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Attention: Mr Schwartzfeger

Dear David

Drury Centre Fast Track Referral Application Stormwater Preliminary Assessment

1 Introduction

Kiwi Property Holdings No.2 Limited ("Kiwi Property") propose to lodge an application for a referred project under the Covid-19 Recovery (Fast-track Consenting) Act 2020 (the "Act") to utilise the fast-track consenting process via an expert consenting panel. This application relates to the development of a contiguous landholding bound by Fitzgerald and Flanagan Road in Drury which includes 139, 155, 173 and 189 Fitzgerald Road; 108, 116, 120, 124, 128 and 132 Flanagan Road; and 61 Brookfield Road ("the site"). This landholding forms part of a larger land area within Drury East that is currently subject to a private plan change process, Drury Centre Precinct Private Plan Change ("PC48"), to rezone the land from Future Urban to a combination of Business – Metropolitan Centre, Business – Mixed Use and Open Space – Informal Recreation under the Auckland Unitary Plan ("AUP") which will enable quality urban development and well-functioning urban environments.

This proposal for a referred project will give effect to the purpose of the Act to promote employment and New Zealand's recovery to the economic and social impacts of Covid-19 by enabling the construction and delivery of a comprehensive development that offers employment opportunities and an accelerated supply of quality housing choice and diversity.

To support the application for a referred project, this memo provides a high-level review of the stormwater aspects of the proposal, including:

- Summary of the proposal and site description;
- Summary of work completed to date;
- High level stormwater assessment of proposal; and
- Overview of works required to achieve the proposal.

2 Site description and proposal

2.1 Site description

The project area comprises 26.2 hectares of land bound by Fitzgerald and Flanagan Road in Drury which is currently zoned Future Urban Zone ("FUZ") under the AUP as identified by the red boundary in Figure 2.1.

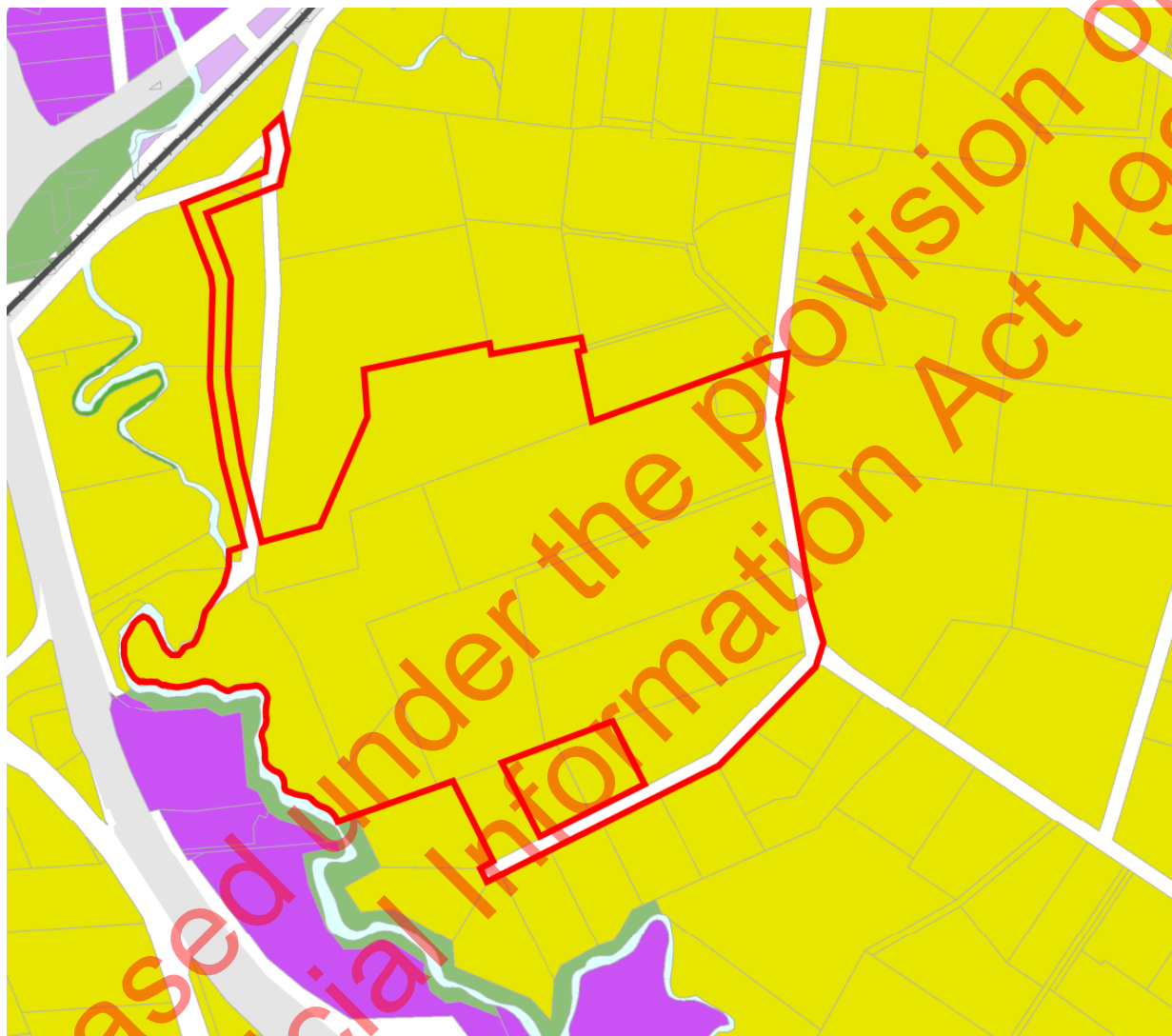


Figure 1: Extent of the referred project application (shown in red)

The natural topography of the site is gently undulating. The site drains to the west and south to the Hingaia Stream, and north to the Fitzgerald Stream. Figure 2 shows the key hydrological features of the site:

- The Hingaia Stream runs along the western boundary of the site in a northerly direction and is a 5th order stream with a contributing catchment of approximately 5440 ha¹.
- Two wetlands (Wetland 1 and Wetland 2) are located on the eastern margin of the Hingaia Stream, outside of the proposed residential area but within 100 m of the proposed wastewater pipeline. Both are degraded wetlands, having been impacted by stock access and modification of their margins.

¹ <https://shiny.niwa.co.nz/nzrivermaps/>

- Stream B is approximately 120 m in length and comprises intermittent and permanent stream reaches. The entire area is fenced and there is no stock access to stream channel. A culvert is present in the lower 20 m of the reach which has modified the hydrologic regime of the stream. It discharges to the Hingaia Stream.
- Stream C is an intermittent stream approximately 40 m long, which has been straightened along a fence line. The stream appears to be spring fed. While the stream lacks a riparian margin, it is fenced, and some shading is provided in the upper reach. It discharges to the Hingaia Stream.
- An unnamed tributary of the Hingaia Stream (denoted as Southern Overland Flood Path on Figure 2) is present in the southern portion of the fast-track application area. No stream characteristics have been observed within the bounds of the project area, however there may be more confined flows resulting in a stream channel downstream of the site. This will be further investigated to support the application if accepted as a referred project.

Outside of the project area, but within the northern sub-catchment and serving as a receiving environment for the Stage 1 area, are Stream A and Fitzgerald Stream:

- Stream A commences to the north of the proposed Stage 1 area and flows in a northerly direction for approximately 400 m, where it enters a pipe. The stream comprises permanent and intermittent reaches, with several farm access culverts restricting fish passage. Where riparian vegetation is present, the stream has a higher degree of ecological value and instream stability.
- Fitzgerald Stream is a main tributary of the Hingaia Stream located just to the north of Kiwi Property Landholdings, within the wider PCA. As for much of the wider area, the stream is degraded, resulting from agricultural land-use and an absence of riparian margins. Fitzgerald Stream discharges to the Hingaia Stream via a 2100 mm diameter culvert under the railway and Great South Road. It is noted that the existing culverts are of poorer quality and undersized and have been identified in PC48 applications as requiring upgrades to support development in the area.

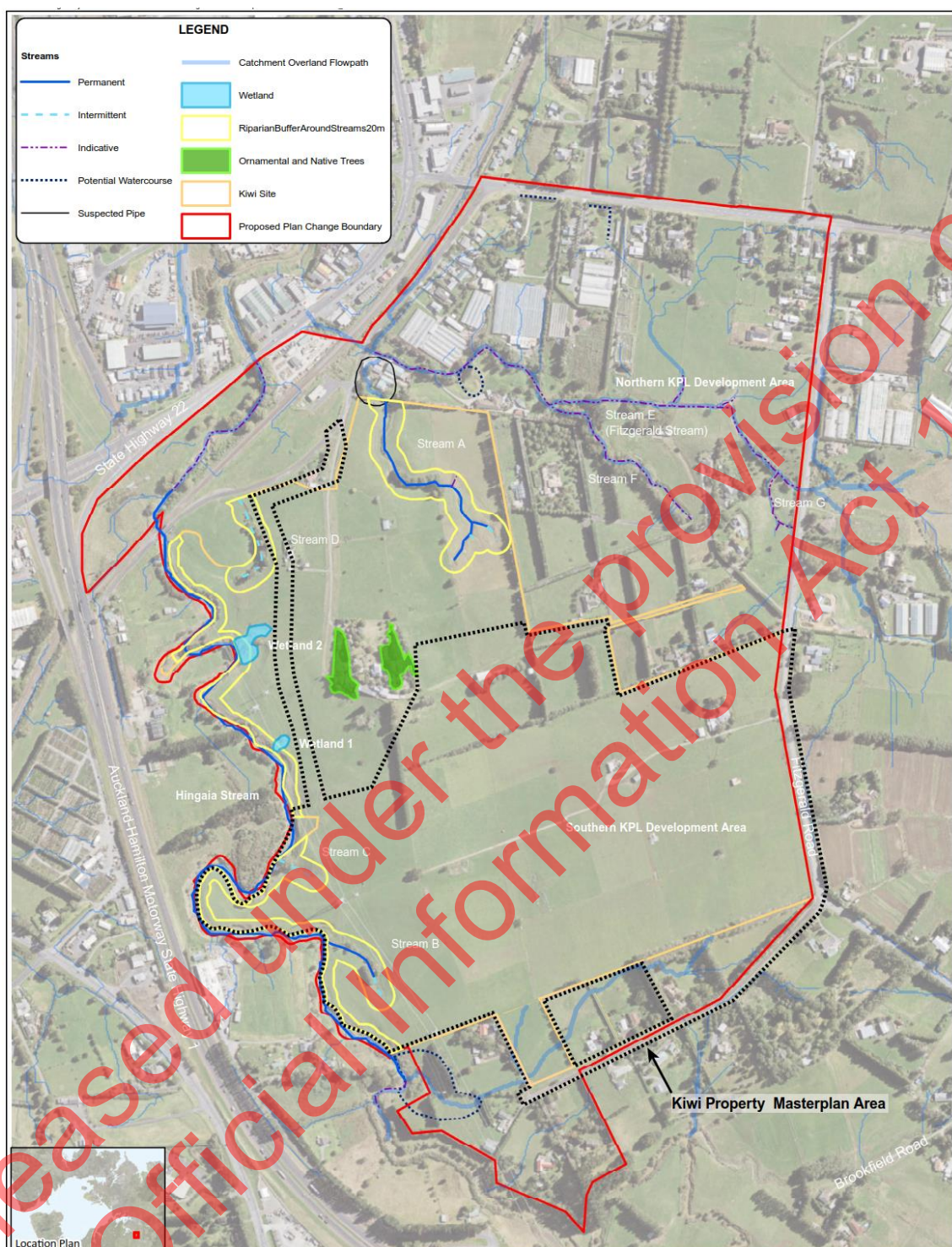


Figure 2: Existing hydrologic features in the vicinity of the site

2.2 Proposal

Kiwi Property are proposing the subdivision and development of this land as the first stage of Drury Centre which will include large format retail ("LFR") and superlots enabling residential development. A total of six superlots for LFR amounting to 45,200 m² gross floor area ("GFA") is proposed on the western portion of the site and surrounding the ancillary car parking areas for this retail space. Planned immediately to the east of the LFR are 13 superlots totalling 7.597 hectares of land for residential development which will enable the construction of 400 - 600 dwellings. During

construction, excess cut from the Stage 1 residential area will be placed immediately to the north of the Stage 1 area and still within the site. A wastewater pipe will be trenched in a south to north direction, likely along the proposed Creek Road (parallel to the Hingaia Creek).

The proposal also includes the creation of a 4.14 hectare open space in the form of Hingaia Reserve directly adjacent to the Hingaia Stream and a series of roads to vest. Riparian planting of native species is proposed along the Hingaia Stream (to at least 10 m width) and two tributaries (named Stream B and Stream C). This will contribute to improved outcomes for freshwater and indigenous biodiversity.

Figure 3 shows the proposed development.

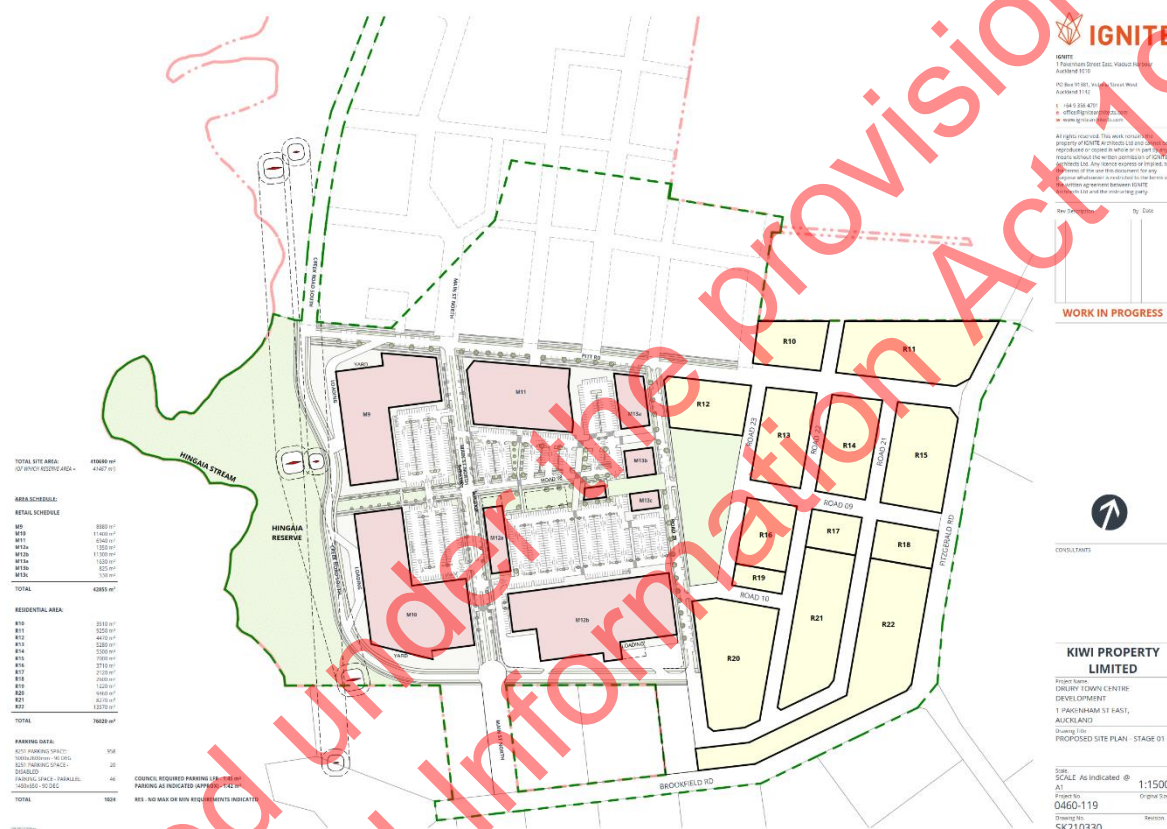


Figure 3: Proposed development plan

3 Background analysis

An integrated Stormwater Management Plan² ("SMP") has been prepared by Tonkin + Taylor and Woods to support the Plan Change applications for the Drury Centre Precinct and Drury East Precinct areas which are both located within the Hingaia Stream catchment. The requirements for stormwater management are based primarily on the AUP provisions with consideration of the Future Urban Land Supply Strategy for the area, the relevant SMPs for the Drury-Opāheke area and the region-wide Network Discharge Consent.

The proposed approach, based on water sensitive design to deliver water quality, conveyance, hydrological and flood mitigation outcomes, comprises:

² Tonkin + Taylor, June 2020, *Drury East Stormwater Management Plan - Drury Centre and Drury East Plan Change Areas*. Prepared for Kiwi Property and Fulton Hogan Land Development in support of the Plan Change Application (Job number 1003297.7000 and 1003297.8000)

- Preserving, protecting, and enhancing streams and floodplains in the Blue-Green network, which can also provide amenity and connectivity with communities.
- Eliminating and minimising the generation of contaminants. Provide near-source water quality treatment of runoff for all contaminant generating impervious surfaces. Water quality treatment to target sediment, metals and gross pollutants should be provided. Green infrastructure is preferred.
- Providing a minimum of Stormwater Management Area – Flow 1 (“SMAF 1”) hydrological mitigation for all impervious surfaces within the Drury Centre and Drury East plan change areas. Intervene with stream erosion mitigation methods where necessary.
- Generally adopting the “Pass forward flows” flood management approach, but for Fitzgerald Stream provide temporary on-site flood attenuation to mitigate changes within the 100 year flood plain from the development of the Drury East areas in advance of upgrades to the railway and Great South Road culverts.

3.1 Stormwater management

A water sensitive stormwater management approach is proposed³ which will work to preserve, protect and enhance streams within the Blue-Green Network of the Hingaia Stream. The water quality management approach seeks to minimise the generation of contaminants (by using inert building materials etc) as much as possible. For all contaminant generating impervious surfaces, the preferred approach is to provide near-source water quality treatment of runoff to target sediment, metals and gross pollutants should be provided. Green infrastructure is preferred.

The general approach to water quantity management for small storm events is to provide a minimum of SMAF 1 hydrological mitigation for all impervious surfaces. Retention by infiltration and rainwater harvesting will be maximised.

The Stormwater management toolbox to achieve this is set out in Appendix A, which is from the Drury East SMP².

Stormwater management devices in roads will meet Auckland Transport (“AT”) requirements.

3.2 Stormwater conveyance

Primary flows generated by a 10 year ARI storm event will be conveyed by a piped stormwater network to the downstream receiving environment. Stormwater infrastructure will be designed as per the Auckland Council Stormwater Code of Practice⁴. It is proposed to be located in the road corridor to provide easy access for maintenance.

For events greater than a 10 year ARI storm event and up to a 100 year ARI storm, the excess flow or secondary flows will be conveyed by using roads and drainage reserves as overland flow routes, where they are to be maintained) or through dedicated flow channels, integrated within the site layout plan. All secondary flow paths will be located within public areas (roads and parks) and not on private properties.

It was envisioned that the existing sub-catchment and discharge points could be maintained. The downstream receiving environment will also be protected from erosion using green outfalls and vegetated channels to dissipate energy prior to discharge to the receiving environment.

³ Refer to Drury East Fast Track Referral Application – Stormwater, dated 12 February for further detail.

⁴ Auckland Council, 1 November 2015, *Code of Practice for Land Development and Subdivision – Chapter 4 Stormwater*, Version 2.0

3.3 Flood risk management

The SMP is supported by a flood hazard assessment, which was carried out using the Auckland Council flood model for the Hingaia Stream catchment. The assessment confirmed suitability of the “Pass forward flows” flood management approach, noting that for Fitzgerald Stream a suitable approach was to provide temporary on-site flood attenuation to mitigate changes within the 100 year flood plain from the development of the Drury East areas in advance of upgrades to the railway and Great South Road culverts.

4 The Masterplan

The stormwater management approaches investigated and tested as part the plan change process includes the site extent as part of this referred project application. Based on the level of development illustrated on the Masterplan, it is considered that the stormwater management proposed in the SMP for the Drury East areas can be successfully implemented to manage stormwater flows expected to be generated by the development within the site.

The Masterplan includes several areas suitable for vegetated bio-retention devices to provide water quality treatment including:

- Roadside on Main Street North;
- Car parking areas and associated green spaces in the Town Centre;
- Open space adjacent to the Hingaia Stream; and
- Gardens within the Residential superlots area.

5 Assessment

While the general approach to stormwater management remains consistent with the SMP, this section discusses specific stormwater matters in more detail, as they relate to the Kiwi Properties site and the referred project application.

The items discussed below will be addressed in the technical reports which accompany the final application, if accepted.

5.1 Stormwater treatment and Industry Best Practice

In recognition of AT's preference to remove smaller treatment devices adjacent to roads, we are looking to move towards aggregated stormwater treatment devices i.e., larger raingardens and communal wetland/raingardens where best applicable within the Masterplan. The Masterplan has allowed for this approach in the design of the road cross section and greenspaces.

The treatment devices will provide close to source treatment in accordance with GD01⁵. Stormwater treatment devices in the road will meet AT requirements.

5.2 Catchments and Flood management

Whilst the greater Drury area is subject to existing flooding issues, the Drury Centre Precinct by comparison is elevated and largely located outside of the flood plain. The building for the LFR and building platforms for the superlots can be constructed to achieve the necessary flood protection and freeboard requirements to protect people and property from the potential effects of flood hazards.

⁵ Auckland Council, December 2017, *Guideline Document 2017/001 (GD01) Stormwater Management Devices in the Auckland Region*, Version 1

Since development of the SMP, it has become apparent that there are flood management benefits which could be achieved by adjusting the sub-catchment and discharge points. There will likely be some changes to the size and direction of contributing catchments for Streams A, B and C, however these will be managed to ensure base flows are maintained and significant adverse effects on the streams will be avoided.

Based on proposed levels, the site drains to:

- North to Stream A and the Fitzgerald Stream and culvert;
- West to the Hingaia Stream; and
- South to unnamed tributary of the Hingaia Stream near Brookfield Road (Stream E).

5.2.1 Flows to the North

The flood management strategy for the northern sub-catchment draining to the Fitzgerald Stream and Stream A is to attenuate flood flows up to the 100 year ARI storms to mitigate downstream flooding including any impact on the undersized railway and Great South Road culverts. When the culvert is upgraded in the future, the temporary flood storage can be removed, and the land developed in accordance with the Masterplan. This option will be investigated/developed as part of the final application.

5.2.2 Flows to the West

Flows to the Hingaia Stream will be unattenuated in accordance with the pass-forward approach proposed in the SMP.

5.2.3 Flows to South

The southern part of the site currently drains to an unnamed tributary of the Hingaia Stream which runs through several private properties on Brookfield Road.

A number of options will be considered to mitigate any adverse flood effects on these downstream properties. Initial options to be considered as part of the final application include the following and all are considered to be feasible options:

- Direct discharge if no effects;
- Attenuation of flood flows up the 100 year storm;
- Diversion of increased flows along the southern boundary directly to the Hingaia Stream. The increased flows would pass-forward unattenuated.

5.3 New National Environmental Standards for Freshwater ("Freshwater NES")

In general, the project illustrated on the masterplan avoids physical impacts on wetlands and watercourses, consistent with the direction of the AUP and Freshwater NES. . Design consideration should be given to maintaining the surface and groundwater flow regimes to the wetland, including our hydrological mitigation approach of detention through infiltration and retention which will help to mitigate any changes to groundwater and surface water hydrology. The proposed wastewater pipeline is expected to be located within 100 m of Wetland 1 and Wetland 2, but can be managed to avoid 'partial or total drainage' of the wetland systems.

Earthworks will be undertaken across the project area, including to the north of the proposed residential development area. Management of potential discharges of sediment to the environment will be managed through implementation of best practice sediment and erosion controls.

6 Conclusion

Based on the background analysis and stormwater modelling that have been completed to date, it is expected that stormwater effects from the site can be managed safely in accordance with accepted best practice and without adversely affecting the receiving environment. Further details and supporting analysis will be provided in the final application if the proposal is accepted as a referred project.

In our view, the development can therefore, proceed without any fundamental concerns relating to stormwater management.

Released under the provision of
the Official Information Act 1982

7 Applicability

This report has been prepared for the exclusive use of our client Kiwi Property Group Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement. We understand and agree that this report will be used by Ministry for the Environment in undertaking its regulatory functions in connection with the consent application.

Tonkin & Taylor Ltd

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Appendix A - Stormwater Management Toolbox from Drury East Stormwater Management Plan²

Zone	Land Use	Performance Outcomes				Toolbox	Notes
		Water Quality	Hydrological Mitigation	Flood Attenuation	Water Sensitivity Design ¹		
Performance standard		GD01 ²	AUP: SMAF 1 minimum ³	100 Year ARI: Not worsen downstream flooding ⁴			¹ The proposed stormwater management options adopt a Blue-Green network approach that includes other devices or measures which are not listed in this table i.e. filter strips, green outfalls (where practicable), streams protected and enhanced with riparian buffer and re-vegetation planting. The need for bank stabilisation/instream works to be determined by stream erosion assessments. ² Stormwater Management Devices in the Auckland Region –Guideline Document 20017/001 (GD01). (December 2017). Auckland Council
Mixed use Metropolitan Centre	Roads	✓	✓	X	✓	Bio-retention devices including: • Raingardens • Tree pits • Vegetated swales	Eliminate or minimise the generation and discharge of contaminants. Treat all contaminant generating impervious areas at or near source by a water quality device designed in accordance with GD01 to target sediment, metals and gross pollutants.
	Carparks	✓	✓	✓	✓		Elimination of contamination generation is considered the BPO option so if inert roofing materials are used, these impervious surfaces will not generate contaminants and therefore will not require water quality treatment.
	Other	✓ ²	✓	✓	✓	Inert Building materials Rainwater tanks for re-use of roof runoff Permeable pavements for public realm areas Communal detention devices	³ AUP Auckland Council The PCA does not fall within a Stormwater Management Area - Flow 1 (SMAF 1) overlay but this will be adopted as the minimum requirement across all three sites. This stormwater management approach is consistent with Policy E1.3.10. The minimum hydrological mitigation requirements proposed are as follows: • Retention (volume reduction) of at least 5mm of runoff depth from impervious surfaces • Detention of the 95th percentile event for the difference between the pre-development and post-development runoff volumes from a 95th percentile, 24 hour rainfall event minus the achieved retention volume. Exceptions for providing retention can be made in cases where soil infiltration rates preclude disposal to ground and rainwater reuse is not possible. It is noted that if retention cannot be met, devices are to be lined with the retention volume being treated as a detention through bioretention devices. An erosion assessment is to be carried out to determine if additional measures (such as additional detention requirements) are required to mitigate the hydrological impacts of development.
Mixed Housing – Urban	Roads	✓	✓	✓ ⁶	✓	Communal devices ⁵ Bio-retention devices including: • Raingardens • Tree pits • Vegetated swales	
Mixed Housing – Suburban	Carparks > 30 Vehicles	✓ ⁵	✓	✓ ⁶	✓		
Terraced Housing Apartment Buildings	Roofs, jointly-own access lot driveways, driveways, gardens/landscaping	X✓ ^{2,8}	✓	✓	✓	Inert Building materials Rainwater tanks for re-use of roof runoff Permeable pavements for driveways or laneways Communal devices ⁵ Bio-retention devices including: • Living Roofs • Raingardens • Tree pits • Vegetated swales	⁴ No increase in peak flood level effects to properties upstream and downstream of the PCAs. ⁵ Devices will be provided and sized for WQ treatment for carparks (greater than 30 vehicles) only for the Residential Zones. ⁶ Includes the option for large communal devices to provide treatment and hydrology mitigation to public roads and impervious areas. Gross Pollutant Traps (GPT) or alternative proprietary devices will be installed upstream of communal devices. The communal devices may be dual-purpose as they could also provide flood attenuation, if required. ⁸ Hydrology mitigation will be provided for impervious areas; Water quality treatment will be provided where contaminants are generated e.g. Water quality treatment won't be provided for roofs with inert building material or footpaths. Bio-retention devices generally have the added benefit of providing WQ treatment too.