to discharge to the northern watercourse.<br>• Manage OLFPs safely within road networks, engineered OLFP channels and drainage reserves and establish |

| | |
|---|---|
| | minimum finished floor levels for new buildings as per AC SWCoP and NZBC. |
| ASSETS | • All new public stormwater infrastructure will be designed and constructed in accordance with AC SW CoP and AT SW CoP requirements. |

### 6.2.2 General

The proposed stormwater management approach aims to protect and enhance existing watercourses within the Site. It preserves watercourses and natural wetland features identified as having high ecological value. It also creates new valuable ecological areas by removing several artificial water features within the golf resort area and creating new stream reaches in their place. It provides peak flow attenuation for extreme storm runoff to avoid adversely impacting properties downstream of the proposed northern catchments, and to reduce the potential erosive effects of new development on the bed and banks of Waikopua Creek tributary streams. It provides hydrological mitigation for all new impervious areas within the Site, and water quality treatment for all impervious areas within the Site. It also enables on-site, non-potable reuse of runoff from new buildings constructed within the Site.

Table 9 lists the proposed stormwater management device options that could be applied across the Beachlands site in accordance with GD/01.

**Table 9: Proposed stormwater management device options.**

| Mitigation outcomes | Proposed stormwater management device options |
|---|---|
| SMAF 1 DETENTION | • Rainwater Tanks<br>• Wetlands<br>• Bioretention Rain gardens |
| SMAF 1 RETENTION | • Rainwater Tanks<br>• Bioretention Rain gardens |
| WATER QUALITY TREATMENT | • Inert Roofs<br>• Bioretention Rain gardens<br>• Wetlands<br>• Proprietary Treatment Devices |
| PEAK FLOW ATTENUATION | • Wetlands<br>• Existing Stream Basins |

### 6.2.3 Managing runoff from roads and public spaces

Runoff generated by the roads and public space will be managed by a new primary network designed to capture surface runoff via standard catchpits and super pits at critical low points. Flows will be captured and conveyed through an initial proprietary treatment device, prior to discharge into the primary communal wetland/rain garden, for treatment, detention and attenuation.

### 6.2.4 Managing runoff from private lots

A toolbox of devices exists for managing runoff from private lots. Devices suitable for meeting treatment and hydrological mitigation requirements include rainwater tanks, permeable and porous paving slabs and small-scale bioretention systems. Devices suitable for meeting peak flow attenuation requirements include attenuation basins (wet ponds, dry ponds, and wetlands) and rainwater tanks. The preferred solution for managing stormwater effects at the source within private lots is to install dual-purpose rainwater tanks designed to provide retention (through non-potable reuse) and detention of runoff prior to discharge into the public stormwater network.

They are preferred as they can be installed above or below ground and are compatible with a range of housing typologies due to their small footprint area. This approach offers multiple benefits including reducing mains water consumption, improving stream baseflows, protecting valuable streams within the Site, and improving the resilience of the public stormwater network.

### 6.2.5 Communal stormwater management

#### 6.2.5.1 Communal treatment & attenuation basins

Communal devices are required to attenuate peak flows generated by the loss of depression storage and urban intensification prior to discharging stormwater runoff into the stream network.

The proposed communal devices will also provide a primary source of treatment for runoff generated by the impervious surfaces throughout the development, as well as hydrological mitigation, to mitigate the adverse effects of frequent storm events on receiving stream reaches.

Treatment and peak flow attenuation wetlands are proposed to provide multiple outcomes for all on-site sub catchments. Through specific design of inlet and outlet structures and spillways these devices can detain runoff for a range of events including the SMAF1 event (36 mm rainfall) through to the 50% AEP design storm (90.9 mm rainfall). Surplus runoff up to the 1% AEP design storm (278.7 mm rainfall) is capable of being attenuated within the two existing stream basins to the north. Careful landscape design can create significant ecological value within these wetlands as well as amenity value for the ultimate development.

A catchment layout plan for Beachlands South is shown on Harrison Grierson drawings 4160 to 4195 Rev 2, attached to this report in Appendix A – Plans of existing and proposed site features. This catchment layout plan delineates sub-catchments discharging to eleven proposed bioretention wetlands, and four bioretention rain gardens, prior to discharge to the receiving environment. Sub-catchments that do not have a well-defined outlet point or do not fall towards a suitable location for attenuation are proposed to be mitigated on-site using smaller or alternative devices.

### 6.2.6 Attenuation Device Sizing

A concept design of peak flow attenuation devices mitigating peak runoff within the Site is provided, using spreadsheet calculations based on the TP108 SCS method. This design proposes eleven discrete wetland catchments, shown on Harrison Grierson drawings 4160 to 4195 attached to this report in Appendix A – Plans of existing and proposed site features. A calculation summary is provided below. These calculations are based on the following assumptions:

- Attenuation device catchments were derived based on existing and proposed site contours, road alignments, riparian margins, and natural wetland extents.
- Flows from northern catchments are attenuated to 100% of the peak flow rate in the 50% AEP design storm event.
- The peak flow attenuation device volumes also include storage volumes for SMAF 1 detention.
- Flows from catchments discharging to the western coastline are sized exclusively for SMAF 1 detention only.
- Impervious coverage is as per the anticipated future site coverage as shown on Figure 28 inclusive of the associated road network assumed at 90% impervious.
- Attenuation devices within northern discharging catchments provide an additional 9,700 $m^3$ attenuation volume to account for the flood storage volume associated with depression storage areas that is projected to be lost through the future development of the Site.
- Attenuation devices are assumed to be treatment wetlands providing multiple functions including water quality treatment, hydrological mitigation, and peak flow attenuation. Attenuation volumes summarised in Table 10 below.
- The live attenuation volume storage required is 70% of the total calculated attenuation volume required for the same catchment, to account for cumulative simultaneous inflows and outflows.
- Surplus attenuation for catchments discharging to the north, beyond the 50% AEP storm are to be attenuated within the existing two stream basins up to the 1% AEP storm event.

**Table 10: Peak flow attenuation basins.**

| Wetland ID | Discharge Location | Catchment area ($m^2$) | Downstream flood hazard? | Attenuation standard | Attenuation volume ($m^3$) |
|---|---|---|---|---|---|
| Wetland 01 | Northern W/C | 88,738 | Yes | 50% AEP | 3,107 |
| Wetland 02 | Waikopua Creek | 62,764 | No | SMAF1 | 1,076 |
| Wetland 03 | Northern W/C | 74,420 | Yes | 50% AEP | 2,559 |
| Wetland 04 | Waikopua Creek | 283,310 | No | SMAF1 | 5,455 |
| Wetland 05 | Northern W/C | 125,888 | Yes | 50% AEP | 4,194 |
| Wetland 06 | Northern W/C | 36,407 | Yes | 50% AEP | 1,741 |
| Wetland 07 | Northern W/C | 28,058 | Yes | 50% AEP | 1,397 |
| Wetland 08 | Northern W/C | 24,362 | Yes | 50% AEP | 1,167 |
| Wetland 09 | Northern W/C | 38,533 | Yes | 50% AEP | 1,868 |
| Wetland 10 | Waikopua Creek | 37,600 | No | SMAF1 | 637 |
| Wetland 11 | Waikopua Creek | 41,564 | No | SMAF1 | 747 |
| **Total** | | **841,644** | | | **23,949** |

### 6.2.7 Water quality device sizing

Water quality treatment will be provided for runoff from all new impervious areas throughout the development area through proprietary treatment devices, rain gardens, and communal wetlands. Where HCGAs or HURs are identified, water quality treatment will be provided in accordance with Chapter E9 (Stormwater quality - High contaminant generating car parks and high use roads) of the Auckland Unitary Plan and the Beachlands South precinct provisions.

### 6.2.8 Stream hydrology

SMAF 1 retention & detention will be provided for all new impervious areas within the Site requiring hydrological mitigation.

A range of options to achieve hydrological mitigation throughout the development are provided in Section General 6.2.2.

### 6.2.9 Flooding 10 percent AEP event (Network Capacity)

The Site is presently serviced by a network of natural and modified watercourses with pipe networks provided only as necessary to facilitate drainage through the golf course. New pipe networks will be constructed within the Site to convey runoff from roads and other public areas and future developed lots into stormwater management devices and watercourses and in accordance with the Auckland Council SW CoP.

### 6.2.10 Flooding 1 percent AEP event (Habitable floors)

Local flooding within the Site will be addressed at the lot development stage. Minimum finished floor levels will be set relative to peak water levels associated with the 1% AEP, maximum probable development (MPD) scenario floodplain and in accordance with the

Auckland Council SW CoP. As per Table 10, attenuation features within northern sub-catchments discharging to the northern watercourse, will provide 100% peak flow attenuation for the 50% AEP, with surplus runoff up to the 1% AEP storm scenario to be accommodated within the existing stream basins.

### 6.2.11 Overland flowpath and floodplain management

Overland flowpaths and floodplains are to be managed through the public roads, engineered flow paths, and drainage reserves. Finished floor levels on developable land within the Site will be set relative to peak water levels identified through the hydraulic modelling undertaken for the development and successive modelling for approvals processes.

### 6.2.12 Development staging

As stormwater related effects are mitigated close to the source no significant issues associated with development staging and stormwater servicing are anticipated. As development staging plans are developed this assumption should be continually tested and revisited.

## 6.3 Hydraulic Modelling

Hydraulic models were developed using InfoWorks ICM v2026.3 software to support the AUP I458 and now this FTAA application. These models are primarily 2D models using topographical survey data presented in this report to identify stream extents and flood hazards within the existing site and through the future development process. 1D structures based on asset survey data presented in this report are included in the models where necessary to facilitate drainage through culverts.

A total of seven hydraulic model simulations were completed. These are set out in Table 11. The results of these model simulations provide stream extents for stream and future lot boundary definition, existing floodplain extents to approximate current infrastructure constraints and downstream hazards, and how these might change as a result of the development. Detailed flood maps are attached to this report in Appendix B – Flood modelling results maps.

**Table 11: Hydraulic model simulations**

| Development scenario | Rainfall AEP % | Rainfall ARI | Scenario purpose | Climate change factors included | Design rainfall depth | Storm profile |
|---|---|---|---|---|---|---|
| ED | 50% | 1-in-2-years | Flood hazard, peak flow attenuation | Yes | 90.9 mm | TP108 SCS |
| ED | 10% | 1-in-10-years | Flood hazards, pipe networks & peak flow attenuation | Yes | 159.1 mm | TP108 SCS |
| ED | 1% | 1-in-100-years | Flood hazard, overland flowpaths, peak flow attenuation & flood risk comparison with current climate change standards | Yes (2.1-degrees) | 243 mm | TP108 SCS |

| Developme nt scenario | Rainfall AEP % | Rainfall ARI | Scenario purpose | Climate change factors included | Design rainfall depth | Storm profile |
|---|---|---|---|---|---|---|
| ED | 1% | 1-in-100-years | Flood hazards, overland flowpaths & peak flow attenuation | Yes (3.8 - degrees | 278.7 mm | TP108 SCS |
| MPD | 50% | 1-in-2-years | Flood hazard, peak flow attenuation | Yes | 90.9 mm | TP108 SCS |
| MPD | 10% | 1-in-10-years | Flood hazards, pipe networks & peak flow attenuation | Yes | 159.1 mm | TP108 SCS |
| MPD | 1% | 1-in-100-years | Flood hazards, overland flowpaths & peak flow attenuation | Yes | 278.7 mm | TP108 SCS |

The results of the comparison of 1% AEP ED scenario flood (2.1-degree vs. 3.8-degree climate change) models are presented in Figure 26 and Figure 27 below.

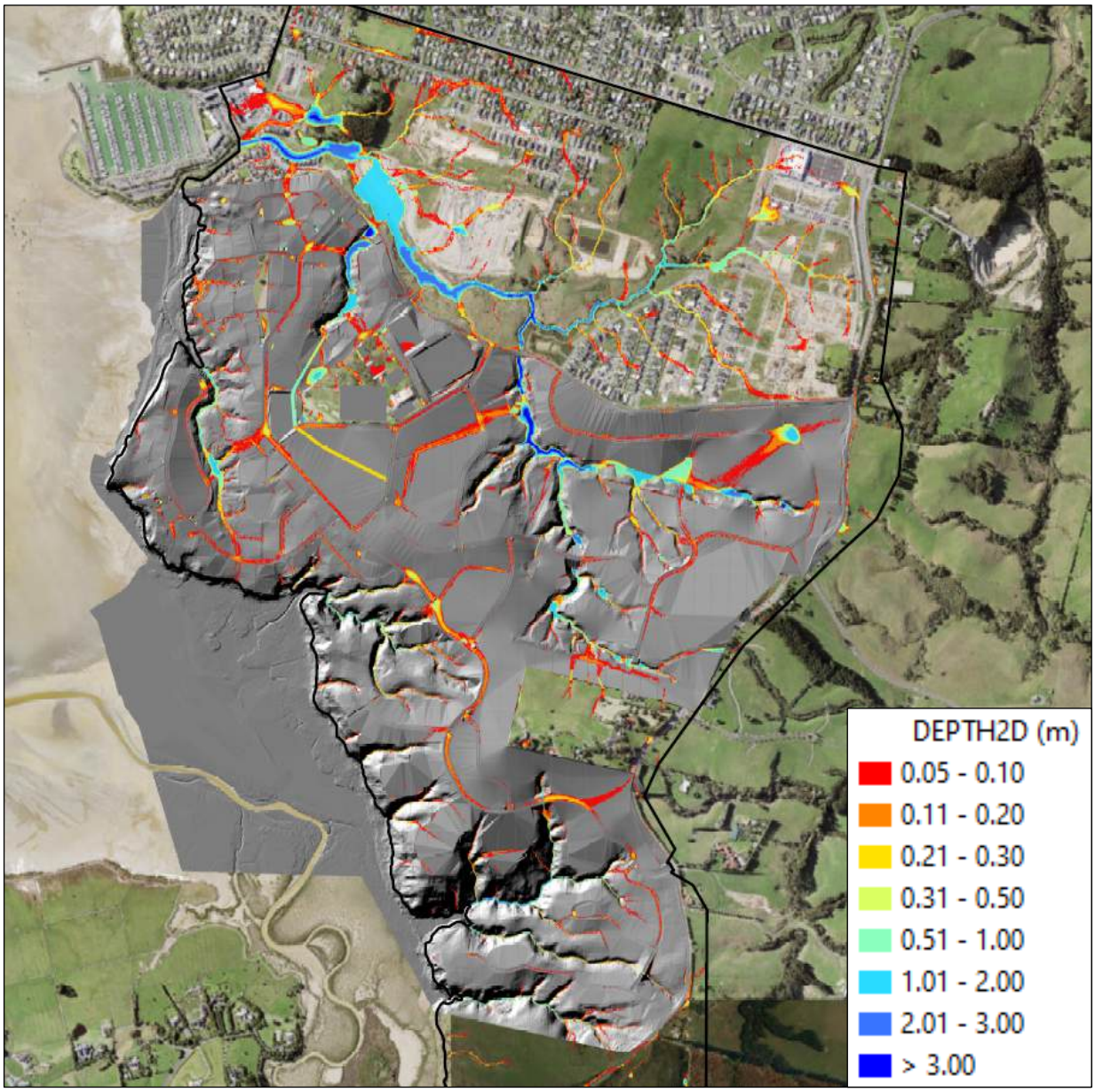



**Figure 26: Existing Scenario, 1% AEP (+2.1-degrees CC) hydraulic model results. Modelled extent outlined in black.**

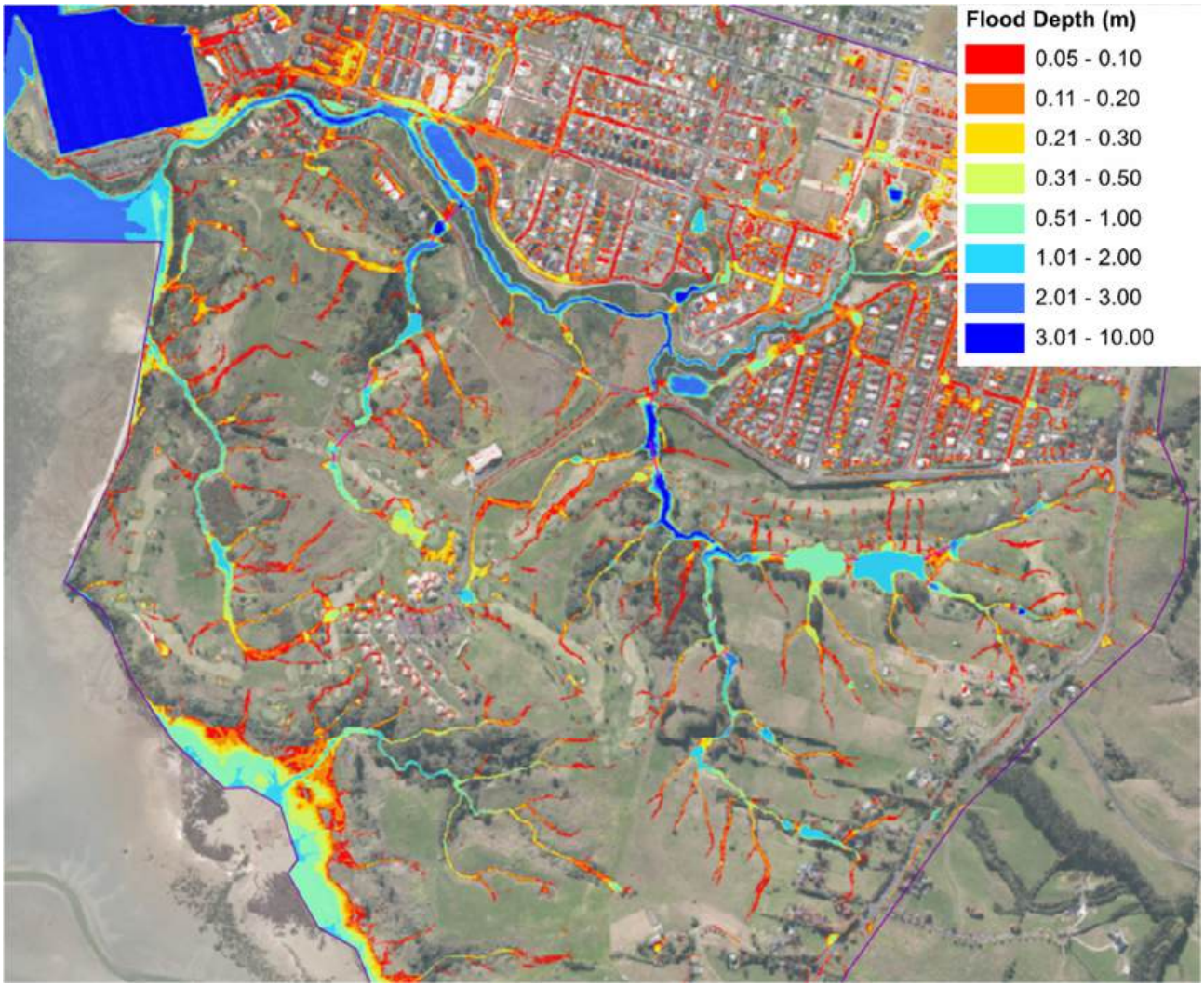



**Figure 27: Existing Scenario, 1% AEP (+3.8-degrees CC) hydraulic model results. Modelled extent outlined in purple.**

At the time of AUP I458, the Auckland Council SW CoP required a 2.1-degree climate change allowance for all 1% AEP storm events. Since then, version 4 of the SW CoP has been released in July 2025, which now requires consideration of 3.8-degrees climate change for all 1% AEP scenarios.

Subsequently, where this application seeks to replicate the conditions of the pre-development scenario, where practicably possible, during the 1% AEP storm event, 2.1-degree climate change allowance will be used for the 50% and 10% AEP, whereas 3.8-degrees will be considered for the 1% AEP storm events (for both existing development (ED) and maximum probable development (MPD) scenarios).

The equivalent results of the 1% AEP scenario flood model for the developed site scenario are provided below. This is a simplified model that does not include primary stormwater networks or peak flow attenuation features that will be required to mitigate the potential impacts of development.

### 6.3.1 Model Assumptions & Exclusions

- All drainage culverts identified within the Site with diameter of 375mm or more, were included in the InfoWorks ICM hydraulic models. Modelled pipe sizes ranged from 450 mm to 2000 mm diameter. The largest culverts being located beneath Jack Lachlan Drive.
- New pipe networks associated with future development were not included in the model. This exclusion caused ponding in several depression areas, most notably at road junctions where under-verticals and low points are present throughout the road network which would otherwise be served by the primary network.
- The extent of future development within the eastern sub-catchments has largely been undeveloped, and maintains the existing Golf Resort water features, minimising the impact to the stream. This conforms with the proposed masterplan layout and assumes a nominal stream extent with esplanade reserves provided either side.
- The modelled ground surface was modified to include the proposed road layout to illustrate the developments intention to maintain secondary flows within the road network. These flows are directed to discharge locations throughout the Site to match the pre-development scenario wherever practicably possible.
- Primary network and secondary network sub-catchments have been assessed independently to better reflect the reality of the proposed development arrangement, and ensure more accurate runoff peak flows, OLFP channels, and communal detention/attenuation devices have been assessed during the 50%, 10% and 1% AEP storm events.
- Hydraulic models have utilised specific impervious areas corresponding to the specific allocated zone, and associated roading (assumed at 90% impervious).
- Maximum imperviousness limits associated with the zoning under the AUP I458 are not exceeded in any of the proposed development areas, apart from the ‘Residential - Large Lot’ zoning to the west.
- The Residential - Large Lot proposes a building coverage of 50% for sites less than 1,000m$^2$ and therefore an increased impervious area up to 65%. Whilst this does not meet the standards of the ‘Residential – Large Lot’ zone, the increase in impervious area will have no material impact to downstream flood risk due to the nature of the coastal environment in which it will discharge into. This has not been reflected in the current modelling, but the resultant impact will largely remain the same in that it will create very little flood risk or flood hazard to the people or the downstream environment.
- The coastal boundary is a static water level set at 2.3 mRL (NZVD 2016), corresponding to the Mean High-Water Springs for the coastal Waikopua Creek of 1.3 mRL as well as +1m Sea Level Rise (SLR) accounting for climate change, in accordance with Auckland Council modelling specifications 2023. Previous assessments also included a +2 m SLR scenario, however following discussions with Auckland Council during the plan change process, a +1 m SLR was adopted to ensure the development impact rainfall-focussed and not dominated by tailwater effects from high SLR assumptions.
- In small, localised areas where topographical survey could not be undertaken due to safety concerns, Council LiDAR data was used.
- Peak flow attenuation devices proposed under this development have been included as well as proposed overland flow path channels to discharge secondary flows where they cannot practicably convey towards wetland features.

- The proposed ground model was modified in the northern-most catchment to divert a portion of post-development runoff towards the EPAN area to the west. This enabled more runoff to be discharged from eastern catchments whilst minimising the flood risk impact to the receiving downstream watercourse, and associated environments.

### 6.3.2 Design Rainfall

All hydraulic model simulations use TP108 SCS method rainfall with climate change factors applied in accordance with the Auckland Council SW CoP.

Runoff zones were delineated across the Site based on soil types and proposed development density. Runoff hydrographs were applied directly to rainfall zones within the model using the 'net rainfall' approach, whereby initial & constant losses are subtracted from the rainfall hyetograph prior to modelling. Design rainfall depths are shown on Table 11.

### 6.3.3 Catchment Imperviousness

The pre-development scenario was modelled using weighted curve numbers derived from different land use zones based on percentage impervious coverage.

The post-development scenario was modelled using weighted curve numbers derived from the allowable impervious coverage anticipated by the Project masterplan. The impervious coverage zones in the modelling are reiterated in the masterplan shown on Figure 28 with associated impervious coverage percentages in Table 12 below.

A weighted curve number of CN = 88 was used for the predominantly rural areas to the north of Jack Lachlan Drive, assuming 60% impervious coverage.

Weighted curve numbers of CN = 76, 90-91, 93 and 98 were used for green spaces, residential areas, Business Zones and Village Zones within development area respectively.

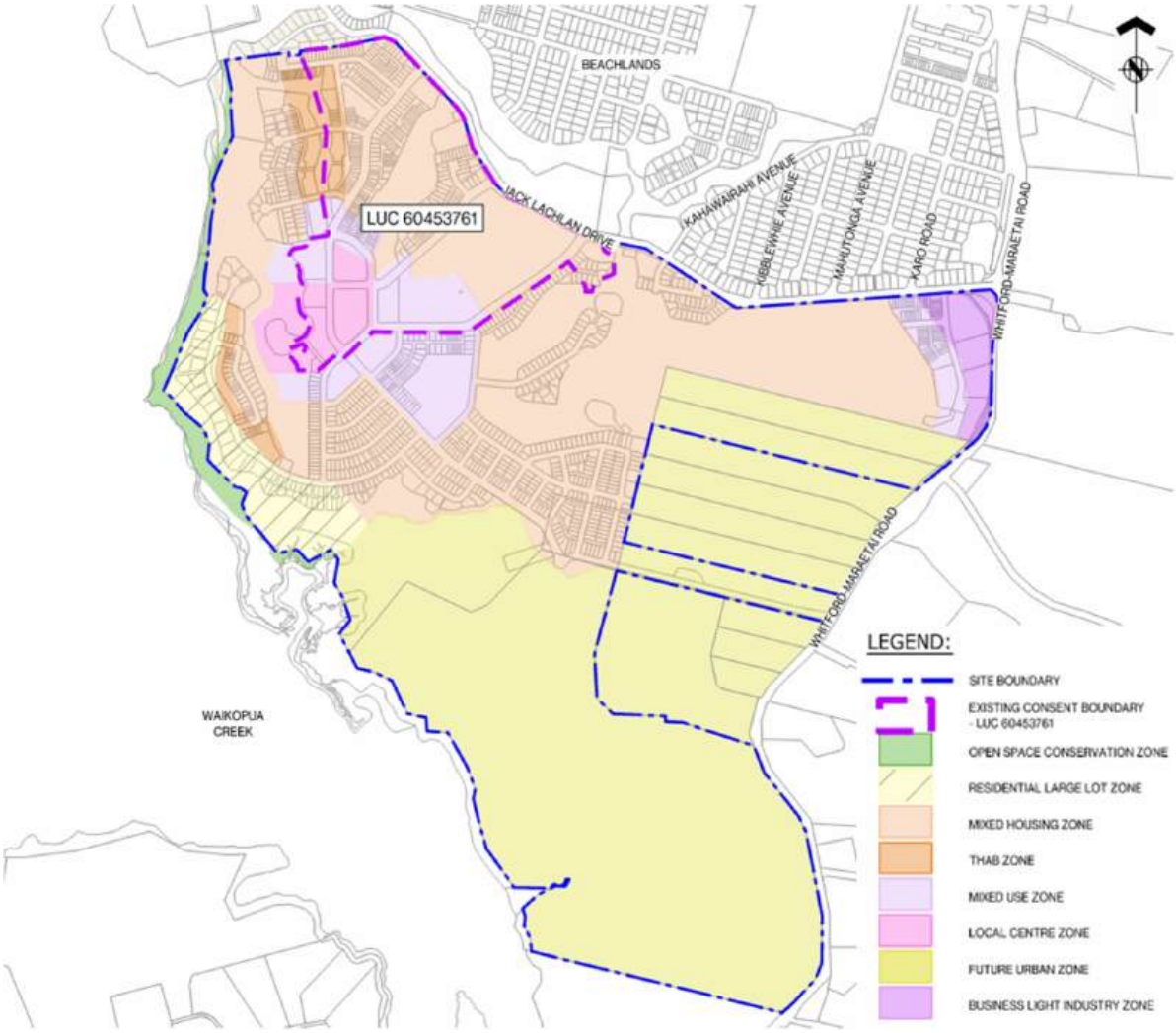



**Figure 28: Fast Track Consent Boundary and Future Urban Zone (Harrison Grierson, 2026)**

**Table 12: Post-Development Land Use and Associated Impervious %**

| Land Use | Impervious % |
|---|---|
| Business - Mixed Use Zone | 80 |
| Residential - Large Lot Zone | 35 |
| Ecological Areas and Open Space (Open Space - Conservation Zone) | 10 |
| Golf Course (Open Space - Sport and Active Recreation Zone) | 40 |
| Ponds | 100 |
| Roads | 90 |
| Residential - Terrace Housing and Apartment Buildings Zone | 70 |
| School (Special Purpose - School Zone) | 70 |
| Village Centre (Business - Local Centre Zone) | 100 |
| Standalone (Residential - Mixed Housing Urban Zone) | 60 |
| Business - Light Industry Zone | 90 |

### 6.3.4 Surface Roughness

Surface roughness values for the existing scenario were derived by validating observations from successive site visits against Manning's roughness values put forward in Chow (1959). Roughness zones were imported into the ED scenario hydraulic model (Figure 29) and replicated in the MPD scenario model. This applies relatively low roughness values for middle and upper catchment areas within the live zoned area reflecting the landscaped features of the golf resort. This is also a valid general assumption for the MPD scenario due to the level of intensity anticipated under the development. The surface roughness used in the post-development hydraulic model is shown on Figure 29.

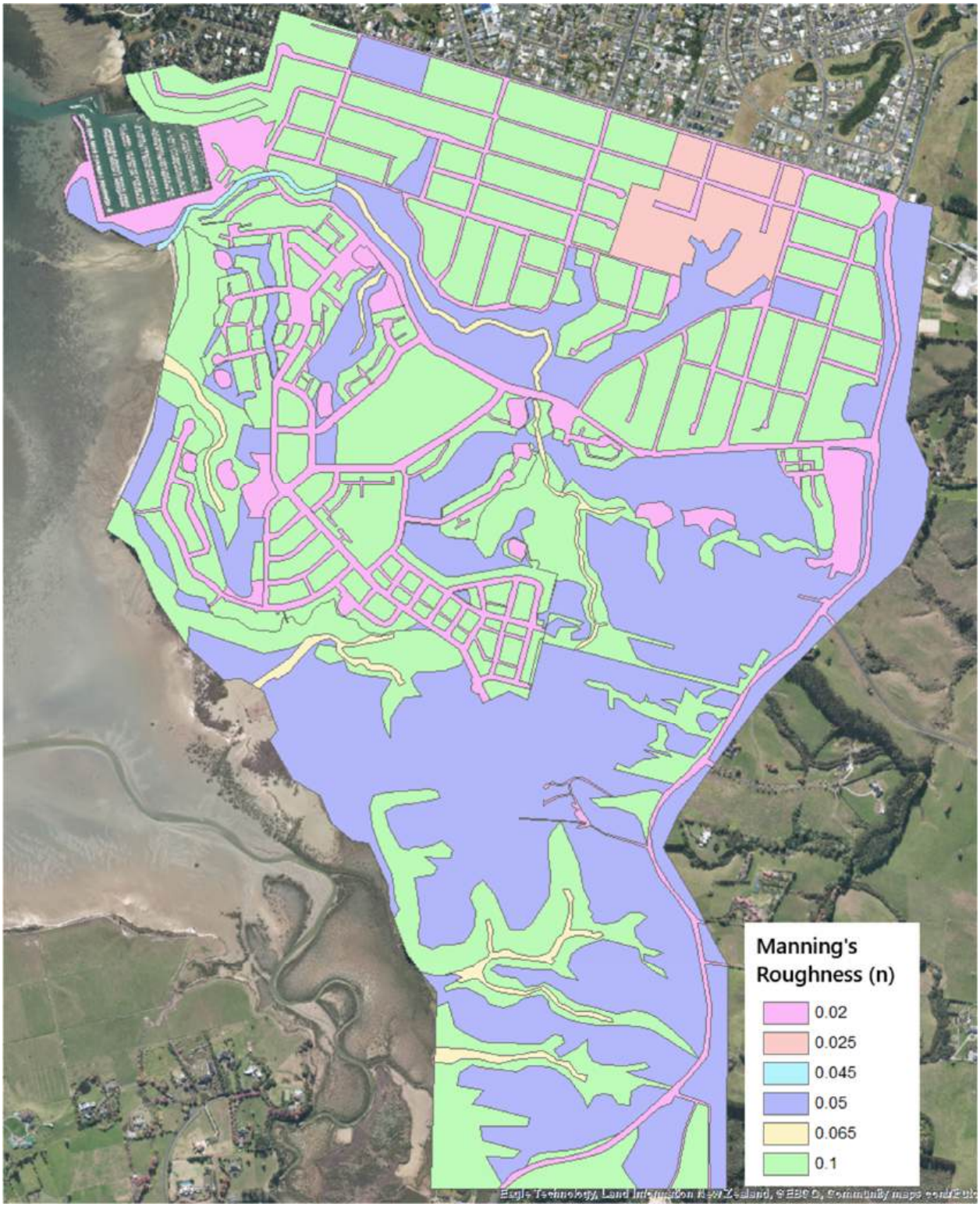



**Figure 29: Hydraulic model surface roughness values (Manning's n values).**

### 6.3.5 Downstream Impacts

Flood maps indicating changes in the extents and severity of flooding experienced across the Site and receiving environment in the 50%, 10% and 1% AEP scenarios are provided in Appendix B – Flood modelling results maps. Excerpts from flood maps and discharge hydrographs are provided below. These results (Figure 30) indicate that during the 1% AEP storm scenario, the post-development scenario only increases flood depths by 20 –

50mm in the receiving downstream watercourse for catchments discharging to the north. This correlates to a relatively immaterial impact compared to pre-development conditions where existing flood depths within the stream are currently between 3.0 – 10.0m.

Catchments discharging to the western coastal area are shown to also marginally increase within the EPAN area by 50 – 300mm. This is considered within acceptable margins for coastal discharge areas.

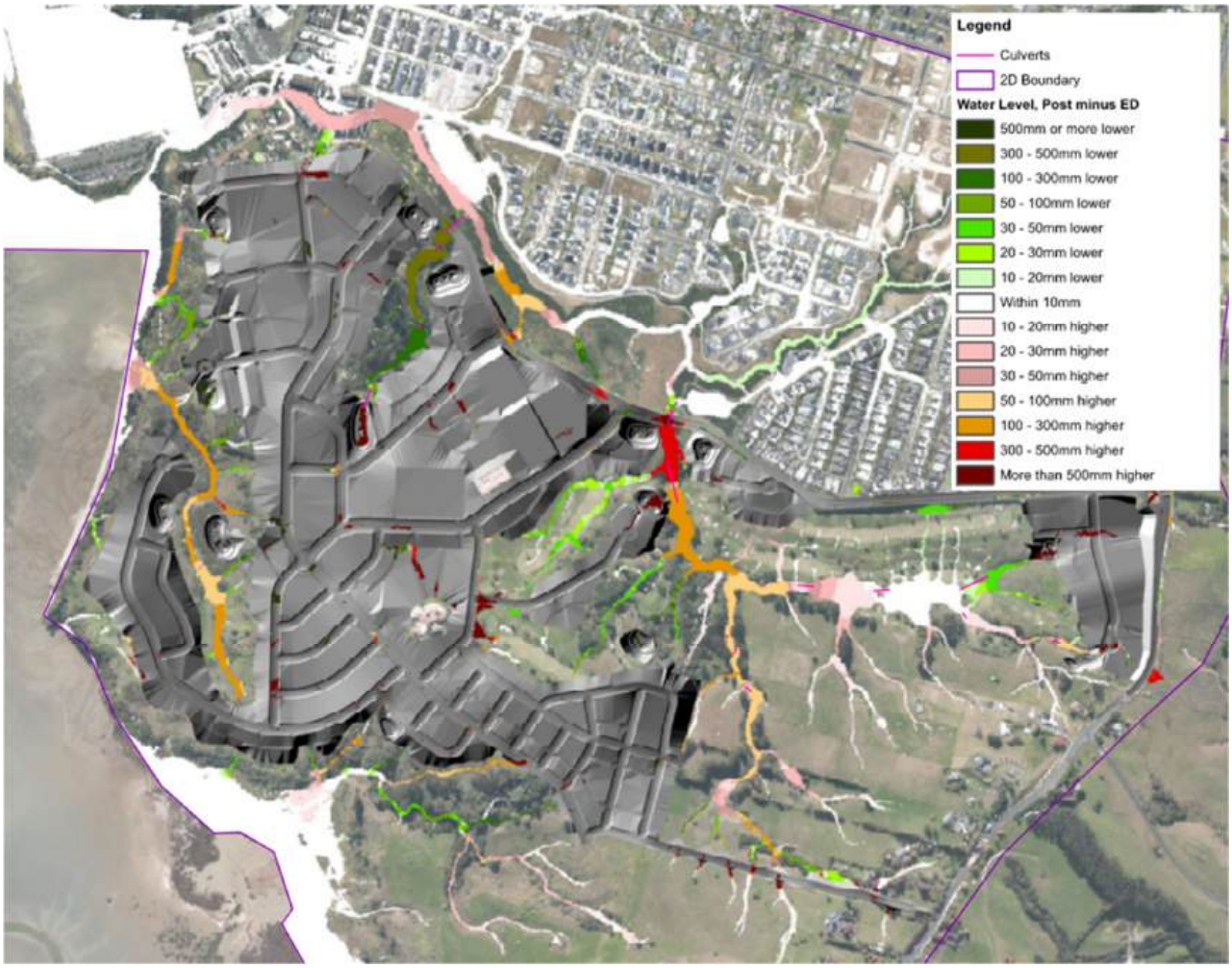



**Figure 30: Difference in flood depth and extents between the 1% AEP ED and 1% AEP MPD flood model scenarios.**

Similarly, during the 50% AEP and 10% AEP storm event, flood levels within the same northern watercourse are shown to increase up to 300mm and 100mm, respectively. Whilst these values are more significant, the relative increase in flood level is ultimately immaterial due to the existing depths of flooding experienced within this stream, of 1.0 – 2.0m and 2.0 – 3.0m for the 50% AEP and 10% AEP storms, respectively, as illustrated in Figure 31 and Figure 32 below.

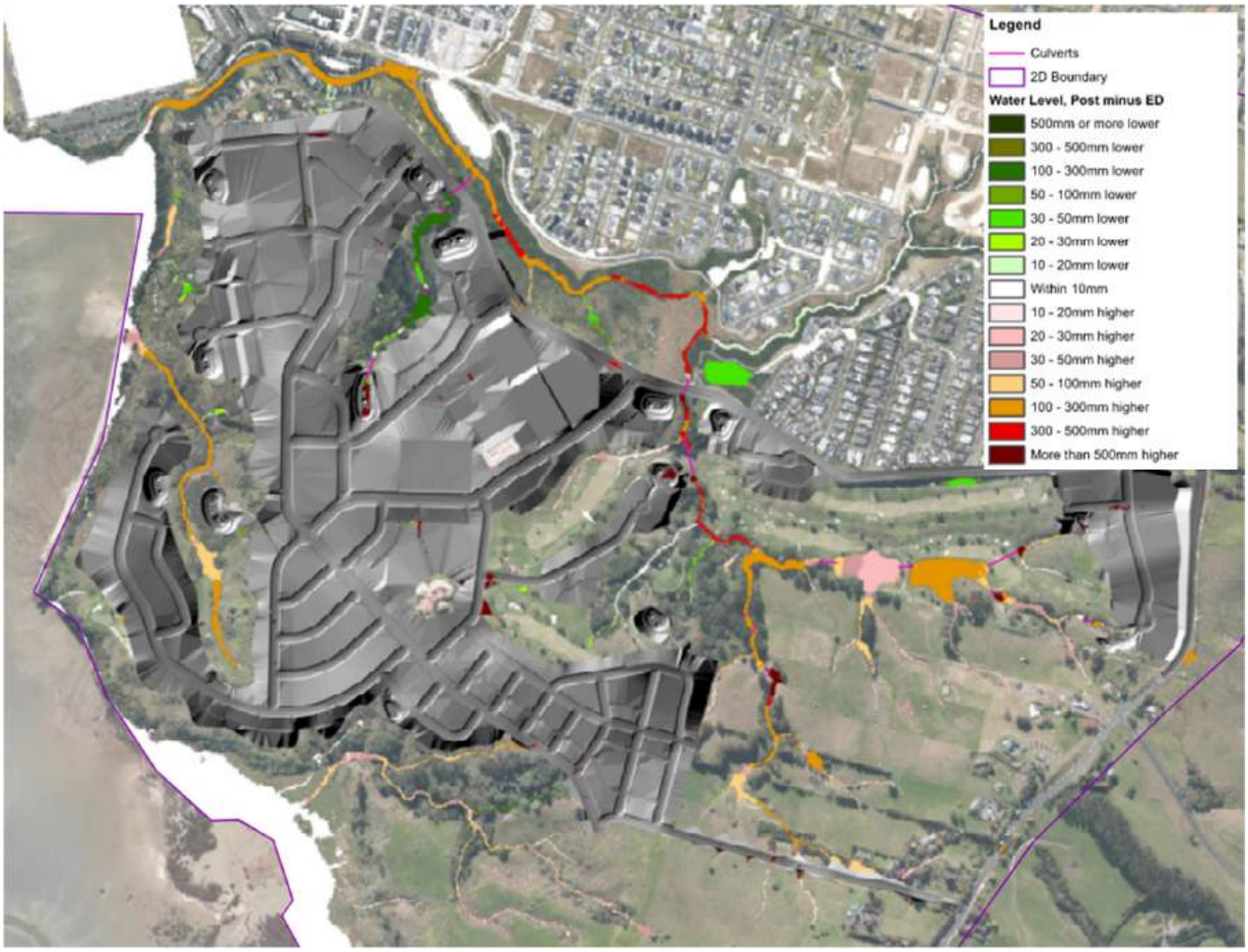



**Figure 31: Difference in flood depth and extents between the 50% AEP ED and 50% AEP MPD flood model scenarios.**

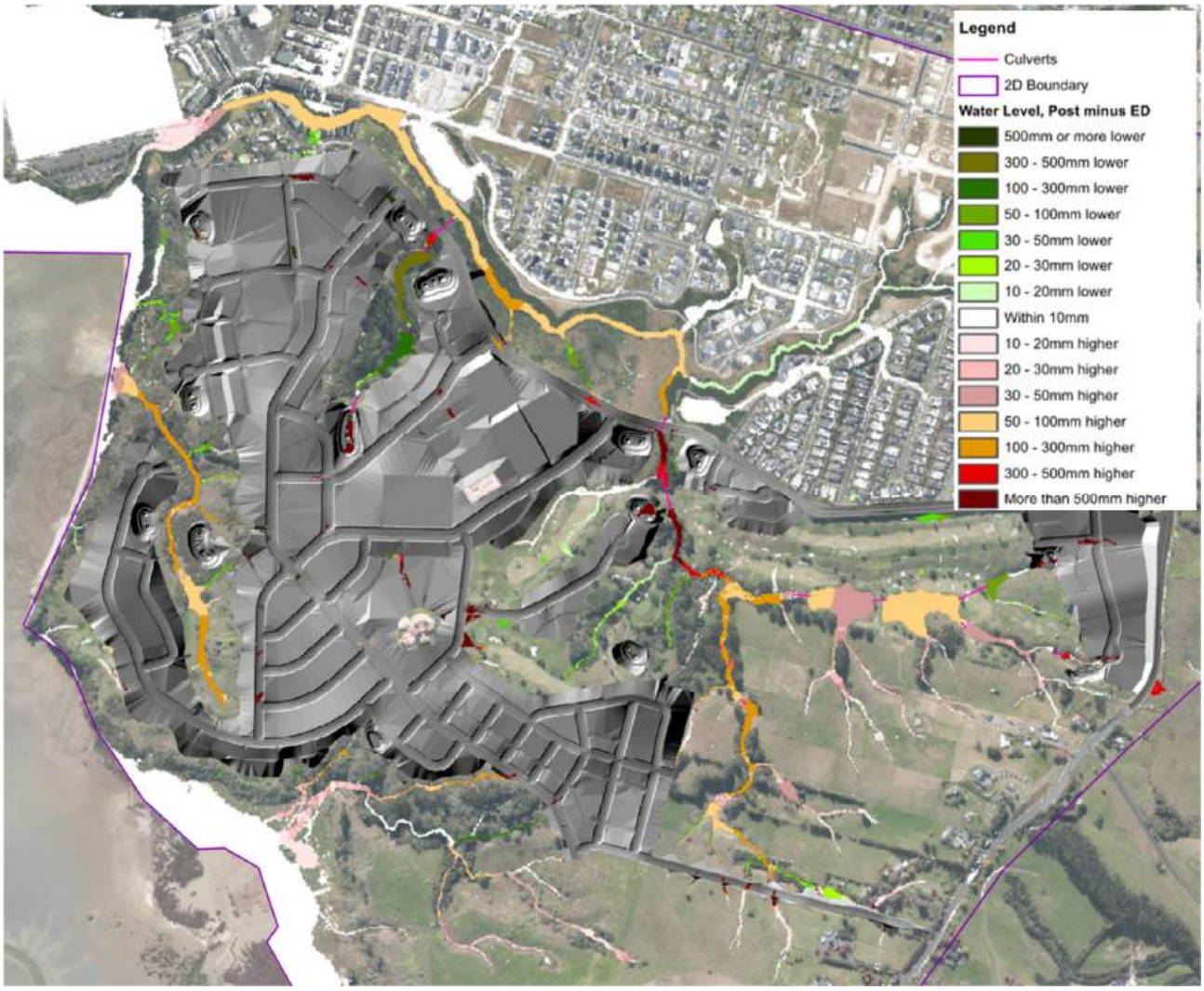



**Figure 32: Difference in flood depth and extents between the 10% AEP ED and 10% AEP MPD flood model scenarios.**

The relative increase in flood levels has been further assessed within the downstream watercourse to the north, where the worst-case flood increase occurs (Figure 33).

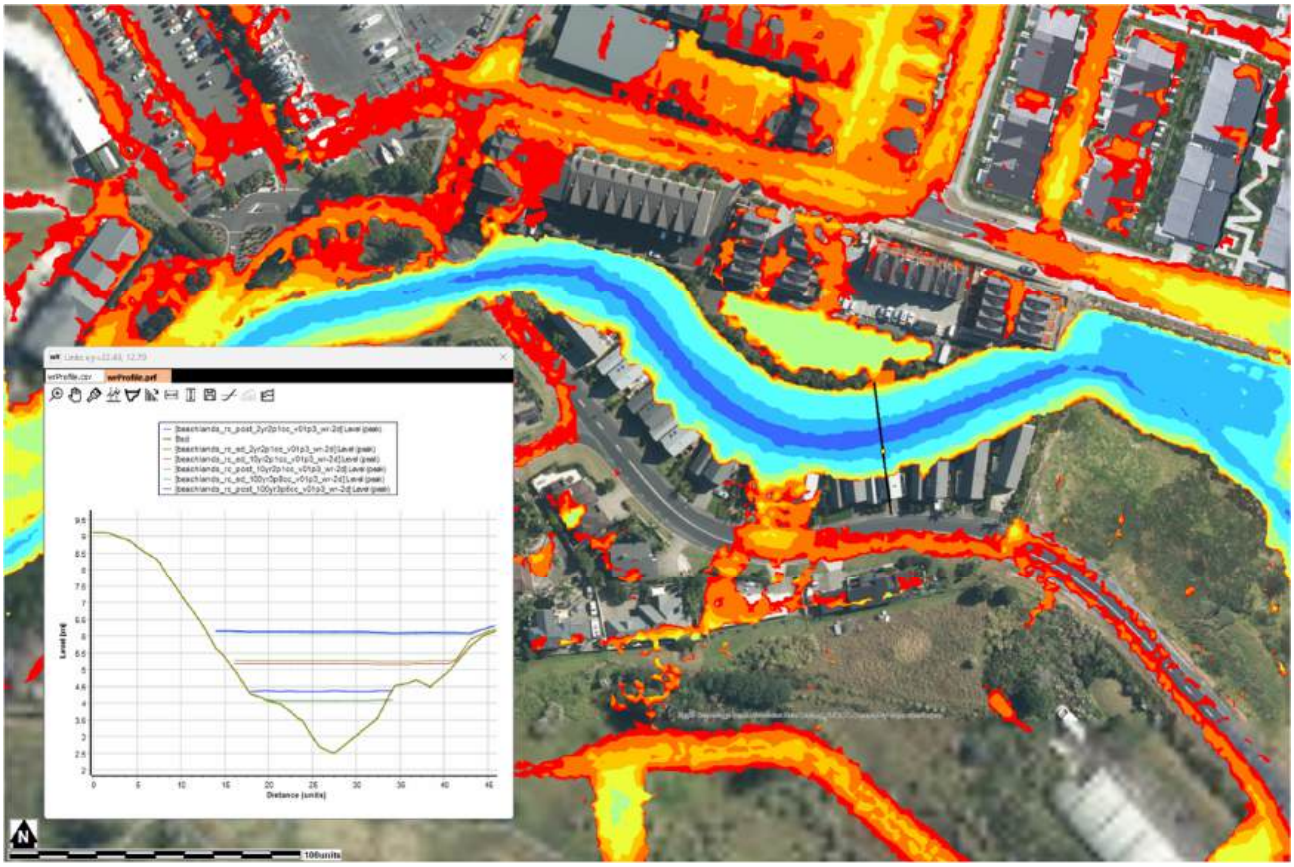


**Figure 33: Comparison of flood depth across all storm events within downstream watercourse (Plan illustration during 1% AEP ED scenario).**

Whilst the most notable increase in flood level occurs during the 50% AEP storm scenario (+300mm), the flood risk to the existing houses will remain low, as the finished floor level of these units is raised outside of the floodplain. This is the case throughout all MPD scenarios, up to the 1% AEP storm event, providing minimal flood hazard increase to these developments.

Flood depths within this section of the watercourse have been assessed against the physical stream banks, to assess the flood risk to this area. The results during the 50% and 10% AEP storm events maintain that, without flow control structures at the final outlets beneath Jack Lachlan Drive, flows within the downstream watercourse are contained within the stream banks, posing a negligible change to flood risk within this area.

## 6.4 Plan Change 120

As part of Plan Change 120, Chapter E36 was fundamentally rewritten and introduced a risk based natural hazard framework replacing the previous “hazard presence” approach. The proposed hazard rules have immediate legal effect from 3 November 2025. This moved the chapter away from a binary trigger to more of a decision-making framework through which sites should be assessed.  This provided for both sensitivity and risk categories to be applied to sites in order to assess activities’ sensitivity to natural hazards but also the potential consequence should the activity be impacted by the natural hazard event.

To ensure no adverse impacts have been introduced as a result of the proposed development, a flood hazard assessment has been carried out for both pre-development and post-development scenarios.

The flood hazard classification is based on the Australian Rainfall and Runoff (ARR): A Guide to Flood Estimation (2019). It assigns hazard levels based on factors such as flood depth, velocity, and the product of depth and velocity (d x v). An H1 classification applies to floods with depth less than 300mm, velocity under 2 m/s, and a depth-velocity product of 0.3 m²/s or less, indicating that such floods are “generally safe” for vehicles and pedestrians. All other categories pose potential risks to people, vehicles, or buildings (Figure 34).

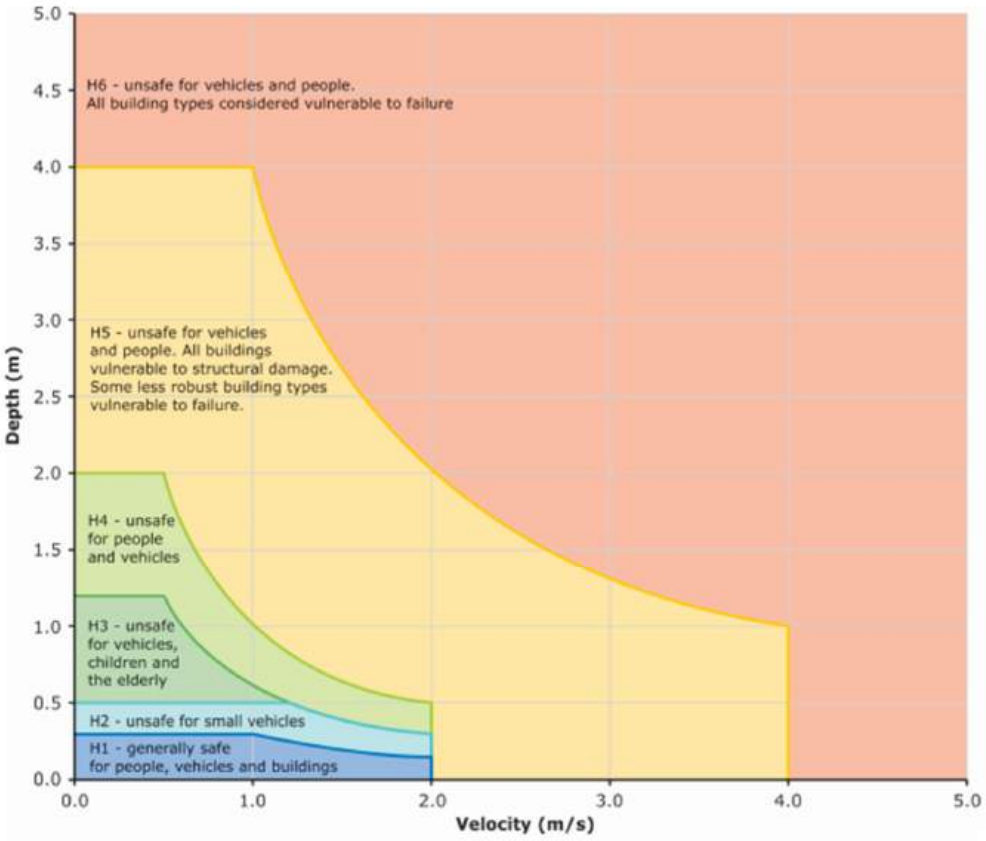



**Figure 34: Combined flood hazard curves (Smith et al., 2014, Flood hazard UNSW Australia water research laboratory technical report 2014/07 30 September 2014).**

Figure 35 shows the 1% AEP 3.8° CC flood hazard classification for the post-development scenario, not considering a blockage scenario, which is deemed to represent the worst-case flood hazard for the downstream environment.

This demonstrates that flood hazard within the development boundaries will be predominantly categorised within an H1 – Low Risk category and therefore a low risk to people or property during the worst-case 1% AEP storm event.

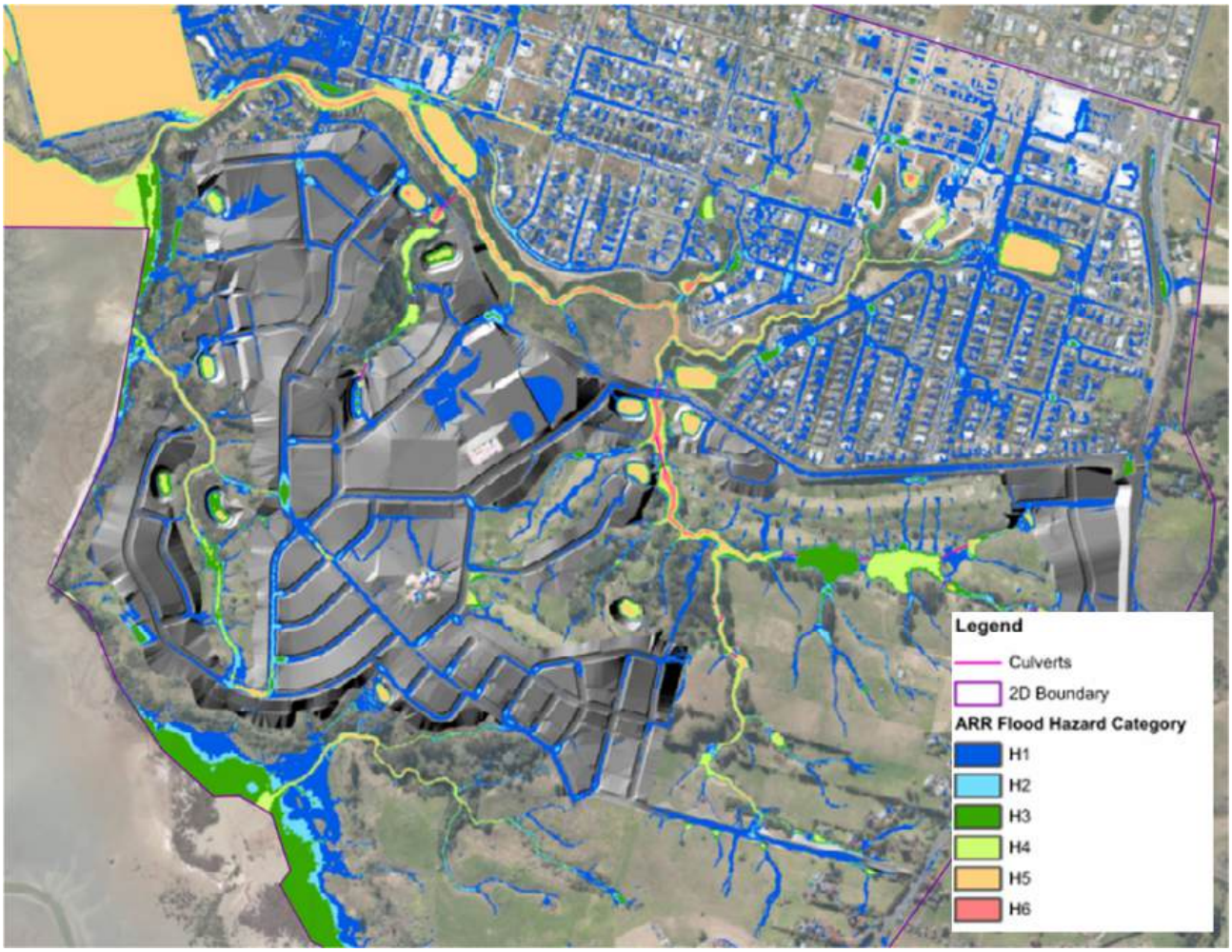



**Figure 35: ARR flood hazard classification for post-development, 1% AEP 3.8° CC, no culvert blockage.**

The post-minus-pre-development flood hazard assessment (Figure 36) also confirms that there is no increase of flood hazard within the downstream environments for both catchments discharging to the northern watercourse, and western EPAN/coastal environment.

As a result, the Project will not significantly impact the flood hazard within the development or the downstream environment in which it discharges into and closely mimics the flood hazard categorisation of the pre-development scenario.

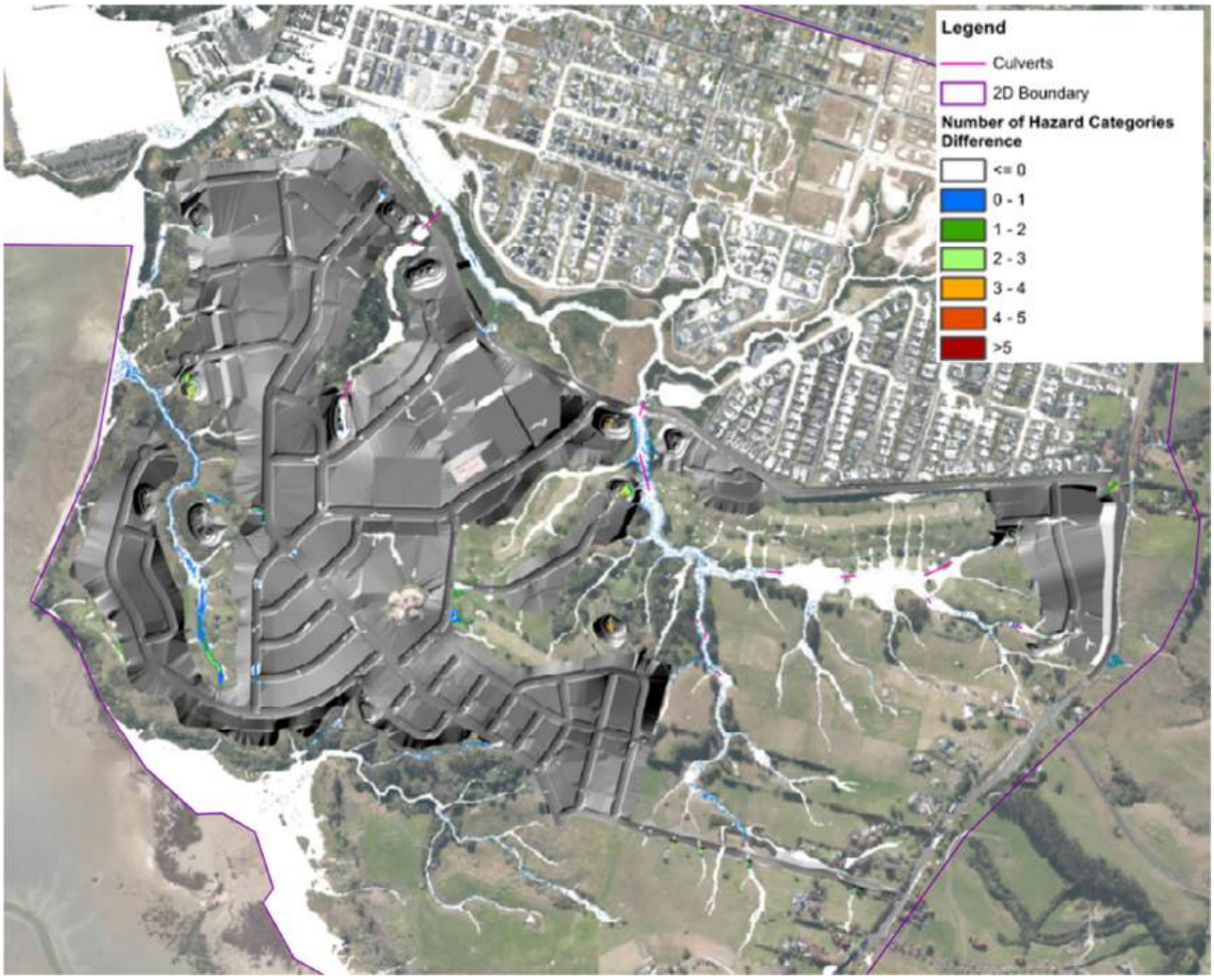



**Figure 36: Flood hazard category difference, 1% AEP 3.8° CC, no culvert blockage.**

As per the assessment undertaken by T+T, the coastal hazard NPS-NH and AUP risk assessment, it was concluded that no coastal inundation or tsunami hazard will occur on property parcels, key assets and infrastructure within the Project area, even considering the adjusted water level following the 2 m SLR.

The proposed development being situated to avoid coastal hazards and having all property parcels, key assets, and infrastructure located landward of the 2130 area susceptible to coastal instability and erosion and tsunami hazard the proposed development will not exacerbate or accelerate any of the existing hazards present (Tonkin & Taylor, 2026).

## 6.5 Hydraulic connectivity

Refer to Section 1.8 of this report.

## 6.6 Asset ownership

All existing drainage assets within the Site are understood to be under private ownership.

New public assets including bioretention wetlands, proprietary treatment devices, rain gardens, and piped stormwater networks are to be vested in Auckland Council following completion.

## 6.7 Ongoing maintenance requirements

All communal stormwater management devices proposed within the Project area will be designed in accordance with Auckland Council guidelines and standards and vested by the Council following completion. The operation and maintenance activities required to support the ongoing function of the stormwater devices will be set out in an operation and maintenance plan provided to the Council in draft format at the engineering approval stage and progressively updated following commissioning and approval of As-Built drawings.

## 6.8 Implementation of stormwater network

Implementation of the stormwater network would fall under the development staging as set out in the staging plans (refer to Harrison Grierson Drawing A2515591.00-2150 to 2167 and A2515591.00-16 and 17 for further details). This approach would limit the active earthworks and civil works extents to a 4 ha active (exposed) area and one or two catchments at a time and allow for successive extensions of the new stormwater network to support progressive development through multiple stages across several years. The methodology for implementation will be in accordance with the sustainability and environmental protection outcomes outlined for this project.

## 6.9 Dependencies

Dependencies will be addressed at a development staging level. Stormwater upgrades are ultimately dependent on successive stages of earthworks, civil works, road construction, and building.

## 6.10 Risks

*This SMP was prepared to set out the framework and strategy for stormwater management required to facilitate the urban development as envisaged in the Beachlands South AUP I458 and subsequent FTAA application.*

**Table 13: Project risks record.**

| What is the risk to the proposed stormwater management? | How can this be mitigated / managed? | What other management / mitigation could be used? | When does this risk need to be addressed? | What is the resultant level of risk? |
|---|---|---|---|---|
| Development staging does not progress as it is anticipated at this point in time. | Develop a stormwater management concept that works within small sub-catchments and is flexible to change. | - | Subdivision stage. | Medium |
| Raised groundwater levels inhibit the function of peak flow attenuation basins. | Relocate devices to areas with lower groundwater levels. Design devices with shallow live storage to raise pools above groundwater levels. | Apply a reduced attenuation standard in areas of the Site with higher groundwater levels and over-attenuate runoff in other areas of the Site. | Subdivision stage. | Low |
| Increased stormwater runoff overwhelms the capacity of existing public stormwater drainage assets and causes nuisance flooding. | Providing peak flow attenuation devices throughout the Site and progressively reviewing the performance of existing assets against development plans. | Upgrading existing public stormwater drainage assets. | Subdivision stage. | Very low |
| Increased stormwater runoff into SEA-M1 and SEA-M2 coastal environments of the Waikopua Creek | Detention and release of SMAF1 volumes over 24hours to mitigate erosion effects of sensitive downstream environments | Hard-engineered structures at final discharge locations to provided similar energy reducing effects of final discharge. | Subdivision stage | Very Low |
| Habitable floors within downstream properties interact with increased flood levels within receiving northern watercourse | Further survey of identified properties to confirm finished floor level and therefore relative level compared to post-development flood level. | Augmentation of existing outlet structures/culvert beneath Jack Lachlan Drive to control final discharging flows to an appropriate level within this location. | Subdivision Stage | Medium |
| Increased levels of sediment ladened runoff produced during construction, overwhelming existing drainage features/structures downstream. | Sediment and erosion control complied with in accordance with Auckland Councils GD05 documentation. | Active areas of excavation limited to 4 ha to limit the quantity of sediment-runoff produced. | Construction | Low |

# 7 Departures from regulatory or design codes

The information in this document complies with the standards and procedures set out in the Auckland Council SW CoP.

This assessment assumes 15.1%, 17.0% and 32.7% climate change factors on design 50%, 10% and 1% AEP design rainfall events, respectively, and 1 metre of sea-level rise, which complies with the Auckland Council Modelling Specification (2023).

No significant departures from regulatory or design codes are identified as part of this application. This will be progressively reviewed throughout the preliminary and detailed design process as designs and development plans are finalised.

# 8 Conclusions

*This SMP demonstrates that stormwater within the development will be managed in accordance with the relevant standards and requirements. No major concerns are anticipated relating to stormwater management across the Site. Based on the investigations that have been completed, it is expected that stormwater effects from the Project can be appropriately and adequately managed in accordance with the requirements of the AUP and NDC. This SMP will continue to be updated as the project progresses, and works within the wider catchments are carried out.*

## 8.1 Conclusions

AUP I458 provides an integrated development that will significantly expand the Beachlands urban area. This report builds on this work in support of a FTAA application for the live zone area and FUZ sites and provides information on the existing site features and recommendations on the interventions that may be required to mitigate the potential adverse effects of urban intensification on the receiving environment. These interventions include riparian planting and stormwater management controls including water quality treatment, SMAF 1 retention & detention, and peak flow attenuation of the 50%, 10%, and 1% AEP rainfall events.

The current AUP provisions, including PC120 criteria, relating to SMAF 1, water quality treatment, and peak flow attenuation are sufficient for stormwater management of the Site.

This Project seeks to preserve the ecological value of existing natural features within the Site, including wetlands and stream reaches, and will create new valuable areas by removing golf ponds/water features within the Golf Resort and creating new, higher-value stream corridors in their place. This Project provides a range of stormwater management controls that could be used to provide several stormwater quality and quantity management outcomes, which are proposed to mitigate impacts on existing watercourses within the site, existing flood-prone properties downstream of the Site, and the sensitive estuarine environment of the Waikopua Creek, wherever practicably possible.

A formal partnership has been created with Ngāi Tai Ki Tāmaki, which delivered a detailed Cultural Values Assessment report. This assessment identified iwi values in the Project area and concluded that the values have been positively recognised and preserved through the work the BSLP has undertaken so far (Ngāi Tai ki Tāmaki Trust, 2022). Ngāi Tai supports the FTAA application on the basis of the detailed technical reports prepared by BSLP and the mitigation measures offered by BSLP through these reports (Ngāi Tai Ki Tāmaki, 2026).

Hydraulic modelling was used to provide comparison with previous climate change allowances following updated SW CoP guidelines, existing floodplain extents to approximate current infrastructure constraints and downstream hazards, and how these

might change as a result of the future development. Increases in downstream flood hazards identified through the hydraulic modelling can be mitigated using peak flow attenuation devices as demonstrated in Table 10 (Section 6.2.6).

Stormwater management devices proposed in the SMP have been chosen to align with the sustainability goals and mana whenua values of this Project. They are in accordance with WSD guidelines for the Auckland Region and Schedule 4 of the Regional NDC. These devices include rainwater tanks, wetlands and rain gardens and proprietary treatment devices, to achieve the retention, detention, water quality, and peak flow attenuation requirements set out in this report. As set out in this report, the implementation of these devices will help protect the area from stormwater quality and quantity hazards and enhance the cultural and ecological value of the area.

The modelling assessments undertaken from a stormwater perspective demonstrate that there is no adverse increase in downstream flood hazards during the 1% AEP MPD scenario, addressing the PC 120 criteria. This has also been assessed from a coastal hazard perspective, concluding the proposed habitable zones of the development are not at risk of coastal flood hazards, even with inclusion of 2m sea level rise.

As a result, the proposed stormwater management plan does not adversely impact the pre-development conditions downstream of the development and offers a practical solution whilst successfully managing stormwater quantity and quality within the development boundaries. The principles outlined in this SMP support a holistic solution in support of this FTAA application.

# Appendix A – Plans of existing and proposed site features

# Appendix B – Flood modelling results maps

Auckland Council
Te Kaunihera o Tāmaki Makaurau

R001-A2001228-SMP