

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of a submission in respect of the **PROPOSED WAIKATO DISTRICT PLAN** by **AMBURY PROPERTIES LIMITED** pursuant to Clause 6 of Schedule 1 of the Act seeking the rezoning of land at Ohinewai

## **STATEMENT OF EVIDENCE OF PRANIL WADAN**

### **1. INTRODUCTION**

1.1 My full name is Pranil Wadan. I am a Principal Stormwater engineer at Wood & Partners Consultants Limited.

#### **Qualifications and experience**

1.1 I hold a Bachelor of Engineering degree from the University of Auckland (2008). I have over twelve years' experience in stormwater design, flood risk assessments and stormwater management for land development. I am a Chartered Professional Engineer (CPEng) and a Chartered Member of Engineering New Zealand (CMEngNZ) and Water New Zealand.

1.2 I have been the principal author and lead stormwater engineer for a wide range of stormwater management plans and flood modelling reports to support Woods' land development, urban design and planning teams. I have been involved in and prepared numerous catchment scale flood models, detailed stormwater pipe models and integrated catchment management plans for private clients as well as for district and regional councils.

1.3 Examples of project experience relevant to my evidence include:

(a) Wainui East (Milldale development), lead stormwater engineer for this 190ha subdivision. I was involved in preparing the stormwater management plan for the development area, undertaking flood analysis, culvert sizing, along with the design of stormwater

management devices and numerous stormwater runoff and overland flow path assessments.

- (b) Long Bay Development, lead stormwater engineer for this 250ha coastal subdivision. I was involved in designing wetlands A, C and E, flood analysis, culvert sizing, design of stormwater management devices and numerous stormwater runoff and overland flow path assessments.
- (c) Rymans' Rangatira Village, stormwater engineer. I prepared the stormwater management plan for this 3.25ha retirement village as well as designing on-site bio-retention, attenuation and erosion control devices.

### **Involvement in project**

- 1.4 I was engaged by Ambury Properties Limited ("APL") to develop a Stormwater Management Plan ("SMP") to enable development of the Sleepyhead Estate at Ohinewai and to support APL's submission on the Proposed Waikato District Plan ("PWDP").
- 1.5 I co-authored and reviewed the Sleepyhead Estate – Stormwater Management Plan report dated 30 November 2019 which was attached as Appendix I to the Assessment of Environmental Effects and Section 32AA Assessment provided to the Hearings Panel on 6 December 2019. The Stormwater Management Plan report was peer reviewed by Mr. Brian Flood, a Director of Woods.
- 1.6 I have also been party to consultation with submitters and interested parties with respect to stormwater management for the proposed development and the rezoning. I will cover the outcomes of that consultation later in section 7 of my evidence.
- 1.7 I last visited the site on 7 July 2020.

### **Purpose and scope of evidence**

- 1.8 My evidence describes the SMP developed for the Ohinewai Structure Plan Area, outlines the process and technical assessments used to develop it and addresses the stormwater management systems proposed to be incorporated into the development.
- 1.9 My evidence is structured as follows:

- (a) Existing catchment (Section 3);
- (b) The proposed Sleepyhead Estate development (Section 4);
- (c) Relevant planning context (Section 5);
- (d) Stormwater design and management approach (Section 6);
- (e) Liaison with Waikato Regional Council undertaken during the preparation of the SMP (Section 7).
- (f) Comments on the Section 42A report and expert conferencing (Section 8);
- (g) A brief conclusion (Section 9).

1.10 A summary of my evidence is contained in Section 2.

1.11 My evidence should be read together with the evidence of:

- (a) Mr Chad Croft (ecology);
- (b) Mr Dave Stafford (groundwater);
- (c) Mr Ajay Desai (flooding); and
- (d) Mr Nick Speight (geotechnical).

### **Expert Witness Code of Conduct**

1.12 I have read the Code of Conduct for Expert Witnesses, contained in the Environment Court Consolidated Practice Note (2014) and I agree to comply with it. I can confirm that the issues addressed in this statement are within my area of expertise and that in preparing my evidence I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

## **2. SUMMARY OF MY EVIDENCE**

### **Location and catchment**

2.1 The Sleepyhead Estate development area is located at 52-58 Lumsden Road, 88 Lumsden Road and 231 Tahuna Road, Ohinewai ("the Site"). The Site is approximately 178 ha in area.

- 2.2 Ground surface elevations vary between approximately RL 20 m on the southern boundary with Tahuna Road and RL 6 m at the far eastern end of the site, as set out in the evidence of Nick Speight.
- 2.3 There are no mapped watercourses, wetlands or water bodies within the site according to the Waikato Regional Council's online mapping system, except for the Tahuna Road drain which is noted as "Indigenous Fish Habitat".
- 2.4 The site is characterised by two large mapped drainage channels conveying surface flow from both Lake Ohinewai and groundwater from the site, to Lake Rotokawau and Lake Waikare. These drains are known as the Balemi Road and Tahuna Road drains and are associated with the Lower Waikato Land Drainage Scheme ("LWLDS").
- 2.5 The Balemi Road drain runs along the north eastern boundary along Balemi Road and then runs north to discharge into Lake Waikare (Balemi drain does not drain to Lake Rotokawau but rather straight into Lake Waikare through the drain system which goes north from Balemi Rd).
- 2.6 Tahuna Road drain is currently culverted under Tahuna Road. The drain conveys runoff from the upstream catchment including Lake Ohinewai to Lake Rotokawau.
- 2.7 Recharge to the Rotokawau peat is primarily derived from rainfall infiltration and hydraulic connection within Lakes Rotokawau and Waikare. The proposed development will have no impact on the surface peats connection to the Lakes Rotokawau and Waikare<sup>1</sup>. The offsite effects of any groundwater level reduction from the site development will be negligible
- 2.8 The Site is located within the Lake Waikare catchment and affected by the Lower Waikato Waipa Flood Control Scheme ("LWWFCS").
- 2.9 There is very little or no interaction between River Waikato and the Site as shown in the Lower Waikato Zone Management Plan. The Site drains to Lake Rotokawau which flows into Lake Waikare that ultimately discharge to the Whangamarino Wetland via Waikare Gate in a controlled manner under the LWWFCS.

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1 Sleepyhead Ohinewai – Stage 1 & 2 Sleepyhead Factory Development (Initia)

## **Receiving Environment**

### *Lake Rotokawau*

- 2.10 Lake Rotokawau is located adjacent to the eastern boundary of the Site. It has been classified as a peat lake, with an area of approximately 22 hectares and average depth of 1.2 metres. It is located on the south western side of Lake Waikare and is hydraulically connected to it.
- 2.11 Lake Rotokawau is classified as hyper-eutrophic in TR2011/05 – Significant Natural Areas of the Waikato Region: Lake Ecosystems, with poor water quality. This poor water quality is likely caused from the existing land use (farming) surrounding agricultural activities.

### *Lake Waikare*

- 2.12 Lake Waikare encompasses approximately 3442<sup>2</sup> hectares within the lower Waikato catchment. It is hypertrophic and has poor water quality, with particularly high levels of nitrogen and phosphorus. The lake harbours high levels of suspended solids.<sup>3</sup>

## **Proposed Sleepyhead Estate development**

- 2.13 The Ohinewai Structure Plan provides for a mixed-use development across the 178ha site. The development includes industrial, business and residential land uses. The Sleepyhead Estate Masterplan, and consequently the Ohinewai Structure Plan and zoning plan, which is intended to give effect to the Masterplan, have been informed by stormwater management requirements.
- 2.14 Approximately 55ha of the development is allocated to open space that will include recreational facilities, ecological enhancement, and stormwater management provisions.
- 2.15 Two designated stormwater management areas have been included in the Masterplan – the Central Park Area (“CPA”) and the Wetland Park Area (“WPA”). The CPA is intended to provide stormwater treatment and centralised conveyance via a series of stormwater devices such as wetland, rain gardens and swales.

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2 Lake Waikare and Whangamarino Wetland Catchment Management Plan (2018).  
3 Lake Waikare and Whangamarino Wetland Catchment Management Plan (2018).

- 2.16 The WPA is proposed to be created as an enhanced natural wetland that is enhanced with local flora. Engineered wetlands will be constructed around the fringes of the WPA that will provide treatment for the lower residential zone. The WPA is intended to provide “informal treatment”: although it will not be designed to meet the specific design and performance requirements, a level of polishing will likely occur as a result of discharges to this area.
- 2.17 The primary stormwater network is to be designed to the 10% AEP + climate change scenario with the secondary network being designed to the 1% AEP + climate change scenario. The design of the primary and secondary networks is as per the Waikato Regional Infrastructure Technical Specification (RITS).

### **Stormwater Management Approach**

- 2.18 The stormwater management approach divides the Sleepyhead Estate into three separate zones, each with an approach that is unique to the topography, discharge point and land use characteristics. The zones are:
- (a) Industrial Zone,
  - (b) Business/ Commercial Zone; and
  - (c) Residential Zone.
- 2.19 A treatment train approach is adopted in order to meet the water quality and erosion control requirements for discharges to a lake environment outlined in Waikato Regional Council (“WRC”) document TR2018/01 for development within any of the stormwater management zones.
- 2.20 An overview of the stormwater management approach proposed for the Ohinewai Structure plan area is outlined in the flow chart shown in Figure 4.

### *Water Quality*

- 2.21 I anticipate, based on the available literature, that the proposed development will result in a decrease of nutrients (nitrogen, phosphorus) due to a change in land use from dairy farming to an urban environment.
- 2.22 The stormwater contaminants resultant from an urban environment (total suspended solids, heavy metals and hydrocarbons) are managed through a treatment train approach. The treatment train approach also provides for treatment of any residual nutrients (including in particular nitrogen and phosphorus).

- 2.23 Water quality treatment is proposed for all trafficked areas in all zones (residential, industrial, and commercial) including roads, parking areas and driveways. The treatment train approach involves at least two devices prior to discharge to the receiving environment. This is comprised of at-source treatment options and use of communal with devices within the CPA and WPA.
- 2.24 A stormwater management toolbox has been prepared which provides options for devices that can be utilised within the development. The stormwater management toolbox is shown in Table 3.
- 2.25 The use of multistage stage treatment provides greater benefit than where devices are used individually<sup>4</sup>. The OSP proposes the use of a multistage treatment train approach with a minimum 2 stage treatment requirement as shown in the stormwater management flow chart.

#### *Erosion Protection and Re-use*

- 2.26 Extended detention / volume control criteria are not required for discharges to a lake environment This is because such measures are provided to manage erosion and scour of natural stream/watercourses, which are not a concern when discharging to a lake environment.
- 2.27 Volume reduction is proposed through re-use from roof runoff. The strategy adopts a naturalised interface through inclusion of the wetland park area that provides a diffused outlet to Lake Rotokawau

#### *Flood Protection & Management*

- 2.28 Issues related to flooding are addressed in the evidence of Ajay Desai. The Site is located within a floodplain. The development proposes to elevate the Site above the floodplain. As a result of the proposed works no flooding will be observed within development areas of the site.
- 2.29 No development is proposed within the 1% AEP floodplain. Flood attenuation is not required for discharges to a Lake Environment where no downstream flood risks are identified, as set out in Mr Desai's evidence.

#### **Incorporation of Maturanga Maori**

- 2.30 A key aspect of maturaanga Maori is that the holders of this knowledge are tangata whenua, and access to this detailed knowledge relies entirely upon consultation and engagement with these groups. Mr Gaze's evidence

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4 Waikato Regional Council Technical Report 2018/01 - Section 6.2.6.1

provides an overview of collaboration with mana whenua and the formation of the Tangata Whenua Governance Group ("TWGG"). I attended and presented at a Hui with the TWGG on 22 October 2019 on the proposed stormwater management framework to seek feedback from iwi in order to fine tune the framework. Iwi sought ongoing input into the stormwater management design and emphasised the need for ecological considerations to be integrated into the SMP.

- 2.31 The SMP is intended to reflect that philosophy, including through the naturalised interface between the wetland park and Lake Rotokawau, the requirement for reuse tanks to preserve the resource and its mauri and the construction of the wetland park area, which will have notable ecological and amenity benefits.

### 3. **THE SITE AND CATCHMENT**

#### **The Site**

- 3.1 The Site encompasses 52-58 Lumsden Road, 88 Lumsden Road and 231 Tahuna Road, Ohinewai. It is approximately 178 ha in area and lies to the east of the Waikato Expressway and the Waikato River. It is in a predominantly rural pasture farmed area. The Site holds four farmsteads, one active milking shed and two old inactive milking sheds. The predominant land use is dairy farming.
- 3.2 Ground surface elevations vary between approximately RL 20m on the southern boundary with Tahuna Road and RL 6 m at the far eastern end of the site.

#### **Geology and Groundwater**

- 3.3 The geology of the Site is described in detail in the evidence of Mr Nick Speight. By way of summary, the Site is generally underlain by a surficial layer (3 to 13 m thick) of alluvial soils comprising recently deposited sands (Taupo Pumice Alluvium) and very soft clays/silts and peat (Rotokawau Formation). Older alluvial soils (interbedded sands, silts, clays and peat) of the Karapiro, Puketoka and Whangamarino Formations underlie these surficial soils. The basement rock (interbedded claystone, sandstone, siltstone and coal measures) known as the Te Kuiti Formation occurs at a depth of approximately 100 m below ground level.
- 3.4 Low lying areas of the Site (below RL 7.5 m) are typically mantled between 5 and 10 m of highly compressible soils (Rotokawau Formation). Areas of



the site with higher ground surface elevations (RL 9.0 m or higher) are directly underlain by more competent soils (Karapiro & Puketoka Formation).

- 3.5 Recharge to the Rotokawau peat is primarily derived from rainfall infiltration and hydraulic connection within Lakes Rotokawau and Waikare. The proposed development will have no impact on the surface peats connection to the Lakes Rotokawau and Waikare<sup>5</sup>.
- 3.6 The groundwater resource on the site and the implications of development on that resource are addressed in the evidence of Mr Dave Stafford. As set out in his evidence, the offsite effects of any groundwater level reduction from the site development are anticipated to be negligible.

### **Ecology**

- 3.7 There are no mapped watercourses, wetlands or water bodies within the site according to the Waikato Regional Council's online mapping system (Waikato Maps), except for the Tahuna Road drain which is noted as being 'Indigenous Fish Habitat'. The Waikato Maps Drainage Map shows both Tahuna Rd drain and Balemi Rd drain.
- 3.8 The Site is characterised by two large mapped drainage channels conveying surface flow from both Lake Ohinewai and groundwater from the site, to Lake Rotokawau and Lake Waikare. (Balemi drain does not drain to Lake Rotokawau but rather straight into Lake Waikare through the drain system which goes north from Balemi Rd).
- 3.9 The predominant land use on site is agricultural, comprising of dry stock farming activities. Mr Croft's evidence explains that the Site has highly modified and degraded freshwater and terrestrial ecosystems. The WRC mapped drainage channels are fed by numerous small, artificial farm drains that contain no natural portions from their confluence to their headwaters. Vegetation cover across the site is dominated by pasture grass with scattered exotic tree and indigenous fern specimens.
- 3.10 Mr Croft's evidence states that the surrounding area is known to be inhabited by threatened and at-risk species including bats, lizards and fish.

### **Flood Management**

- 3.11 The Site is located within the Lake Waikare catchment and affected by the LWWFCS. The Lower Waikato Zone Management Plan, which sets out the

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5 Sleepyhead Ohinewai – Stage 1 & 2 Sleepyhead Factory Development (Initia)

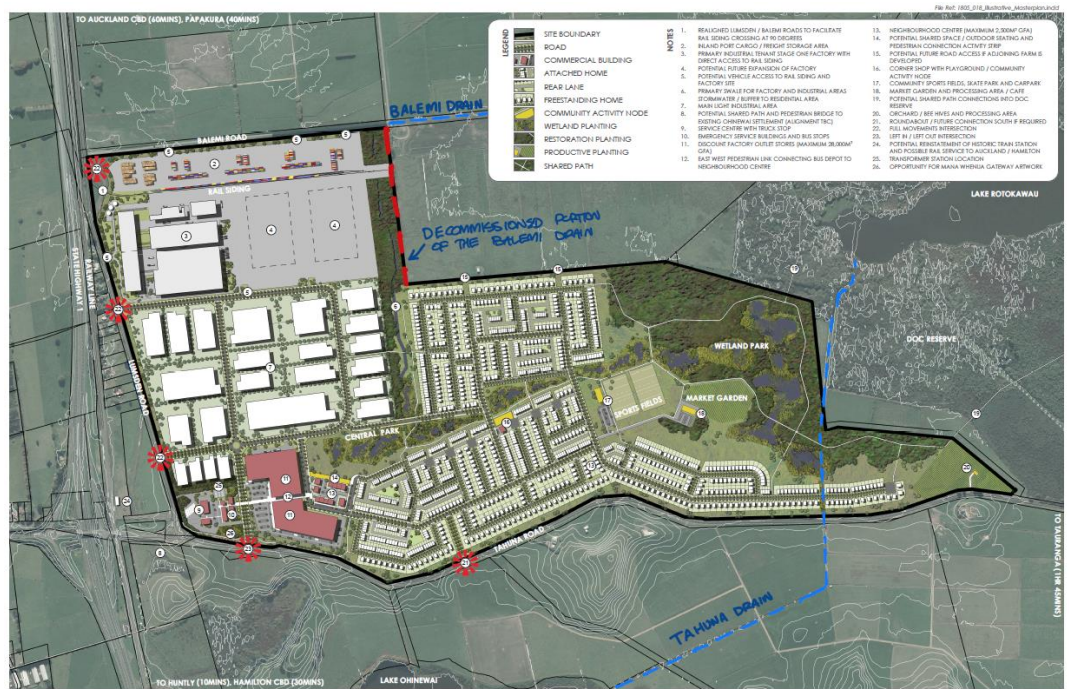
vision, strategy and action plan for this area, shows that there is very little or no interaction between the Waikato River and the Site. This is also reflected in the LWWFCS and is discussed further in Mr Desai's evidence.

- 3.12 The Site drains to Lake Rotokawau which flows into Lake Waikare, ultimately discharging to the Whangamarino Wetland via Waikare Flood Control Gate in a controlled manner in accordance with the LWWFCS.
- 3.13 The development of the Sleepyhead Estate will require that the development platforms are raised above the flood levels observed within Lake Waikare for various storm events.
- 3.14 Flood modelling has been undertaken to understand the flood hazard on the Site. This was undertaken with close consultation with WRC and is discussed in further detail in Mr Desai's evidence.
- 3.15 The operational level for Lake Waikare is between 5.4 – 5.75mRL. As per WRC's direction, a conservative water level of 8.0mRL was used which is the crest level for northern foreshore stop bank (approximately 0.6m above the spillway design level of 7.37mRL) for Lake Waikare. Additional modelling was undertaken with a water level of 5.4mRL which is the minimum operating level for the Lake to test flood effects for every day, i.e. non-severe storms.
- 3.16 Emergency Management Plan Assessment was also completed to understand flood risk to the proposed development associated with stop bank breach along River Waikato. Subsequently, additional modelling analysis has been undertaken with refinements in and around the Site to capture the topographical features like roads, rail lines, depressions and overland flow paths with higher precision/resolution.
- 3.17 A blockage assessment was undertaken to understand the risk associated with blockage of Lumsden Road and Tahuna Road culverts which discharge through the Site and will be culverted as part of the development (in consultation with and as directed by WRC). With both these modelled scenarios, there is no overtopping across Tahuna Road and Lumsden Road and there is no increase in flood effects on the proposed development
- 3.18 Sensitivity analysis was undertaken for the 10yr post development scenario to assess whether there is an increased flood risk to the development or downstream environment with any loss of storage to stormwater devices within the CPA.

- 3.19 To understand the worst-case effects, a conservative approach was adopted assuming that 100% of the Central Park area storage is used by stormwater devices (i.e. no storage is available for flood storage) and the model was simulated for the 10y year with the lower tailwater level of 5.4mRL.
- 3.20 The model results confirmed that there is no increased flood risk within site or to the neighbouring properties. There is no increase in flood extents or flood levels within Lake Waikare.
- 3.21 The modelling undertaken confirms that there is no increased flood risk within the Site or to the neighbouring properties. There is no increase in flood extents or flood levels within Lake Waikare.

**Land Drainage Scheme**

- 3.22 There are two farm drains / open channels associated with the Lower Waikato Land Drainage Scheme in the vicinity of the property. One is known as the Balemi Road drain and the other is the Tahuna Road drain. A schematic of these drains is shown in Figure 1 below.



**Figure 1:** Site area and contributing catchment area

- 3.23 The Balemi Road drain runs along the north eastern boundary along Balemi Road and then runs north to discharge into Lake Waikare.
- 3.24 The Tahuna Road drain is currently culverted under Tahuna Road. The drain conveys runoff from the upstream catchment of approximately 4.5km<sup>2</sup>,

including Lake Ohinewai to Lake Rotokawau. It is understood through consultation with WRC that there is a private pump used to facilitate flows from Tahuna Road Drain into Lake Rotokawau. The culvert under Tahuna Road acts as a flow restriction.

- 3.25 Consultation with the WRC Land Drainage Team confirmed that the drains are frequently at capacity and are unable to adequately convey flows resulting from a lack of grade. WRC advised that the lack of grade and standing water in the drain has created water quality issues exacerbated by sedimentation and submerged macrophytes.
- 3.26 There is little impermeable surface on the site and no record of reticulated public stormwater network. Stormwater runoff from the site discharges to the Balemi Road and Tahuna Road drains. The eastern part of the site is low-lying and there is likely to be overland flow passing through to adjacent properties.

### **Receiving Environment**

- 3.27 The northern portion of the Site discharges overland to the neighbouring site and into Balemi drain where it discharges to Lake Waikare. The remainder of the Site discharges to Lake Rotokawau and ultimately, to Lake Waikare.

#### *Lake Rotokawau*

- 3.28 Lake Rotokawau is located adjacent to the eastern boundary of the Site. Lake Rotokawau has been classified as a peat lake, with an area of approximately 22 hectares and average depth of 1.2 metres. It is located on the south western side of Lake Waikare and is hydraulically connected to it.
- 3.29 Lake Rotokawau is classified as hyper-eutrophic in TR2011/05 – Significant Natural Areas of the Waikato Region: Lake Ecosystems, with poor water quality. This poor water quality is likely caused from the existing land use (farming) surrounding agricultural activities.

#### *Lake Waikare*

- 3.30 Lake Waikare encompasses approximately 3442<sup>6</sup> hectares within the lower Waikato catchment. Lake Waikare is hypertrophic and has poor water quality, with particularly high levels of nitrogen and phosphorus. The lake harbours high levels of suspended solids.<sup>7</sup>

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6 Lake Waikare and Whangamarino Wetland Catchment Management Plan (2018).

7 Lake Waikare and Whangamarino Wetland Catchment Management Plan (2018).

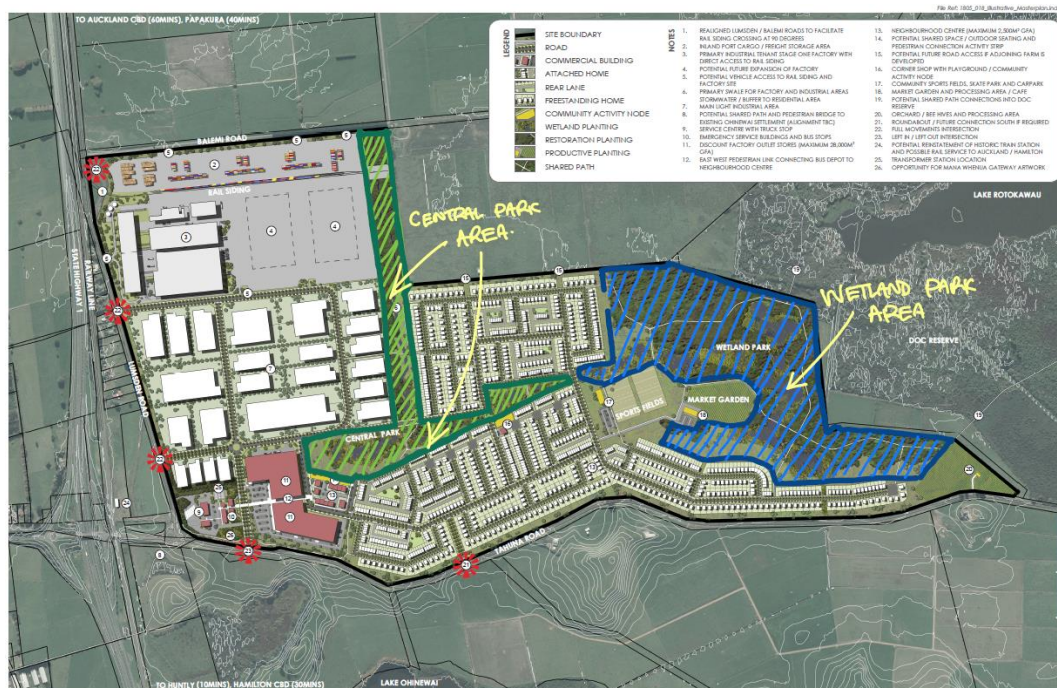
#### 4. **PROPOSED SLEEPYHEAD ESTATE DEVELOPMENT**

- 4.1 The Ohinewai Structure Plan provides for a mixed-use development form including across the 178ha site. The development includes industrial, business and residential land uses.
- 4.2 A large manufacturing factory (the Sleepyhead factory) sits within 61ha of industrial zoned land.<sup>8</sup> Approximately 52 hectares of land is allocated for residential development.
- 4.3 Approximately 10 hectares of the site is proposed for commercial development that is likely to include a service station, convenience stores and a discount factory outlet.<sup>9</sup>
- 4.4 Approximately 55ha of the development is allocated to open space that will include recreational facilities, ecological enhancement and stormwater management provisions.
- 4.5 The Sleepyhead Estate Masterplan, and consequently the Ohinewai Structure Plan and zoning plan, which are intended to give effect to the Masterplan, have been informed from the outset by stormwater management requirements. Two designated stormwater management areas have been included in the Masterplan – the CPA and the WPA. These are shown in Figure 2.
- 4.6 The CPA is intended to provide stormwater treatment and centralised conveyance via a series of stormwater devices such as wetland, rain gardens and swales.
- 4.7 The WPA is proposed to be created as an enhanced natural wetland that is planted with local flora. Engineered wetlands will be constructed around its fringes that will provide treatment for the lower residential zone.

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8 Total land area zoned Industrial is 68 hectares.

9 Total land area zoned Business/Commercial is 13 hectares.



**Figure 2:** Central Park and Wetland Park Areas

### Primary and Secondary Networks

4.8 The primary stormwater network is to be designed to the 10% AEP + climate change scenario as per the RITS. Owing to the lack of grade in the area, the drainage is proposed to be a combination of open channel swales and piped network.

4.9 The use of open channel swales to convey runoff in the primary storm event provides an opportunity to accommodate treatment as part of the conveyance strategy in the swales. This will aid in the stormwater management strategy for the site and is in alignment with Waikato Regional Council’s requirements (RITS and TR201801).

4.10 The secondary network is to be designed to the 1% AEP + climate change scenario. It is intended that the road network be used to convey runoff in the 1% AEP + climate change scenario as per RITS to the central park stormwater management area, which will then discharge into the WPA before discharging in a diffused manner to Lake Rotokawau.

### 5. RELEVANT PLANNING CONTEXT

5.1 A review of the statutory framework, relevant stormwater guidelines and policies was carried out to inform the appropriate stormwater requirements.



5.2 A summary of technical guidance documents considered in preparation of the Sleepyhead Estate SMP is summarised in Table 1 below:

Table 1: Summary of Guidance Documents (from Woods SMP, 2019)

Guidance Document	What it says	Relevance for Sleepyhead Estate SMP
Resource Management Act (1991)	Overarching environmental legislation.	Yes
National Policy Statement for Freshwater Management (2014)	National Statement outlining objectives for managing freshwater in New Zealand and policies for Regional Councils to adopt in order to meet these objectives.	Yes
Waikato Regional Policy Statement	Document outlining key objectives for the Waikato Region	Yes
Vision and Strategy for the Waikato River	Document outlining key objectives for the Waikato River specifically and strategies/policies to achieve those objectives	Yes
WRC TR2018/01 – Stormwater Management Guideline	Benchmark document for technical guidance and design criteria for stormwater management devices	Yes
WRC TR2018/02 – Waikato Stormwater Runoff Modelling Guideline	Guideline document for hydrology in the Waikato Region	Yes
Regional Infrastructure Technical Specifications (RITS)	Standards for the design and construction of public infrastructure within Waikato District. Stormwater Runoff Modelling Guidelines	Yes
NZS4404 – Land development and Subdivision Infrastructure	Provides detail on stormwater management including WSD, flood risk management, freeboard allowance etc	Yes
WRC TR2011/05 – Significant Natural Areas of the Waikato Region – Lake Ecosystems	Provides guidance on the prioritisation of natural areas for biodiversity management. Contains Lake water levels.	Yes
ARC TP10 – Stormwater Management Devices: Design guidelines manual	Superseded document for technical guidance and design criteria for stormwater management devices.	Yes – provides guidance in technical design for sizing of stormwater management devices
Auckland Council - Guideline Document 2017/001 Version 1 - Stormwater Management Devices in the Auckland Region	Based on ARC's TP10 document. Document for technical guidance and design criteria for stormwater management devices.	Yes – provides guidance in technical design for sizing of stormwater management devices
Streamlined Environmental – Rotokauri ICMP – Broad Scale Water Quality Assessment (December 2015)	Identifies the likely effects of emerging contaminants arising from urban development on hypertrophic lake environments.	Yes – provides guidance around contaminants of concern affecting hypertrophic lake environments

## **Te Ture Whaimana o Te Awa o Waikato (Vision & Strategy)**

- 5.3 The Vision and Strategy for the Waikato River (Te Ture Whaimana o Te Awa o Waikato) responds to four fundamental issues, which are as follows:
- (a) The degradation of the Waikato River and its catchment has severely compromised Waikato River iwi in their ability to exercise mana whakahaere or conduct their tikanga and kawa;
  - (b) Over time, human activities along the Waikato River and land uses through its catchments have degraded the Waikato River and reduced the relationships and aspirations of communities with the Waikato River;
  - (c) The natural processes of the Waikato River have been altered over time by physical intervention, land use and subsurface hydrological changes. The cumulative effects of these uses have degraded the Waikato River; and
  - (d) It will take commitment and time to restore and protect the health and wellbeing of the Waikato River
- 5.4 While the Site does not discharge directly to the Waikato River, the Vision and Strategy has been considered as part of this SMP given that Lake Rotokawau and Lake Waikare ultimately form part of the Waikato River's significant catchment.
- 5.5 The Vision and Strategy is part of the Waikato Regional Policy Statement, but in the event of a conflict, it takes precedence over any national policy statement.<sup>10</sup> It outlines objectives and strategies to achieve the restoration of the Waikato River. The following objectives (As per section 2.5.2 of the Vision and Strategy) have been considered as part of the SMP:
- (a) The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River, and in particular those effects that threaten serious or irreversible damage to the Waikato River;
  - (b) The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities; and

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10 Section 12(1) of the Settlement Act.



- (c) The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.

5.6 The following strategies to meet the above objectives set out in 2.5.2 of the Vision and Strategy have also been considered as part of the SMP:

- (a) Ensure that the highest level of recognition is given to the restoration and protection of the Waikato River;
- (b) Encourage and foster a 'whole of river' approach to the restoration and protection of the Waikato River, including the development, recognition and promotion of best practice methods for restoring and protecting the health and wellbeing of the Waikato River; and
- (c) Ensure that the cumulative adverse effects on the Waikato River of activities are appropriately managed in statutory planning documents at the time of their review.

### **National Policy Statement for Freshwater Management**

5.7 The National Policy Statement for Freshwater Management (NPSFM) sets out the statutory framework for the management of freshwater across New Zealand. The NPSFM requires Regional Councils to recognise the national significance of freshwater. Overall, freshwater quality within a region must be maintained or improved.

5.8 Key provisions of the NPSFM that are relevant to the SMP are Objectives A1, A2 and A4 and Policy A4. These are as follows:

#### **Objective A1**

*To safeguard: a) the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems, of fresh water; and b) the health of people and communities, as affected by contact with fresh water; in sustainably managing the use and development of land, and of discharges of contaminants.*

#### **Objective A2**

*The overall quality of fresh water within a freshwater management unit is maintained or improved while: a) protecting the significant values of outstanding freshwater bodies; b) protecting the significant values of wetlands; and c) improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.*

#### **Objective A3**

*The quality of fresh water within a freshwater management unit is improved so it is suitable for primary contact more*

*often, unless: a) regional targets established under Policy A6(b) have been achieved; or b) naturally occurring processes mean further improvement is not possible.*

5.9 The SMP is designed to give effect to the NPSFM. Relevant features of the SMP are as follows:

- (a) The SMP will provide for the reduction of nitrogen and phosphorus from stormwater runoff from the site which will help to contribute to the enhancement of the water quality of the receiving lake and wetland environments.
- (b) The treatment train approach will ensure that discharges from the site will not have any effects on the health of people and communities as affected by their secondary contact with freshwater nor on the mauri (life supporting capacity) of the downstream environment.

### **Waikato Regional Policy Statement**

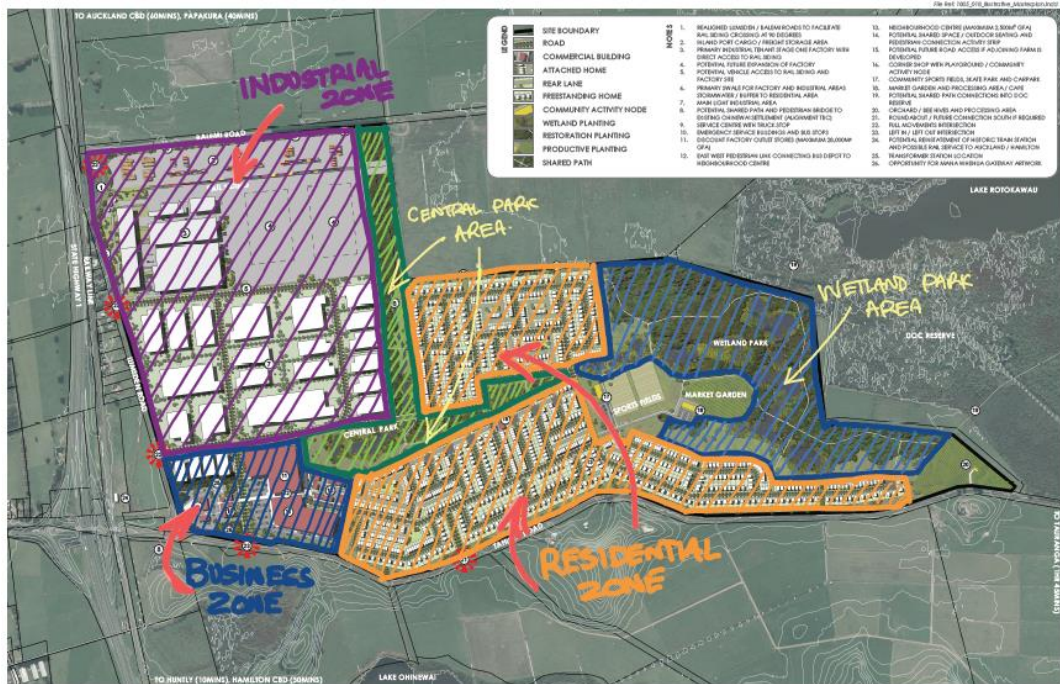
5.10 As part of formulating the SMP, consideration was given to the following aspects of the Waikato RPS:

- (a) Objective 3.12: Built Environment (Ngā Wāhi Ka Whakawhanakehia)
  - (i) Requires that subdivision, use and development of the built environment occurs in an integrated and coordinated way that is sustainable, affordable and planned; and
  - (ii) Recognises the historical, cultural and social importance of marae and papakāinga and provides for their ongoing use and development as part of the built environment.
- (b) Objective 3.14: Fresh Water Bodies (Ngā Huinga Waimāori)
  - (i) Seeks to maintain and enhance the values of freshwater bodies in the region, manage the allocation and use of fresh water and manage lakes, riparian areas and wetlands to promote water quality, biodiversity, cultural values and public access;
  - (ii) Recognises Te Ture Whaimana o Te Awa o Waikato - the Vision and Strategy for the Waikato River as the primary direction setting document for the Waikato River;

- (iii) Acknowledges the special relationship that tangata whenua have with water resources; and
  - (iv) Promotes a catchment based approach to water quality interventions to ensure the integrated management of water resources.
- (c) Objective 3.24: Natural Hazards (Ngā Pūmate Ā-Taiao)
  - (i) Promotes a regionally consistent approach to managing natural hazard risks through district and regional plans.
  - (ii) Advocates for collaboration between organisations and the sharing of information. A Regional Natural Hazards Forum has been established to promote organisational integration and sharing across jurisdictional and plan boundaries;
  - (iii) Takes a risk based approach to the management of natural hazards; and
  - (iv) Requires that local authorities consider the potential effects of high impact, low probability natural hazard events and plan ahead.

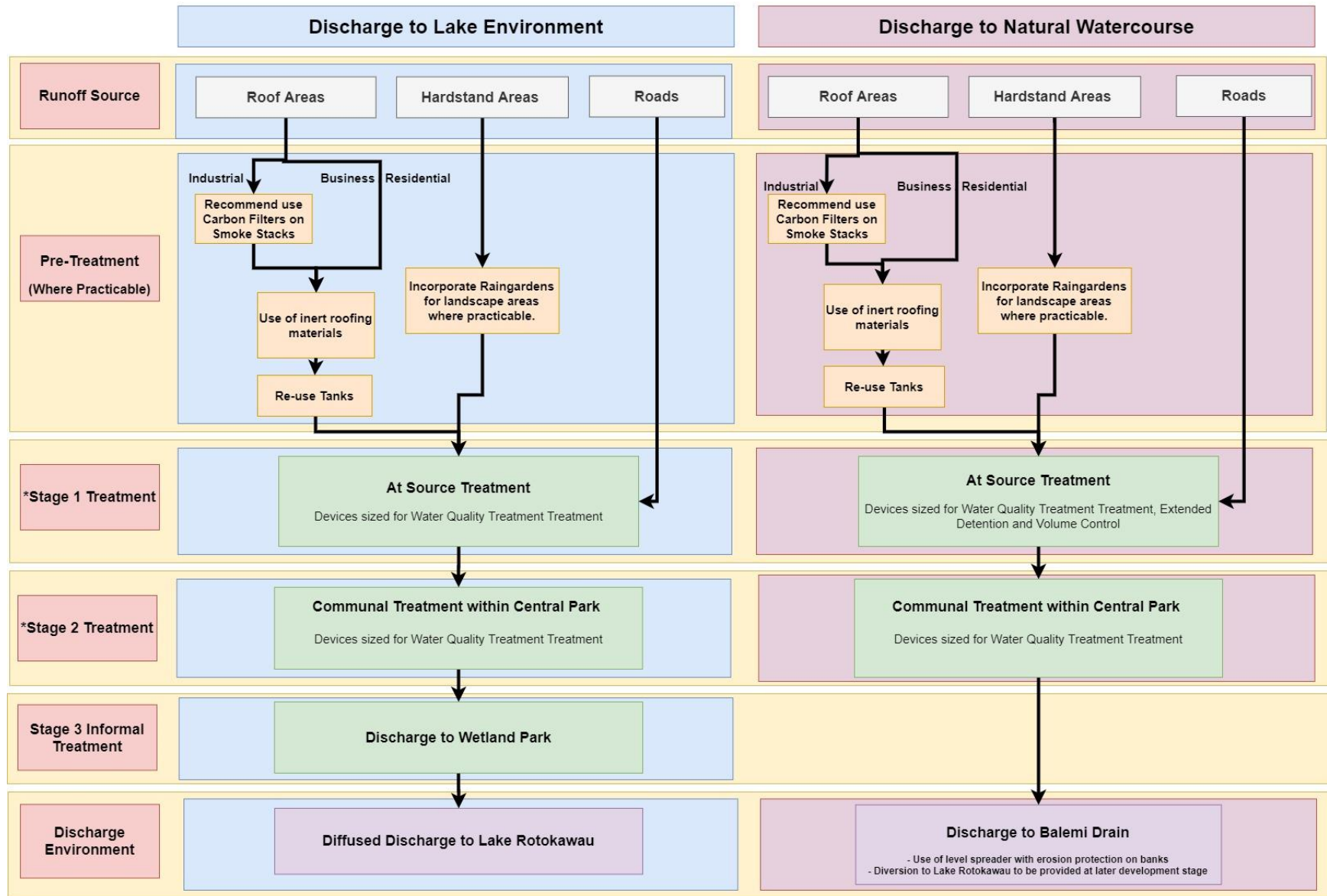
## 6. **STORMWATER DESIGN AND MANAGEMENT APPROACH**

- 6.1 The stormwater management approach divides the Sleepyhead Estate into three separate zones, each with an approach that is unique to the topography, discharge point and land use characteristics. The zones are:
  - (a) Industrial Zone;
  - (b) Business/ Commercial Zone; and
  - (c) Residential Zone.
- 6.2 A schematic of these zones in relation with the site is shown in Figure 3.



**Figure 3:** Stormwater management zones (from Woods SMP, 2019)

- 6.3 A treatment train approach is adopted in order to meet the water quality and erosion control requirements outlined in the WRC’s TR2018/01 for development within any of the stormwater management zones. The approach varies depending on the ultimate discharge environment (lake vs natural watercourse).
- 6.4 The requirements for extended detention and volume control are not required when discharging to a lake environment.
- 6.5 An overview of the stormwater management approach proposed for the Ohinewai Structure plan area is outlined in the flow chart shown in Figure 4.



*\*Denotes WRC minimum requirements with respect to water quality treatment for lake and natural watercourse environments and volume control/extended detention criteria when discharging to a natural watercourse.*

**Figure 4:** Stormwater management flow chart

- 6.6 The stormwater management flow chart has been developed based on the feedback received from WRC.
- 6.7 While the ultimate discharge environment for the development is Lake Rotokawau, the development staging will require Balemi Drain to be used as in interim solution until the central park area is established.
- 6.8 The flowchart also denotes the WPA as providing “informal treatment”, this is because the WPA is not proposed to be a engineered wetland and therefore will not be designed to meet the specific design and performance requirements, it is however anticipated that a level of polishing will likely occur as a result of discharges to this area.
- 6.9 A summary of the framework with respect to the stormwater management zones is set out in Table 2.

Table 2: Stormwater Management Treatment by Zone

Zone	Treatment Method		
	On-Site (Stage 1)	Central Park Area (Stage 2)	Wetland Park Area (Informal Treatment)
<b>Industrial</b>	Y	Y	Final polishing (informal)
<b>Business</b>	Y	Y	Final polishing (informal)
<b>Residential – West</b>	Y	Y	Final polishing (informal)
<b>Residential - East</b>	Y	N	Specific device within Wetland Park Area + final polishing

- 6.10 The SMP for the Sleepyhead Estate development area sets out specific design criteria that will provide guidance for detailed design. These criteria are summarised as follows:

*Water Quality*

- 6.11 Water quality treatment is proposed for all trafficked areas in all zones (residential, industrial and commercial) including roads, parking areas and driveways. No high contaminant yielding cladding or roofing materials are recommended.
- 6.12 The SMP adopts a treatment train approach of at least two devices prior to discharge to the receiving environment. This is comprised of at-source treatment options and use of communal with devices within the CPA and WPA.

6.13 I anticipate that the proposed development will result in a decrease of nutrients from stormwater runoff (nitrogen, phosphorus) due to a change in land use from dairy farming to an urban environment. I base this conclusion on the following:

- (a) Currently, the Site discharges raw untreated dairy effluent to the receiving environment. Nitrogen discharges associated with dairy farming typically discharge volumes ranging between 1-70mg/L<sup>11</sup>, with numerous studies showing much higher mean concentrations. Longhurst et. al. 2000 reported values in the order of 269mg/L<sup>12</sup>.
- (b) Phosphorus discharged by dairy farms is typically in the order of 4-150 mg/L<sup>13</sup> with Longhurst et. al. 2000 reporting a mean of 69mg/L<sup>14</sup>.
- (c) Urbanisation generally introduces different types of contaminants to the receiving environment particularly those associated with vehicular usage (heavy metals, PAH's etc). With respect to nutrients, the major contributing sources are fertiliser runoff, sewage overflows and soil loss. Long term baseline water quality monitoring carried out in the Auckland region<sup>15</sup>, showed some urban catchments recording nitrate-nitrogen levels between 1 and 2 mg/L and some with ammonia-nitrogen up to 2.9mg/L. Total phosphorus has been recorded between 0.06 to 0.28 mg/L<sup>16</sup>. According to TR2013/035, while nutrients have been identified as a contaminant of concern in certain water bodies, they are in general associated with wastewater overflow rather than stormwater contamination

6.14 Paragraph 6.13 above is not a direct comparison between a dairy farm catchment and an urban catchment. However, numerous studies (Longhurst

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11 Marshall, K. R., and Harper, W. J.(1984). The Treatment of Wastes from the Dairy Industry. In: Survey in Industrial Wastewater Treatment, Barnes, D., et al. eds., Part 1, Pitman, London, 296-376.

12 R.D Longhurst, A.H C. Roberts and M.B. O'Connor (2000) Farm dairy effluent: A review of published data on chemical and physical characteristics in New Zealand, New Zealand Journal of Agricultural Research, 43:1, 7-14, DOI: 1080/00288233.2000.9513403.

13 Marshall, K. R., and Harper, W. J.(1984). The Treatment of Wastes from the Dairy Industry. In: Survey in Industrial Wastewater Treatment, Barnes, D., et al. eds., Part 1, Pitman, London, 296-376.

14 R.D Longhurst, A.H C. Roberts and M.B. O'Connor (2000) Farm dairy effluent: A review of published data on chemical and physical characteristics in New Zealand, New Zealand Journal of Agricultural Research, 43:1, 7-14, DOI: 1080/00288233.2000.9513403.

15 Auckland Unitary Plan stormwater management provisions: Technical basis of contaminant and volume management requirements, Technical Report 2013/035. Auckland Council 2013.

16 Mills, G.N.; Williamson, R.B., 2008. The Impacts of Urban Stormwater in Auckland's Aquatic Receiving Environment: A Review of Information 1995 to 2005. Prepared by Diffuse Sources Ltd and Geosyntec Consultants for Auckland Regional Council. Auckland Regional Council Technical Report 2008/029.

et. Al. 2000<sup>17</sup>, Barnett 1992<sup>18</sup>, Wrigley 1994<sup>19</sup>, Selvarajah 1998<sup>20</sup>, Longhurst et. Al. 2017<sup>21</sup>) indicate farm runoff typically generates higher nutrient concentrations than most urban catchments (Yang and Musk 2018<sup>22</sup>, Barten 1987<sup>23</sup>) Wei et. Al 2013<sup>24</sup>).

- 6.15 It is my opinion that the stormwater management framework for the development provides for best practice contaminant removal for stormwater runoff from urban land use. A stormwater management toolbox has been prepared which provides options for devices that can be utilised within the development. The stormwater management toolbox is shown in Table 3.
- 6.16 The stormwater contaminants resultant from an urban environment (total suspended solids, heavy metals and hydrocarbons) are managed through the treatment train approach. The treatment train approach also provides for treatment of any residual nutrients (nitrogen, phosphorus). A summary of the stormwater removal capabilities for devices is provided in Tables 4 and 5.
- 6.17 The use of multistage stage treatment provides greater benefit than those used only individually<sup>25</sup>. The OSP proposes the use of a multistage treatment train approach with a minimum two stage treatment requirement as shown in Figure 4.

Table 3: Stormwater Management Toolbox (from Woods SMP, 2019)

Stormwater Device	Typical Applications	Water Quality Treatment	Erosion Control	Flood Attenuation
Rain tanks	Roof areas. Applicable in residential, commercial or industrial zones.	NA	Yes	No

- 17 R.D Longhurst, A.H C. Roberts and M.B. O'Connor (2000) Farm dairy effluent: A review of published data on chemical and physical characteristics in New Zealand, New Zealand Journal of Agricultural Research, 43:1, 7-14, DOI: 1080/00288233.2000.9513403.
- 18 Barnett J.W., 1992, Wastewater treatment in the dairy industry, Technical report, New Zealand Dairy Institute.
- 19 Wrigley, R. (ed.) (1994) Managing dairy-shed wastes, Volume 2, Dairy Research and Development Corporation, Melbourne.
- 20 S. Selvarajah (1998) Treating farm dairy effluent to minimise impacts on New Zealand – Dairy Farmers- session, Conference Paper; DOI: 10.13140/2.1.3328.1604 · Conference: Desafio Lechero (Dairy Farmers' Session), At Florida, Uruguay.
- 21 R.D. Longhurst., Rajendram, G., Miller, B., Dexter M., 2017. Nutrient Content of Liquid and Solid Effluents on NZ Dairy Cow Farms. In: *Science and policy; nutrient management challenges for the next generation* (Eds L.D. Currie and M.J Hedley). <http://flrc.massey.ac.nz/publications.html>. Occasional Report No. 3. Fertilizer and Lime Research Centre, Massey University, Palmerston North, New Zealand.
- 22 Y.Yang., M. Lusk., 2018., Nutrients in Urban Stormwater Runoff: Current State of the Science and Potential Mitigation Options., in Current Pollution Reports Volume 4., DO - 10.1007/s40726-018-0087-7.
- 23 J. M. Barten., 1987, Stormwater Runoff Treatment in a Wetland Filter: Effects on he Water Quality of Clear Lake, Lake and Reservoir Management, 3:1, 297-305, DOI: 10.1080/07438148709354785.
- 24 Z. Wei., Simin, L., Fengbing, T., 2013, Characterization of Urban Pollution between Dissolved and Particulate Phases, Hindawi Publishing Corporation, The Scientific World Journal, Volume 2013, Article ID 964737, 6 pages, <http://dxdoi.org/10.1155/2013/964737>.
- 25 Waikato Regional Council Technical Report 2018/01 - Section 6.2.6.1.



Stormwater Device	Typical Applications	Water Quality Treatment	Erosion Control	Flood Attenuation
Inert roofing material	Roof areas. Applicable in residential, commercial or industrial zones	NA	No	No
Living roofs	Roof areas. Applicable in residential, commercial or industrial zones.	NA	No	No
Bioretention devices	Roofs, carparks, driveways, footpaths. Applicable in residential, commercial or industrial zones.	Yes	Yes	No
Permeable pavement <sup>1</sup>	Carparks, driveways, footpaths, cycleways. Applicable in residential, commercial or industrial zones.	Yes	No	No
Swales	Carparks, driveways, roads, parking bays, footpaths. Applicable in residential, commercial or industrial zones.	Yes	No	No
Filter strips	Applicable in residential, commercial or industrial zones.	Yes	No	No
Wetland swales	Open space areas. Applicable to residential, commercial or industrial zones.	Yes	Yes	No
Dry pond with extended detention <sup>3,4</sup>	Applicable to residential, commercial or industrial zones. Accommodated in open space areas.	No	Yes	Yes
Wet pond with extended detention	Applicable to residential, commercial or industrial zones. Accommodated in open space areas.	Yes	Yes	Yes
Wetlands	Accommodated in open space areas.	Yes	Yes	Yes
Proprietary devices such as StormFilters or cellular storage	Roofs, carparks, driveways, roads, parking bays, footpaths. Applicable in residential, commercial or industrial zones.	Yes, depending on device	Yes, depending on device	No

Table 4: Stormwater Device Capabilities (Source: Waikato Regional Council Technical Report 2018/01 -Table 6-8)

Device	Peak flow control	Water Quality Treatment			
		Sediment Removal	Metal Removal	Total Petroleum Hydrocarbons (TPH) Removal	Nutrient Removal
Dry pond with extended detention	High	Moderate	Pb – Moderate Cu – Low	Low	P – Low N – Low

Device	Peak flow control	Water Quality Treatment			
		Sediment Removal	Metal Removal	Total Petroleum Hydrocarbons (TPH) Removal	Nutrient Removal
			Zn – Low		
Wet pond with extended detention	High	High	Pb – High Cu – Moderate Zn – Moderate	Low	P – Moderate N – Low
Wetland	High	High	Pb – High Cu – High Zn – High	High	P – High N – High
Filter systems	Low	High	Pb – High Cu – Moderate Zn – Low	High	P – Moderate N – Low
Raingarden	Low	High	Pb – High Cu – High Zn – High	High	P – High N – Moderate
Infiltration devices	Moderate	High	Pb – High Cu – High Zn – High	High	P – High N – Moderate
Swales and filter strips	Low	High	Pb – High Cu – Moderate Zn – Moderate	Moderate	P – Moderate N – Low
Rain tank	Moderate – only useful during smaller, frequent rainfall events	None	None	None	None
Permeable Pavement	Low	Low	Low	Low	Low
Living Roofs	Low	Low	Low	Low	Low

Table 5: Removal rates for various stormwater devices (Source: Waikato Regional Council Technical Report 2018/01 -Table 6-10 & 6-11)

Practice	Removal Rates (%)				
	TSS	Nitrogen	Phosphorus	Zinc	Copper
Swales	75	20	30	50	60
Filter strips	70	20	20	50	60
Sand Filters (with organic matter)	80	35	45	90	90
Bioretention Devices (Normal)	80	40	60	70	75
Bioretention Devices (Anaerobic Zones)	80	50	80	70	75
Infiltration Devices	80	30	60	80	70
Dry Ponds (no EDV)	40	10	20	10	20
Dry Ponds (with EDV)	60	20	30	20	30
Wet ponds	75	25	40	30	40
Wetlands	80	40	50	60	70
Green roofs	Volume reduction and some water quality treatment	Volume reduction and some water quality treatment	Volume reduction and some water quality treatment	Volume reduction only	Volume reduction only
Water tanks	Volume reduction only	Volume reduction only	Volume reduction only	Volume reduction only	Volume reduction only
Oil water separators	15	0	5	5	5

#### *Erosion Protection and Re-use*

- 6.18 Extended detention / volume control criteria are not required for discharges to a lake environment. Volume reduction is proposed through re-use from roof runoff.
- 6.19 The strategy adopts a naturalised interface through inclusion of the wetland park area that provides a diffused outlet to Lake Rotokawau

#### *Flood Protection & Management*

- 6.20 No development is proposed within the 1% AEP floodplain. Flood attenuation is not required for discharges to a lake environment.

#### *Incorporation of Mātauranga Māori perspective*

- 6.21 A key aspect of mātauranga Māori is that the holders of this knowledge are tangata whenua, and access to this detailed knowledge relies entirely upon consultation and engagement with these groups. I attended and

presented at a hui with the TWGG on 22 October 2019 on the proposed stormwater management framework. At that time the framework was being fine-tuned and the purpose of the hui was to seek feedback from iwi on the proposed measures. Participants sought ongoing input into the detailed design of the SMP, and made a number of suggestions including provision of habitat for fish and tuna (eels).t They also raised a general concern that ecological matters should be integrated into the SMP.

- 6.22 The SMP is intended to reflect that philosophy, including through the naturalised interface between the wetland park and Lake Rotokawau, the requirement for reuse tanks to preserve the resource and its mauri and the construction of the wetland park area, which will have notable ecological and amenity benefits.
- 6.23 A Kaitiaki Environmental Values Assessment (KEWA) has been undertaken, this assessment with respect to stormwater is summarised in Table 6.

Table 6: Kaitiaki Environmental Values Assessment (KEWA)

Item	Response
Retiring marginal lands from unsustainable land uses.	Existing dairy farmland will be retired from that use.
Avoiding further clearance/degradation of indigenous vegetation and disturbance of land prone to heavy erosion.	There is no indigenous vegetation on the site (reference Evidence of Chad Croft) discharge from proposed development site will not result in erosion due to the site not discharging to watercourses
Protect water-bodies from erosion and sediment, and any contaminants.	<p>There are no water bodies on the site apart from the Balemi and Tahuna Drains and some minor farm drains. The nearest water body is Lake Rotokawau. The stormwater management plan involves no point source discharge to the lake, but treated stormwater will be discharged in a diffuse manner into the wetland areas around the lake. Stormwater will be treated to a higher quality than the current discharges from the farm which is untreated and from the Balemi and Tahuna drains that discharge into the Lake.</p> <p>Matters regarding sediment are erosion through construction are addressed in the evidence of Mr Ben Pain.</p>

<p>That the development seeks to restore the capacity of the local ecosystem, especially ecosystems that function without human intervention:</p> <p>a) By incorporating in the design of the development, the inclusion of an area of land/wetland (e.g constructed wetlands) towards the restoration of taonga, and</p> <p>b) Financially supporting projects that seek to restore taonga in the immediate vicinity of the development area, and</p> <p>c) The prevention and/or mitigation of potential contaminants in run-off water from impervious surfaces (paved areas), reaching open water bodies (drains, streams etc)</p>	<p>Constructed wetlands will form part of the stormwater/open space design in the 55ha central park/wetland park area.</p> <p>The restoration of 55ha of open space/wetlands on the site, and opening them up to public access is a significant project and will be the primary financial investment.</p> <p>The stormwater management plan prepared for the project includes a best practice treatment train approach that includes treatment devices and wetlands. Implementation will mainly be through subsequent regional resource consents for stormwater disposal.</p>
<p>Protection of water-bodies (river, lakes, wetlands, streams/tributaries), from the negative impacts of land use (includes agricultural, residential/commercial and industrial development).</p>	<p>The negative impacts of the current agricultural land use will be removed. The urban land uses will be developed in a manner that protects water bodies, particularly through restoration of wetlands and a high level of stormwater treatment.</p>
<p>Aspire for improvements in the quality of water (and state of water-bodies) in the lower Waikato River catchment to drinkable, swimmable and fishable standard,</p>	<p>The Ohinewai development will contribute to these improvements by treating stormwater discharges from the site to a higher quality than currently</p>
<p>Consider beneficial re-use and on-site management of stormwater and wastewater</p>	<p>The stormwater management approach includes potential reuse of stormwater as part of the treatment train approach.</p>
<p>Protection of wetlands from farm drainage systems, or the removal of wetland margin/riparian vegetation, unnaturally high sediment (and nutrient) loads, and the introduction of noxious/pest plant and animal species.</p>	<p>The current farm drainage system will be removed. No existing wetland or riparian vegetation will be removed.</p>

*Land Drainage Scheme*

- 6.24 The SMP has accounted for both the Balemi Road and Tahuna Road drains as comprised within the LWLDS that are managed by the WRC.
- 6.25 Consultation with the WRC Land Drainage Team has confirmed that the portion of the Balemi Road drain, which runs along the northern property boundary can be decommissioned as part of the development.
- 6.26 The drainage and conveyance function previously provided for by the Balemi drain is no longer required. The area of the Site identified for the Sleepyhead factory, which previously discharged to the Balemi drain is now accounted for within the CPA. The CPA will provide both stormwater conveyance and treatment functions for the proposed development.
- 6.27 Part of the residential zone will be built over a section of the Tahuna Road drain. The Tahuna Road drain currently services drainage for the upstream catchment. The development will not affect the conveyance capacity of the drain. Consultation with the WRC Land Drainage Team has indicated that any conveyance structures traversing the Ohinewai Structure Plan Area are

required to be easily accessible structures (such as arch culverts or bridge structures) to allow for access to and clearing of submerged macrophytes within the Tahuna drain.

## **7. LIASON WITH WAIKATO REGIONAL COUNCIL**

7.1 In formulating the SMP and in finalising this evidence, various meetings and discussions have been undertaken with Waikato Regional Council. The SMP was introduced to the WRC regulatory team at a meeting on 27 February 2020. Key matters raised and outcomes are described below:

- (a) Confirmation that extended detention and volume control criteria are not required for discharges to a lake environment. Clarification that the volume control/retention criteria is only required when discharging to a natural watercourse.
- (b) Confirmation that water quality treatment is required for all trafficked areas in all areas (residential, industrial and commercial) including roads, parking areas and driveways.
- (c) If there is a risk of air borne pollutants in industrial/commercial areas (dust, process emissions, smoke stacks) then roof runoff will also need to be treated. This is a matter that will appropriately be addressed at resource consent stage.
- (d) Discharges to a lake catchment require a minimum two stage treatment.

7.2 Feedback from the WRC Land Drainage team has also been sought at various stages of the development of the SMP given the presence of the Balemi Drain and Tahuna Road drain within the site.

7.3 Key matters raised and outcomes are described below:

- (a) Balemi Road drain does not discharge into Lake Rotokawau directly as shown on the land drainage maps on WRC GIS. The drainage portion which would enable discharge into Lake Rotokawau is a private drain. There are pumps that drive flow towards the north to discharge directly into Lake Waikare. This drain travels north and then east before discharging into Lake Waikare.
- (b) Balemi Road drain is currently unable to adequately convey flows into Lake Waikare. This is due to a lack of grade in the channel. Siltation

issues also results in lateral drains being unable to perform to the level of service that is expected of them.

- (c) WRC agreed that the portion of Balemi Road drain that runs along the boundary of Parcel ID: 425757, ALLOT 405 WHANGAMARINO PARISH could be decommissioned on the basis that the Balemi Road drain is currently struggling with conveyance capacity issues.
- (d) Tahuna Road drain is currently culverted under Tahuna Road and discharges to within the Site. There is potential for an extension of the culvert under the proposed residential properties on this part of the site. WRC have indicated that this culvert frequently sees drainage issues resulting from weed growth within the standing water in the culvert. WRC indicated that it would prefer a bridge rather than a culvert under Tahuna Road. I understand that this is a matter that will be addressed at detailed design stage.
- (e) WRC advised that DOC permission is required if APL are to propose any outlets within the Lake Rotokawau boundary. It was advised that any outlet structures will be constructed within the Ohinewai Structure Plan Area land within the WPA.

## 8. **COMMENTS ON THE SECTION 42A REPORT AND EXPERT CONFERENCING**

### **Stantec (for Waikato District Council & Watercare Services Limited).**

- 8.1 The Section 42A report was informed by a report prepared by Stantec (Megan Blackburn). I understand that Watercare Services Limited (as WDC's service provider) was also involved with Stantec's review.
- 8.2 The majority of matters raised by Stantec were of a technical nature. Ms Blackburn and I have had ongoing discussions since her report was released. During the course of discussions, Ms Blackburn and I largely agreed that the matters raised would be appropriately addressed at detailed design stage during the resource consent process.
- 8.3 Expert conferencing was undertaken with Ms Blackburn on 16 June 2020. All outstanding areas of disagreement were discussed at the conferencing session. Ultimately, Ms Blackburn and I reached agreement on all outstanding matters, as reflected in the Joint Witness Statement dated 18 June 2020.

9. **CONCLUSIONS**

- 9.1 The stormwater management approach for the Ohinewai Structure Plan Area has been developed to respond to the particular characteristics of the Site and receiving environment.
- 9.2 The proposed stormwater approach incorporates a water sensitive design approach that manages the impact of land use change from predominantly rural/farmland to urban.
- 9.3 The proposed approach promotes at source stormwater management which is in line with Waikato Regional Council's Stormwater Management Guidelines.
- 9.4 The stormwater approach minimises the adverse effects on the water quality and ecological values of the receiving environment through the implementation of stormwater management devices to be selected using a toolbox of options and a minimum two stage treatment train approach.
- 9.5 As a result of the work undertaken to date, there is in my professional opinion no reason related to stormwater why the rezoning of the Ohinewai Structure Plan Area, as sought by APL, cannot be approved as proposed.

**Pranil Wadan**  
**9 July 2020**