Future Development Strategy

Future urban areas evidence report

November 2023

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Auckland future development strategy 2023-2053. Future urban areas evidence report.

November 2023

ISBN 978-1-991146-04-5 (PDF)

Strategy adopted by the Auckland Council Planning, Environment and Parks Committee, 2 November 2023.

Contents

Executive summary

In 2016, around 15,000ha of land was identified for growth in rural areas, referred to as future urban areas (FUAs). It was estimated that this land could accommodate approximately 137,000 homes and 67,000 jobs. These FUAs were seen as a valuable resource that needed to be planned and used efficiently to get the best long-term, sustainable outcomes for Auckland and Aucklanders.

The Future Urban Land Supply Strategy 2017 (FULSS) (Auckland Council, 2017) outlined a coordinated approach to timing and sequencing development in these FUAs over 30 years. This was based on live zoned areas being sequenced first. Infrastructure or environmental constraints were also key considerations for sequencing.

In 2018 the sequencing information for anticipated development readiness of FUAs was included in the Auckland Plan Development Strategy 2050 (Auckland Council, 2018a).

Currently 31% of initial future urban land, identified in the FULSS, has been live zoned[1]. This is higher than what was anticipated at this point in the FULSS sequencing.

Monitoring (2021-2022) indicated that of 21,607 dwellings consented region wide, 2,408 dwellings were in FUAs, this represented a 0.4% increase from the previous reporting year. This was approximately 11% of all dwellings consented.

Consent information showed that 60% of the dwellings consented in FUAs were for stand-alone houses (Auckland Council, 2022).

Opportunities and challenges

The identification of FUAs provides Auckland with an opportunity to comprehensively plan these areas to achieve well-functioning urban environments. Comprehensive planning enables these areas to provide housing capacity as well as accommodating business and employment land, community facilities, parks and green spaces.

However, planning for these areas also presents challenges. There have been a significant number of private plan changes and fast track consents that challenge the ability to plan comprehensively and achieve good design through structure planning. Development of greenfield areas is more costly to provide infrastructure for and generates greater VKT because of its relative distance from facilities and existing employment. The council has legislative requirements to reduce greenhouse gas emissions. Additionally, weather events and new information have highlighted natural hazards in some of the FUAs and the need to address these comprehensively.

Approach

The approach of the Future Development Strategy (FDS) proposes:

- Changing the timing of ‘development readiness’ for some FUAs to reflect the significant challenges in funding infrastructure investment to support growth and the need to better align development readiness with the ability to fund infrastructure.
- Reducing the spatial extent of some FUAs where there would be risks to life and property from existing and future natural hazards.

[1] This includes land zoned straight from a rural zone to an urban zone as part of the AUP decisions.

- “Red flagging” some FUAs to place particular emphasis on existing regulatory requirements that ensure a whole of catchment approach is taken to FUAs where development would otherwise result in exacerbating risks to life and property downstream.

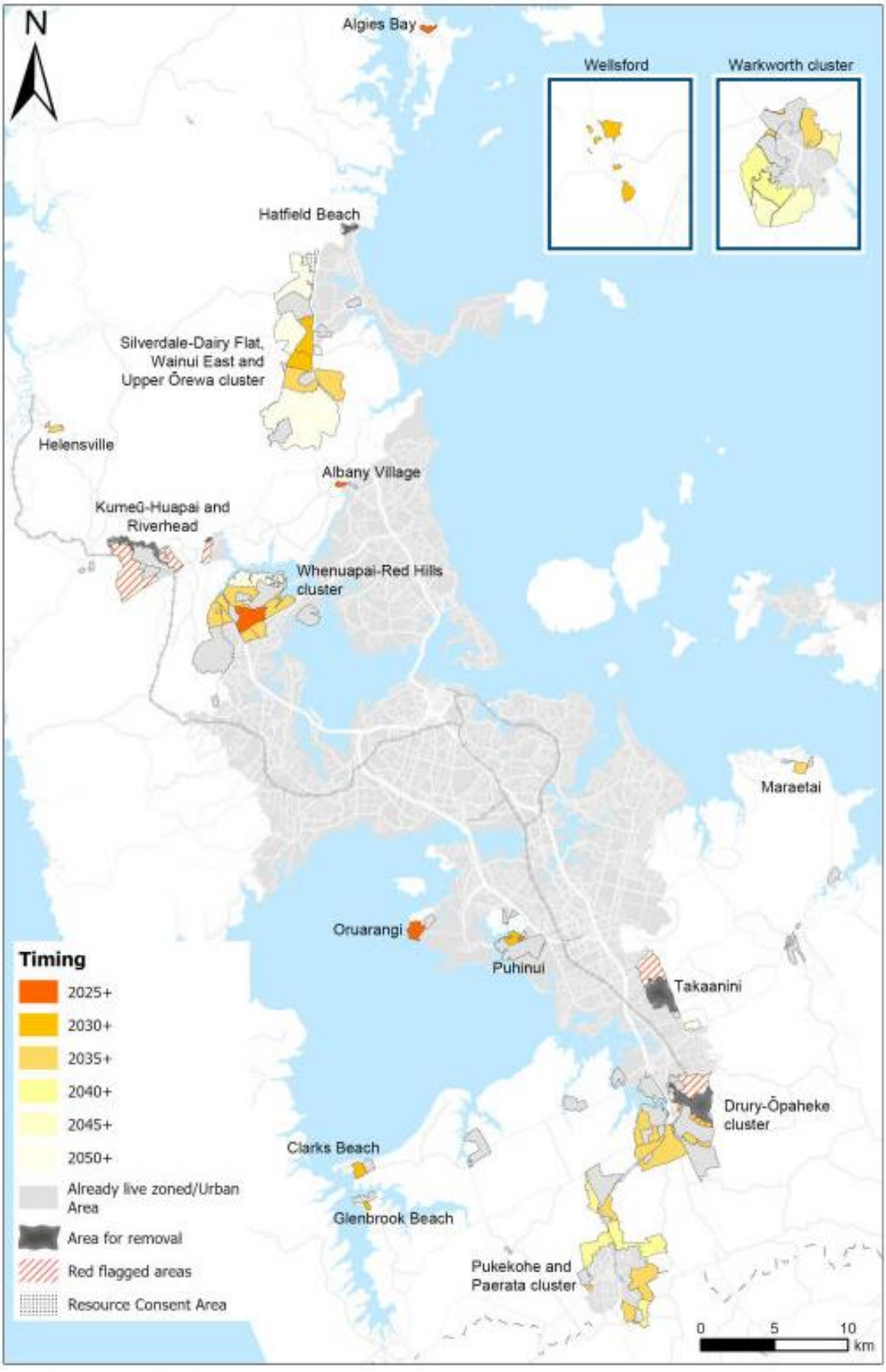
The FDS systematically addresses all FUAs and indicates whether the spatial extent is reduced and/or whether timing for live zoning is changed.

The FULSS, as a standalone document, will be removed and the information currently contained within it is reframed and sits within the FDS. This better integrates strategic approaches and confirms status under the Resource Management Act (RMA).

Timeframes for sequencing future development in the FDS are broader and more indicative compared to the more precise FULSS timing and sequencing.

As well as bringing this timing information into the FDS, the FDS bases the timing of rezoning on the introduction of infrastructure prerequisites. It also recommends that the prerequisites and timing approach is embedded into the Regional Policy Statement. This will provide greater decision-making weight to prerequisites and timing in plan change applications. The FDS also recommends that structure planning is strengthened by placing a greater emphasis on the assessment of natural hazards.

The following map and tables illustrate the approach to timing of future urban areas, the areas removed from the FDS and the red flagged areas.



Map of future urban areas with proposed timing and amendments

Future urban cluster	Future urban area	Timing
North		
Warkworth	Warkworth North (remainder)	2035+
	Warkworth West (remainder)	2040+
	Warkworth South- central	2040+
	Warkworth South- east	2045+
	Warkworth South- west	2045+
	Warkworth North- east	2045+
Silverdale West, Dairy Flat, Wainui East and Upper Ōrewa	Silverdale West (Stage 1)	2030+
	Silverdale West (Stage 2)	2030+
	Silverdale West (Stage 3)	2035+
	Weiti	2035+
	Dairy Flat	2050+
	Wainui East	2050+
	Upper Ōrewa	2050+
North-west		
Whenuapai	Whenuapai North (Stage 1)	2035+
	Whenuapai North (Stage 2)	2050+
	Whenuapai Business	2025+
	Whenuapai East	2035+
	Whenuapai West	2035+
	Whenuapai South	2035+
Red Hills	Red Hills North	2035+
Kumeū-Huapai and Riverhead	Kumeū Huapai and Riverhead	2050+ (including red flag)
South		
Ōpaheke, Drury East, Drury West	Ōpaheke	2050+ (including red flag)
	Drury East	2035+
	Drury West (Stage 1) (remainder)	2035+
	Drury West (Stage 2)	2035+
	Drury West (Stage 3) (remainder)	2035+
Pukekohe and Paerata	Paerata South	2030+
	Paerata West	2040+
	Pukekohe North-east	2040+
	Pukekohe North- west	2040+
	Pukekohe East	2035+
	Pukekohe South-east	2040+
	Pukekohe South- west	2035+
Puhinui	Puhinui (Stage 2)	2030+
Takaanini	Takaanini (Cosgrave Rd)	2050+
	Takaanini	2050+ (including red flag)
Rural and coastal settlements		
North	Wellsford	2030+
	Algies Bay	2025+
	Albany Village 2	2025+
	Helensville 1	2035+
	Helensville 2	2035+
South	Oruarangi 2	2025+
	Clarks Beach 2	2030+
	Glenbrook Beach 2	2030+
	Maraetai 2	2035+

Table of future urban areas with proposed timing

1.0 Introduction

1.1 Purpose of this report

On 4 August 2022 Auckland Council's Planning Committee endorsed strategic direction for the Future Development Strategy (FDS). This included endorsement to reconsider some future urban areas (FUAs) identified in the Auckland region by previous development strategies (PLA/2022/95). The Planning Committee directed that this would particularly be investigated where an area:

- is vulnerable to natural hazard risks;
- does not contribute to council's and government's climate objectives;
- contains large areas of elite or prime soils; or
- would not make the best use of existing or committed infrastructure.

This report addresses the opportunities and challenges for planning and delivering growth in FUAs, as part of an overall approach to accommodating growth, Auckland-wide. That is, as part of a quality compact approach to growth where most growth is through intensification within the existing urban area.

The report provides an assessment of the individual FUAs including the large clusters of future urban land in the north, north-west and south. It also addresses the FUAs identified on Auckland's urban edge and in rural and coastal settlements.

1.2 Background

1.2.1 Accommodating Auckland's growth

Auckland is constantly growing and evolving, responding to changing higher order policy direction as well as external events and trends in the region's economy and demography. The direction to reconsider some FUAs is a result of the following:

- new policy / strategic direction and commitments at both a national and regional level
- changes in capacity requirements following the release of the (NPS-UD) and Medium Density Residential Standards (MDRS).
- new information and data, since previous decisions were made, on topics such as such as climate change and natural hazards.

1.2.2 Legislative framework

Since 2020, a range of new legislative and policy considerations have been introduced which provide a significantly different framework for the development of the FDS. These new considerations have been introduced at both the national level, through central government initiatives, and also at the regional level through Auckland Council strategies and plans.

This legislation includes:

- national policy statements under the RMA on urban development, highly productive land, freshwater management and indigenous biodiversity

- government policy statements on housing and urban development, and land transport
- national emissions reduction plan (ERP)
- COVID-19 fast track legislation

While council strategies and plans include:

- the Auckland Plan 2050
- the Auckland Water Strategy
- Transport Emissions Reduction Pathway (TERP)
- Te Tāruke-a-Tāwhiri: Auckland's Climate Plan.

1.2.3 FDS legislative requirements

The NPS-UD sets out the requirements for the FDS.

The purpose of the Future Development Strategy (FDS), as required by the National Policy Statement on Urban Development (2020) (NPS UD), is to set the high-level vision for accommodating urban growth over the long term and identify strategic priorities to inform other development related decisions.

Regard must be given to the FDS when preparing or changing RMA planning documents. Auckland Council is legally required (as part of the NPS-UD) to plan well for growth, and produce a FDS that spatially identifies:

a. the broad locations in which development capacity will be provided over the long term, in both existing and FUAs, to meet the requirements of clauses 3.2 and 3.3; and

b. the development infrastructure and additional infrastructure required to support or service that development capacity, along with the general location of the corridors and other sites required to provide it; and

c. any constraints on development.

Every FDS must include a clear statement of hapū and iwi values and aspirations for urban development[2].

This makes it clear that it is not just about homes and housing, but also about well-located opportunities, for business activity and community facilities, to offer good accessibility to employment and a range of household needs in an urban setting. These are all relevant matters when considering Auckland's FUAs.

1.2.4 Quality compact and a well-functioning urban environment

The concept of well-functioning urban environments is also fundamental in considering FUAs. Policy 1 of the NPS-UD sets out the minimum requirements for what constitutes a well-functioning urban environment, and it is important to note that this is not just homes. At a minimum, this includes urban environments that:

(a) have or enable a variety of homes that:

[2] For further information on FDS requirements see section 1.1 in the Overall Evidence Report (Auckland Council, 2023a).

(i) meet the needs, in terms of type, price, and location, of different households; and

(ii) enable Māori to express their cultural traditions and norms; and

(b) have or enable a variety of sites that are suitable for different business sectors in terms of location and site size; and

(c) have good accessibility for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport; and

(d) support, and limit as much as possible adverse impacts on, the competitive operation of land and development markets; and

(e) support reductions in greenhouse gas emissions; and

(f) are resilient to the likely current and future effects of climate change.

In understanding what this means for Tāmaki Makaurau Auckland, the FDS states that "A well-functioning urban environment for Tāmaki Makaurau as a city and region is one which develops in a quality compact form and follows five principles to guide its growth and development". These principles are:

Principle 1: Reduce greenhouse gas emissions

Principle 2: Adapt to the impacts of climate change

Principle 3: Make efficient and equitable infrastructure investments

Principle 4: Protect and restore the natural environment

Principle 5: Enable sufficient capacity for growth in the right place and at the right time.

These principles are applicable in considering the appropriateness of future urban areas and their role in accommodating growth in the short, medium and long-term.

It is noted that Plan Change 80 (Auckland Council, 2022a)[3] explicitly includes well-functioning urban environments in the Regional Policy Statement (RPS). It also references well-functioning urban environments in the policies of Chapter B2 Urban Growth of the AUP , specifically those relating to: compact urban form, quality built environment, residential growth and intensification, and commercial and industrial growth.

1.2.5 Emphasis on climate change and natural hazards

A major shift in the framework for the FDS, relative to the framework that applied previously, is in the area of climate change. In addition to national level initiatives such as the National Emissions Reduction Plan and the National Adaptation Plan, Auckland Council has introduced two major policy initiatives: Te Tāruke-a-Tāwhiri: Auckland's Climate Plan and the Transport Emissions Reduction Plan. All of these national and regional plans are relevant matters under the NPS-UD to inform the FDS and they present a very strong climate change framework.

In addition to these plans, another significant change (since 2022) are the amendments to the RMA around climate change which provide far greater scope for RMA plans to address climate change mitigation and adaptation.

[3] Plan Change 80 is not operative, it is at the stage where further submissions have closed.

The flood events of early 2023 have underscored the importance of strategic planning and require consideration of where development should and should not occur, and how it should occur, to reduce exposure to risk posed by natural hazards. These events have led to wider awareness and understanding of the vulnerability of certain areas and communities in Auckland to the effects of climate change and natural hazards more broadly.

Collectively, these documents provide a greater body of research and information available since 2018, to inform the council's planning and decision making.

1.2.6 Residential development capacity

The statutory requirement to apply MDRS to Auckland's residential zones has changed the development landscape by substantially increasing residential development capacity.

The FDS meets the statutory requirement under the NPS-UD to ensure there is at least sufficient housing and business development capacity to meet demand over the next 30 years. (Auckland Council, 2023e). Therefore, the FDS does not focus on identifying significant additional plan enabled development capacity. The focus is rather on the quality aspects of accommodating growth, including where and how development take-up occurs.

1.2.7 Parks and green spaces

Parks and green spaces are critical for supporting well-functioning urban environments, particularly when considering more efficient use of the land resource with increased density of development. These not only need to be in the right place, but need to be tailored to support the requirements of each particular community and may include playgrounds, playing fields, walkways, greenways and esplanade reserves. There is also an opportunity to encourage nature-based solutions to manage stormwater flows as well as providing additional greenspace.

1.2.8 Highly productive land

Auckland has just over 100,000 hectares of highly productive land (being LUC classes 1-3) outside of the existing urban area, of which approximately 7-8% is in the FUAs. The National Policy Statement on Highly Productive Land (NPS HPL) seeks to improve the way highly productive land is managed under the RMA[4]. However, it acknowledges that some highly productive land has already been rezoned, the NPS HPL states:

3.5 Identifying highly productive land in regional policy statements and district plans

(6) If highly productive land is the subject of an approved plan change to rezone the land so that it is no longer general rural or rural production zone, the land ceases to be highly productive land from the date the plan change becomes operative, even if the change is not yet included in maps in an operative regional policy statement.

The wording of the NPS HPL means that land zoned Future Urban is excluded from the directive policies that require regional councils to avoid development on highly productive land. For this reason, the presence of highly productive land is a factor to be considered in terms of context for this report but is not a determining factor for any changes made to the FUAs.

[4] For further information on the NPS HPL see the FDS Overall Evidence Report 1 (Auckland Council, 2023a).

2. Approach to Future Urban Areas

2.1 Previous planning for Future Urban Areas

The review of the FDS has enabled a review of the timing and extent of FUAs as more detailed information has become available. However, it is first important to demonstrate the difference between future urban *areas* and the future urban *zone:*

- Future Urban Areas – Areas identified for urban development in the Future Urban Land Supply Strategy 2017
- Future Urban Zone - is applied to greenfield land that has been identified as suitable for urbanisation. The Future Urban Zone is a transitional zone. Land may be used for a range of general rural activities but cannot be used for urban activities until the site is re- zoned for urban purposes.

The process used to determine an areas suitability to be a FUA started with the identification of Greenfield Areas for Intensification (GAFIs) in the Auckland Plan 2012. Together with the development of the Rural Urban Boundary, GAFIs were investigated to inform the preparation of the Proposed Auckland Unitary Plan (AUP) and the Future Urban Land Supply Strategy 2015 (FULSS), followed by a refresh in 2017 to take into account decisions from the operative version of the AUP in 2016. Since then, there have been a number of plan changes (both private and Council-led) that have rezoned land to a live urban zone.

Using the best information available at a point in time, the primary purpose of the FULSS is to identify the sequencing and timing of future urban areas for development readiness over 30 years. Through the AUP, the future urban zone was applied to approximately 15,000ha of greenfield land[5] that was deemed as suitable for urbanisation at the time of investigation (Auckland Council, 2023c). The FUAs identified in the FULSS are the focus of the FDS and this evidence report[6]. FUAs in the FULSS are shown - in Appendix 1.

While the focus for this evidence report is on areas that are still zoned Future Urban, the live zoned areas are important to provide context. Live zoning, as part of the AUP decisions, as well as a number of private and Council-led plan changes have resulted in 29% of the land identified in future urban areas being rezoned to a live zone which enables development[7]. These live-zoned future urban areas are used for monitoring the Auckland Plan Future Development Strategy. Auckland Council Monitoring of FUAs includes looking on an annual basis at progress in the phases of development: planning, infrastructure and implementation. For this report an understanding of infrastructure delivery for these live zoned areas and how that relates to delivery of infrastructure for areas still zoned as future urban is relevant.

Monitoring also indicated that of 21,607 dwellings consented region wide from 1 July 2021 to 30 June 2022, 2,408 dwellings were in FUAs. This was approximately 11% of all dwellings consented Auckland-wide. In contrast 83% of dwellings consented were in existing urban areas and 6% in rural areas.

[5] Greenfield Land identified for future urban development that has not been previously developed (Auckland Council, 2023c).
[6] The sequencing and timing information from the FULSS was also adopted as part of the Auckland Plan Development Strategy 2050. A copy of the information from the Auckland Plan 2050 is included in the report as Appendix 2.
[7] This includes land zoned straight from a rural zone to an urban zone as part of the AUP decisions.

Consent information showed that for future urban areas, 60% of the dwellings consented were for stand-alone houses (Auckland Council, 2022).

2.2 Approach to Future Urban Areas

The FDS reassessed all FUAs that had not been live zoned (as at 2023), using the area boundaries identified in the FULSS as a baseline. The purpose of this reassessment was to evaluate the ongoing appropriateness of areas previously identified for future growth, but not yet developed. This reassessment was undertaken primarily through the lens of climate change adaptation, as our data and understanding of natural hazard exposure has improved over time. The methodology and assessment undertaken for this evaluation is outlined in Section 5 of this report.

The FDS provides strategic direction to remove FUAs, or parts of FUAs, that are no longer considered suitable for urban development due to the extent and significance of natural hazards posing risks to life and property that cannot be feasibly mitigated. The boundaries of these areas are currently indicative and will be further refined through a plan change process.

3. Opportunities and challenges

While the identification of FUAs presents opportunities to plan comprehensively, there are also often interrelated challenges. This includes process issues, cost and provision of infrastructure, as well as appropriately adapting to, and mitigating the effects of climate change. The following sections look at the opportunities and challenges in more detail.

3.1 Considering urban form

Auckland's urban form is a critical matter for the FDS. Urban form has a very strong influence on urban efficiency of land, infrastructure, energy and travel - and therefore in long-term sustainability. It is a key influence on Auckland being a well-functioning urban environment, a core objective of the NPS UD. Urban form is the spatial arrangement of business and community activities as reflected in land use, their relationship to the physical context in which they are located. It is concerned with all aspects of the urban environment, major ones being the design and structure of urban communities, the infrastructure and connections needed, and the interrelationships within and between communities and business areas as well as other places. This requires consideration of how communities and business areas grow over time and to ensure that growth occurs in a sustainable manner including the efficient roll out of infrastructure.

A key challenge is the degree to which the growth provided for in the FDS will contribute positively to maintaining or enhancing those efficiencies in the urban economy. This has important implications for urban form at regional, sub-regional and local scales. The urban form outcomes are key considerations in structure planning, private and Council-led plan changes and the review of the FUAs Such consideration is often required at several levels, from the micro-scale such as transport connections between subdivisions, to the more macro-scale of how an FUA develops and integrates with the wider urban area. However, it is challenging when development at the micro-scale occurs out of sequence and when it is uncoordinated with the macro-scale outcomes.

Quality city form and design supports liveability, provides location opportunities for business, and is an important part of creating an attractive world-class city. It supports economic growth, as well as local economic development and employment (Auckland Council, 2018b).

Such outcomes are affected by both timing and the location of urban development, with urban form at any point in time important. This means the sequence of development which the FUAs enable is a key consideration, as well as the long-term outcome.

At the regional level there is an opportunity through Plan Change 80 (Auckland Council, 2022a) to strengthen the RPS council's approach to urban growth and form (RPS section B2.2). Plan Change 80 addresses NPS-UD requirements which direct Auckland Council to, among other things, make decisions that contribute to well-functioning urban environments.

3.2 Comprehensive planning

The identification of FUAs provides Auckland with an opportunity to comprehensively plan these areas to achieve well-functioning urban environments. Comprehensive planning sets a vision for an area that guides development of communities to provide a full range of land uses that a community needs, including a range of dwelling types, jobs and social infrastructure and providing better overall development capacity for the required infrastructure investment.

Comprehensive planning, usually through development of a structure plan (discussed below), responds to its physical environment, including natural and catchment boundaries and designs for walkable neighbourhoods and access to public transport. It works with both opportunities and constraints that might be present.

Connections are also considered: how do communities fit together in their wider context? For FUAs this means looking at the relative benefits from building communities in areas closer to the existing urban area where less distance needs to be travelled to get to other places. This could leverage growth off and maximise the use of existing infrastructure. Similarly, there are benefits of developing at scale which need to be considered.

However, successfully enabling comprehensive development is also a key challenge. Often, FUAs are developed through ad hoc and piecemeal private plan change applications, which can hinder the ability to undertake comprehensive planning appropriate for the entire FUA.

3.2.1 Structure plans

Structure plans are an important method for establishing the pattern of land use and the supporting transport and service networks within a defined area. The use of structure plans provides an opportunity to comprehensively and coherently plan an area to ensure quality outcomes are delivered. However, as with plan changes, there are some aspects of structure planning processes that impact on achieving planning outcomes.

While the FDS determines the timing for when FUAs will be ready for development to commence, the use of structure plans, as a tool to influence development readiness, provides the next level of detail needed to effectively integrate land uses with infrastructure provision. The AUP also requires that before any area of the future urban zone is rezoned as being ready for urban development, a structure plan will be completed.

While there may be an assumption that the whole of the FUA is suitable for urban development, it is not until a detailed structure plan is developed that up-to-date information on relevant matters and the related development implications is more fully understood.

Structure plans provide a more detailed examination of the opportunities and constraints relating to the land including its suitability for various activities, infrastructure provision, geotechnical issues and natural hazards. They should identify, investigate and address the potential effects of urbanisation and development on natural and physical resources in the structure plan area and in neighbouring areas, particularly those that have been scheduled in the AUP in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character (see Appendix 3 for a summary of the AUP requirements for structure planning).

Structure plans provide an opportunity to update and provide more information on factors such as specific infrastructure solutions which may change over time, to ensure the efficient and logical roll out of local infrastructure to these areas. This may result in an alternative staging and timing proposal for subsequent plan changes and infrastructure provision. A more detailed examination may also lead to proposing changes to address matters such as natural constraints (e.g. by reducing areas/reducing development yields).

Although a key planning tool, challenges arise when a structure plan moves from the planning to the implementation phase. There are often key gaps (for example clear pathways for implementation) and inconsistencies in how different structure plans address certain matters. For example, in relation to hazard management, Appendix 1 (AUP) is limited to "*measures to manage natural hazards and*

contamination", which does not reflect the significance of the issue. Likewise, there is no direction or requirement for structure plans to consider enabled and embodied carbon / greenhouse gas emissions from land use change. This is largely a result of the Resource Management Act 1991 preventing councils from considering emissions in decision making when the AUP was developed. This restriction has since been removed through amendments to the RMA gazetted in 2022. The effects of climate change are a matter in section 7 of the RMA to which particular regard shall be had. This concept is also embedded in the NPS-UD in both the definition of well-functioning urban environments and Objective 8 of the NPS-UD.

Additionally, the lack of direction in relation to emissions is now a noticeable gap. Therefore, direct, indirect and embodied greenhouse gas emissions from urban development need to be accounted, avoided and reduced through a pathway that aligns with the requirements of the well-functioning urban environment definition (NPS-UD) as well as decarbonisation pathways set in the Emissions Reduction Plan or Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan. A specific review of the AUP may be required to address these requirements.

3.3 Private plan changes, Special Housing Areas (SHAs) and Fast track consenting

Since 2016, when the AUP became operative in part, there have been a significant number of private plan changes and fast track consents, throughout Auckland's FUAs, that challenge the ability to plan comprehensively and achieve good design through structure planning. This came on top of a number of Special Housing Areas that led to plan changes, and increased pressure to provide infrastructure to more areas.

Private plan changes usually result from a desire to enable development beyond or in advance of what the zoning or current provisions allow. These have been largely based around land ownership patterns rather than any thorough, robust and integrated planning rationale. That has led, in some cases, to a relatively scattered pattern of live zoning in some areas, and isolated pockets of development. In addition, other RMA processes such as Special Housing Areas and fast track resource consent applications have also led to discrete pockets being developed with little integration or comprehensive planning across the whole FUA.

Although the NPS-UD seeks to achieve well-functioning urban environments, the challenge with private plan changes is they may not necessarily achieve this at a broader scale, including ensuring they give effect to the wider vision for the area. Currently, the majority of re-zoning of Auckland's future urban land is through private plan changes. These private plan changes are required to prepare their own structure plan, however these are often smaller in scale and area than council structure plans and less likely to be integrated with the wider surrounding FUA, urban or rural context. Often, subsequent plan changes have also relied on general zone and Auckland-wide standards of the AUP, and do not always respond to the specifics of the area by introducing targeted place-based rules.

This piecemeal pattern of development may result in missed opportunities for linkages and key connections, particularly beyond the plan change area but also between discrete development areas. For instance, considering the opportunities of comprehensive planning based on walkable neighbourhoods, that takes account of infrastructure networks and linkages. Opportunities are often interrelated for example designing for stormwater on a catchment basis, may suggest solutions that are more efficient, cost effective and have greater environmental and social benefits (e.g. connecting areas through walking and cycling paths).

3.4 Securing the delivery of future urban business land

Business land supports potential development of a well-functioning urban environment. The FDS indicates that additional business land is needed to support more sustainable communities. However, a key challenge relating to business and industrial land is the pressure to zone and develop land to a higher value use, e.g. residential. The FDS confirms that approximately 1,500 – 1,700 hectares of vacant business land is required in the long term. This could be accommodated through intensification of existing business areas, where appropriate, as well as ensuring that some future urban land is zoned for business uses[8].

Accommodating business and industrial activities is particularly important for creating additional employment opportunities for current and future residents[9]. Employment and business activity needs to be located with easy access to public transport. Communities developed with walkability on between homes and jobs in mind can help to reduce both the need to use private vehicles and the distance needing to be travelled.

3.5 Efficient provision of infrastructure

Aligning future urban areas with planned (bulk) infrastructure delivery is one of the biggest challenges faced when determining when an area will be development ready. It is critical that development readiness is aligned with infrastructure deliver as this ensures that development is well-coordinated and is able to provide a safe, sustainable environment for communities. To ensure alignment to provide more certainty around the timing and sequencing of development, the FDS has introduced the concept of 'Infrastructure Prerequisites'. The locations and timing of infrastructure prerequisites are based on broad assumptions is outlined in section 4.3 of this report and in Appendix 6 of the FDS.

Infrastructure prerequisites have been used to update the FUA timing and specifies the development infrastructure project(s) that would be required to enable the area to be ready to be live-zoned. These projects are in the future and generally not yet confirmed and funded in plans such as a 10-year budget. In practice, the timing of the delivery of infrastructure projects will increase in certainty as they become funded. This can be 7-10 years out from their delivery. The prerequisites will be reviewed regularly to ensure they reflect the latest project information and funding availability.

The approach to the timing of FUA's and the use of infrastructure prerequisites is taken to balance the tension between providing certainty for infrastructure providers, with flexibility for development aspirations. This approach supports the integration of planning decisions under the RMA with infrastructure planning and funding decisions, and aligns with responsive planning, which is a key principle of the NPS-UD. By clearly stating the infrastructure prerequisites required for the development of future urban areas, it provides the potential for the private sector to fund and finance that infrastructure and potentially bring the development of future urban areas forward, noting there may be strategic reasons beyond council's financial resources as to why the timing of development should not be brought forward.

Additionally, timing the live-zoning of future urban areas using infrastructure prerequisites is an important part of the council managing its fiscal position prudently. Out of sequence development can create major challenges to a prudent and sustainable approach to fiscal management. It can also mean

[8] Auckland Council Housing and Business Development Capacity Assessment for the Auckland Region 2023: https://knowledgeauckland.org.nz/publications/housing-and-business-development-capacity-assessment-for-the-auckland-region-national-policy-statement-on-urban-development-2020/
[9] For further information on employment and jobs see the FDS Overall Evidence report (Auckland Council 2023X)

that the council has to defer or forego infrastructure investment in key urban locations where it can leverage and maximise gains in terms of land use, transport integration and emissions reduction.

Out of sequence development can impact on the extent to which Auckland, as a whole, develops into a well-functioning urban environment. This holistic concept of Auckland as a City-Region, and the trade-offs and costs that might occur when one plan change proceeds out of sequence ahead of existing priorities, is critical.

As part of the development of the FDS, the council developed and assessed four alternate growth scenarios, on a spectrum from most intensive to most expansive. This assessment demonstrated that more compact urban forms tend to perform better in terms of reducing the monetary cost of infrastructure over time. This is because more intensive growth results in more efficient use of existing services and new infrastructure. More expansive urban forms require the greatest amount of new infrastructure investment with the highest cost (Auckland Council, 2023a)[10].

At a regional scale infrastructure servicing urban intensification varies in cost depending on its location. Development in existing urban areas typically costs less in terms of infrastructure provision, when compared with development in future urban areas.[11] Adding additional growth at the fringes of our existing networks is the least cost-effective investment in infrastructure to support growth. The best return on investment is closer to the centre.[12]

3.6 Natural hazards and climate change

As our climate changes, the frequency and severity of hazards will worsen. Where and how we plan for growth and change to adapt to these hazards has become increasingly important and also increasingly challenging. The FUAs have been reviewed using the most up to date region-wide data, including flooding, coastal inundation and sea-level rise, coastal erosion and instability, and other geohazards.

In FUAs, the council has a greater ability to require future zoning patterns that avoid hazardous locations. Future development presents an opportunity to deliver positive environmental and community resilience outcomes. For example, future urban areas can allow water sensitive design (WSD) principles to be applied at the catchment scale, allowing for WSD to be fully integrated with land use planning and zoning during the structure planning stage (including the incorporation of rules into relevant planning documents). Holistic water sensitive design approaches aim to integrate water management and development, to improve water quality, ecological health, natural hazard resilience, water supply security and amenity values.

3.7 Fiscal challenges

Fiscal challenges are always present and are particularly relevant when determining the timing and sequencing of FUAs. However sometimes the challenges faced are more prevalent due to unplanned events or economic conditions. For example, the COVID-19 pandemic and high levels of inflation have contributed to and exacerbated current fiscal challenges. Additionally, plan changes to the AUP that

[10] For further information on infrastructure see the Overall Evidence Report (section 4.8).
[11] NSW Productivity Commission, 2023. Building more homes where infrastructure costs less: Comparing the marginal costs of servicing growth in different areas of Sydney. NSW Treasury.
[12] Trubka R, Newman P, Bilsborough, D, 2009. Assessing the costs of alternative development paths in Australian cities, Curtin University of Technology.

are unanticipated or brought forward ahead of time can generate significant funding challenges and financial risks for council and disrupt existing and planned infrastructure work programmes.

Challenges with fiscal constraints are having an impact on implementation of council's first plan change for an FUA (PC 5: Whenuapai Plan Change – notified September 2017) responding to the need for business land in the north-west. This plan change was withdrawn by the council in June 2022: due to issues around infrastructure provision and funding, it was not possible to provide the infrastructure needed. The strategic approach of the proposed plan change is now being overtaken by a series of individual fast track consents and plan changes which do not provide the surety of integrated development, as was the case through the original plan change in a way that would provide for environmental, social, economic and cultural outcomes.

The likely outcome of a series of individual consents will increase pressure on funding and financing to deliver the needed infrastructure, while decreasing efficiencies in provision.

4. Implementation

The implementation of the FUAs identified in the FDS will be through subsequent processes including structure plans, plan changes, designations, and resource consent applications. Together with funding for necessary infrastructure, these processes will be key determinants of the overall success of the approach to FUAs in the FDS.

4.1 Improving plan changes and structure plans

To improve the processes for structure plans and plan changes, Council will focus on giving stronger statutory weight to Regional Spatial Strategies (RSSs). This could be done by clearly defined legal linkages between plans to enable the RSS to be given greater weight in plan change and consent decisions. This should apply to all stages of development - from development of plans to their implementation. Greater weight for other levels of planning including structure planning also needs to be considered as part of RMA reforms.

4.2 Combining the FDS and FULSS

The revised FDS will replace the Development Strategy (2018) and the FULSS. These were previously two separate documents, and combining these into a single document allows a comprehensive integrated approach to Auckland-wide growth, showing the distribution of brownfield and greenfield development. This better integrates strategic approaches and confirms status under the RMA.

4.3 Infrastructure prerequisites and timing of FUAs

Infrastructure prerequisites is a tool to guide the timing of development of future urban areas by making a more specific link between infrastructure readiness and development readiness. They identify the development infrastructure required to support development, and the timing of when the council is able to fund that infrastructure. This influences the timing of when an area will be ready for development, based on “not before” a year, rather than the 5-year periods as was the approach in the FULSS. The FULSS 5-year periods indicated when future urban land was anticipated to be ready for development based on a set of principles, which included information on infrastructure readiness. Prerequisites and their respective timings were developed with the key lead infrastructure providers for development which are water, wastewater, stormwater and transport.

The Future Development Strategy and the implementation of infrastructure prerequisites do not prevent private plan change requests. The council cannot predict private plan change requests and can therefore not rely on this ‘method’ when planning for regional growth and infrastructure provision across a 30-year horizon.

However, a pathway exists for the timing of future urban land to be brought forward where the requestor of a private plan change can fund the infrastructure prerequisites (that is, there is no cost to council), or, conditional on acceptance by council, can identify alternate or new infrastructure funding tools which limit impacts on council’s financial position and commitments.

The timing of live-zoning future urban areas spans 30 years from 2023 – 2050+. Distributing the live zoning of future urban areas over this timeframe enables proactive planning in an orderly and cost-efficient way, ensuring the areas are supported by the required bulk infrastructure and able to deliver the quality urban outcomes anticipated in the FDS.

Live zoning does not necessarily lead to immediate development, and there are often lengthy lead in times until development begins on the ground. This could be for a number of reasons including market factors, or timing of the delivery of infrastructure. Development of greenfield areas also has greater Vehicle Kilometres Travelled (VKT) initially because of its relative distance from existing facilities and employment. The council has legislative requirements to reduce greenhouse gas emissions. Additionally, weather events and new information have highlighted natural hazards in some of the FUAs and the need to address these comprehensively.

Appendix 6 of the Future Development Strategy outlines more detail about infrastructure prerequisites including a detailed list of the bulk infrastructure projects that form part of the timing for each future urban area.

4.4 'Red-flagged' FUAs

In some FUAs, while new development might not itself be directly exposed to significant hazards, developing these areas could result in exacerbating flooding effects downstream unless appropriately managed. These areas fall within the "red flagged" category. This category recognises that while development can occur, it must be carried out through an integrated catchment approach. As such, any future structure planning, master planning, plan changes or other land use change application should demonstrate alignment with certain requirements. These requirements are already enabled through a variety of regulatory instruments including the Auckland Unitary Plan (Operative in Part) (AUP), Healthy Waters regionwide Network Discharge Consent (NDC) and the Auckland Code of Practice for Land Development and Subdivision: Stormwater Chapter. However, the purpose of broadly setting out requirements in "red flagged" areas, as below, is to assist the reader with expectations under these existing regulatory instruments and to place particular emphasis on some requirements because of the critical need for an integrated approach early in the development process.

The description of these requirements here does not fully represent the requirements as set out in those regulatory instruments, nor supersede due process associated with those instruments.

Integration of Land Use Change

Structure planning / master planning needs to be completed for the drainage sub-catchment of the FUA for any land use change application. Land use changes and development applications of isolated or individual parcels can result in perverse outcomes for infrastructure required to service the sub-catchment long-term. Isolated developments do not promote Policy E1.3.10 of the AUP which requires any proposed greenfield development to take an integrated stormwater management approach. Any proposed development also needs to provide stormwater management that aligns with Schedule 4 of the NDC. Where a Best Practicable Option (BPO) is promoted by a land use change or development application, and/or applicants propose earthworks within the FUA to modify the floodplain, applicants need to provide detailed hydrologic and hydraulic modelling to clearly identify impacts of this floodplain removal on adjacent properties. The Healthy Waters' catchment models will not provide the necessary detail to complete this assessment and the applicant will need to undertake the detailed modelling themselves to submit with the application.

Any lot creation will need to meet the shape factors set out in Chapter E38.7.3.3 and E38.7.3.4 of the AUP at all stages of regulatory consenting. Any change in land use or consent application cannot result in the creation of new flood prone areas, unless there is adequate space accounted for this in land use zoning.

Where downstream impacts on flood risk are identified, it will be necessary for any application to consider an appropriate mitigation strategy. This should be through attenuating flows to a percentage of pre-development peaks, thus extending the traditional 24-hour consideration to an appropriate time span that will not result in increased flood risks.

Stormwater Infrastructure

Any development application will need to holistically consider the stormwater infrastructure necessary to service the entire FUA drainage sub-catchment. Stormwater infrastructure to be vested to public ownership will need to be designed considering the maximum probable development in the area with clear demarcation of the assumed stormwater drainage catchment to be serviced.

Public infrastructure will need to be designed to comply with the Healthy Waters (or relevant water entity) Code of Practice and be accompanied by whole of life cost estimates. For both public and private stormwater devices, the application will need to contain sufficient site investigation results to confirm that the proposed stormwater management will achieve what is stated. This includes soakage testing to demonstrate the potential for achieving retention presented in the application. Where an application does not undertake site investigations, then a worst-case scenario should be assumed with clear direction provided in the Stormwater Management Plan (SMP) of site investigations to be undertaken during the design process to achieve the outcomes intended from the stormwater management. Where stormwater conveyance infrastructure is reliant on public infrastructure downstream of the FUA, the applicant will need to undertake a detailed flooding assessment.

Stormwater infrastructure to be vested to public ownership may be subject to a defects liability period.

Modelling

Healthy Waters' catchments models have been produced for the purpose of identifying potential flood hazard. These models are not appropriate to be used for site specific assessments, although they may be suitable to provide boundary conditions associated with a development proposal. It is recommended that discussions be held with Healthy Waters (or the appropriate water entity) when scoping the extents of the assessment to be undertaken.

5. Auckland-wide overview of future urban areas

All the FUAs identified in the 2018 Development Strategy (and associated FULSS), have been reviewed to understand their status since 2018, including whether or not they have been live zoned, partially live zoned or had any dwellings consented within them. This was followed by additional assessment relating to infrastructure; natural hazards and the natural environment; economic (including business and employment); and social / cultural matters. This assessment was carried out to determine if the timing and boundaries of each FUA remain appropriate given new data, policy, and plans (including asset management plans and the adoption of Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan and the Auckland Water Strategy) available since the development of the FULSS.

Assessments relating to infrastructure to understand appropriate timing:

Information to inform the prerequisites and the consequential timing has been developed through close collaboration with the key lead infrastructure providers, Watercare, Auckland Transport, Waka Kotahi and KiwiRail. A series of meetings, workshops, and document reviews were held to understand **what** bulk infrastructure would be required for future urban areas, and **when** all the required bulk infrastructure can be provided to ensure that any development is well-coordinated. This included the consideration of funding availability and deliverability of the projects.

Bulk infrastructure projects provided by Watercare, Auckland Transport and Waka Kotahi include Water Supply, Wastewater and Transport connections such as arterial roads, highways upgrades and public transport provision. These are the bulk projects the council considers will support land to be ready to be live zoned and will support the council to meet its strategic commitments and national targets (for example emissions and Vehicle Kilometres Travelled targets).

In many cases this has resulted in timing amendments to FUAs and/or more granular staging to better reflect when the council plans to fund and deliver key (bulk) infrastructure projects to specified areas. As a result of this some large stages of FUAs have been amended into multiple smaller areas, with new names and timeframes.

Assessments relating to the boundaries of FUAs:

A range of criteria were used to assess each FUA (not yet live zoned and sequenced from 2023 onwards) on the appropriateness of enabling future growth in these locations. The assessment of these matters was carried out on the boundaries of each stage of the FUA identified within the FULSS, not the more granular staging detailed in the FDS following infrastructure considerations (see maps at the start of each of the following FUA sections). The initial assessment of FUAs included a high-level analysis of the following matters:

- exposure to natural hazards
- effects on the natural environment
- anticipated contributions to vehicle kilometres travelled (VKT / CO_2 emissions reduction)
- urban form and business land supply
- highly productive land

- social / cultural matters.

Appendix 4 provides an explanation of the datasets used and assumptions regarding the significance of hazard constraints to development. Appendix 5 describes the high level modelling undertaken to estimate VKT and CO_2 emissions from greenfield areas and rank the relative performance of the FUAs in terms of their likely VKT and CO_2 emissions. As noted in Appendix 5, this modelling involved a number of limitations and assumptions; in particular that the relative VKT and CO_2 emissions performance is a function of the relative availability and accessibility of land, jobs, infrastructure and services at each FUA location, and data regarding these represents a snapshot in time. Therefore, some FUA locations may be quite early in their development cycles and (modelled) travel behaviour may change as further development occurs at that location (e.g. if a FUA develops in stages, and only Stage 1 residential development is underway at the time of modelling, with public transport and/or employment provision expected later, this would lead to longer vehicle trips for early residents of that FUA).

Following this initial high-level assessment, where matters identified potential significant constraints, particularly hazard constraints, and there was high confidence in the data used, the following areas were proposed for removal while further analysis was carried out. These were released for public consultation within the Draft FDS (June-July 2023), this included:

- Hatfields Beach stage 2
- Parts of Kumeū-Huapai-Riverhead
- Takaanini
- Parts of Drury-Ōpaheke

Where the assessment demonstrated moderate constraints, or there was a need for further data[13], these FUAs were initially highlighted as requiring further investigation. Released for public consultation within the Draft FDS (June-July 2023), this included:

- Warkworth South (now divided into south-central, south-east and south west due to the associated infrastructure assessment)
- Warkworth North-east
- Dairy Flat
- Wainui East
- Upper Ōrewa
- Parts of Kumeū Huapai and Riverhead (outside of the significant constraints)
- Albany Village Stage 2
- Oruarangi 2

Following public consultation on the draft FDS (June-July 2023), further investigation was completed for the above areas. This included:

- assessing areas with moderate hazard exposure to confirm the likely feasibility of mitigating this hazard risk

[13] For example, more detailed VKT/CO_2 modelling; updated catchment modelling; a better understanding of the relationship between existing and future land uses i.e. the need for business land and adjacent residential land to support this etc.

- investigating options to undertake more detailed modelling of VKT/CO_2 emissions. In doing so, it was determined that relative contributions to VKT would not be pursued as a reason to remove, or to amend the boundaries of FUAs, provided that all infrastructure prerequisites are met.

It was also determined that despite many FUAs including a high prevalence of LUC class 1-3 land, these areas could not be assessed as highly productive land for the purpose of reviewing the appropriateness of FUA boundaries, as pursuant of the National Policy Statement for Highly Productive Land 2022, land already zoned future urban cannot be classified as highly productive land.

Subsequently, the classification "requiring further investigation" was removed from the FDS. In most cases, this resulted in no changes to the boundaries of FUAs, compared to the Auckland Development Strategy 2018 and FULSS. Only in the case of the Kumeū Huapai and Riverhead FUA did this further assessment demonstrate ongoing risks associated with natural hazards. Because of this, as outlined in section 2.2 below, the remaining portion of Kumeū Huapai and Riverhead was "red flagged" in accordance with the description contained in section 1.5.2 above. This meant that, while development could occur in parts of the FUA, the critical need for an integrated catchment approach means particular existing regulatory requirements need to be meet early in the development process.

In addition to investigating the "areas for investigation", further analysis was undertaken on the areas proposed for removal to confirm if this was appropriate. This analysis has been incorporated into the relevant assessment for each FUA below. This assessment confirmed that the areas proposed for removal within the draft FDS are exposed to significant hazard constraints, including risks to life and property, that cannot be feasibly mitigated. However, through this process, the boundaries were further refined. The outcome of this assessment was:

- **Hatfields Beach stage 2** – area for removal remains unchanged. The whole FUA is not considered appropriate for urban development and strategic direction within the FDS is to remove the area as a FUA.
- **Parts of Kumeū-Huapai-Riverhead** – the area for removal remains unchanged. Part of the FUA is not considered appropriate for urban development and strategic direction within the FDS is to remove this area as part of the FUA, with the remaining portion of the FUA retained but "red flagged".
- **Takaanini** – area for removal has been reduced. The southern portion of the FUA is not considered appropriate for urban development and strategic direction within the FDS is to remove this area as part of the FUA, with the northern portion of the FUA to be retained but "red flagged".
- **Parts of Drury-Ōpaheke** – the area for removal remains unchanged. Part of the FUA is not considered appropriate for urban development and strategic direction within the FDS is to remove this area as part of the FUA, with the remaining portions within the Slippery Creek catchment retained but "red flagged".

The assessments carried out across this process, as well as summary tables and maps for each FUA are detailed below. Section 2.1 addresses each of the FUAs within the large (northern, north-western and southern) areas and Section 2.2 addresses the FUAs within urban edge sites and rural and coastal settlements.

5.1 Large Future Urban Areas (North, North-west and South)

5.1.1 Northern FUAs

Overview

The north includes the following large FUAs: Warkworth, Wainui, Silverdale-Dairy Flat and Upper Orewa. Together these areas comprise a land area of 4,813 hectares.

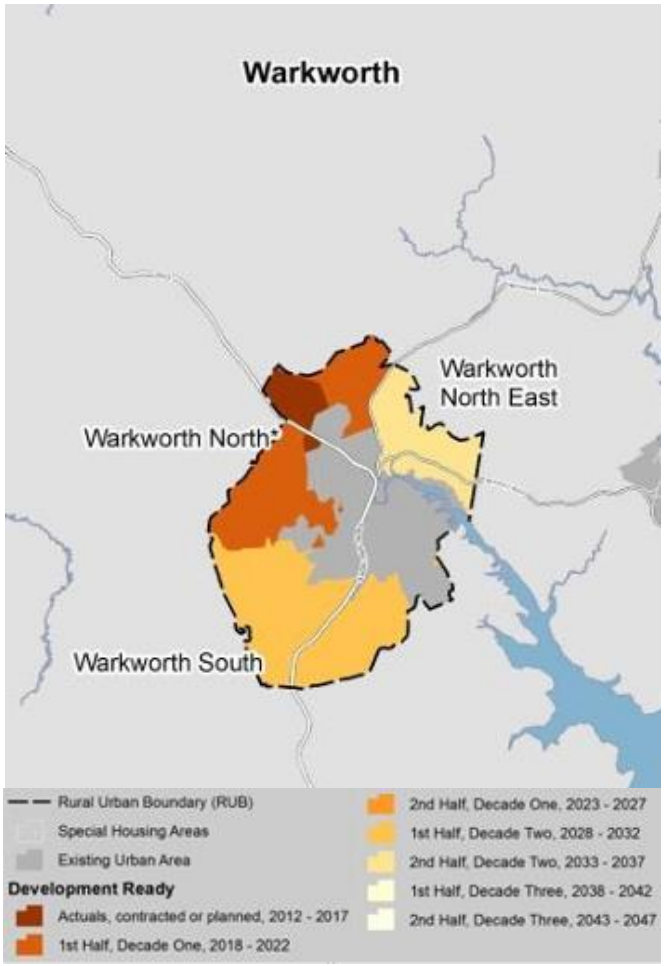
Table 2 provides a summary of information for the north.

Sub-region FUA cluster	Future urban areas	Status in 2023	FULSS 2017 timing	FDS New timing
Warkworth	*Warkworth North*	*Live zoned*	*2012-2017*	*N/A*
	Warkworth North	Partially live zoned	2018-2022	2035+
	Warkworth West	Partially live zoned	2018-2022	2040+
	Warkworth South-central	Future Urban zoned	2028-2032	2040+
	Warkworth South-east	Future Urban zoned	2028-2032	2045+
	Warkworth South-west	Future Urban zoned	2028-2032	2045+
	Warkworth North-east	Future Urban zoned	2033-2037	2045+
Silverdale West, Dairy Flat, Wainui East and Upper Orewa	*Wainui East SHA*	*Live zoned*	*2012-2017*	*N/A*
	Silverdale West (Stage 1)	Future Urban zoned	2018-2022	2030+
	Silverdale West (Stage 2)	Future Urban zoned	2018-2022	2030+
	Silverdale West (Stage 3)	Future Urban zoned	2018-2022	2035+
	Weiti	Future Urban zoned	2033-2037	2035+
	Dairy Flat	Future Urban zoned	2033-2037	2050+
	Wainui East	Future Urban zoned	2033-2037	2050+
	Upper Ōrewa	Future Urban zoned	2033-2037	2050+

Table 1 – Northern FUAs

Warkworth

FULSS 2017 map



FDS map

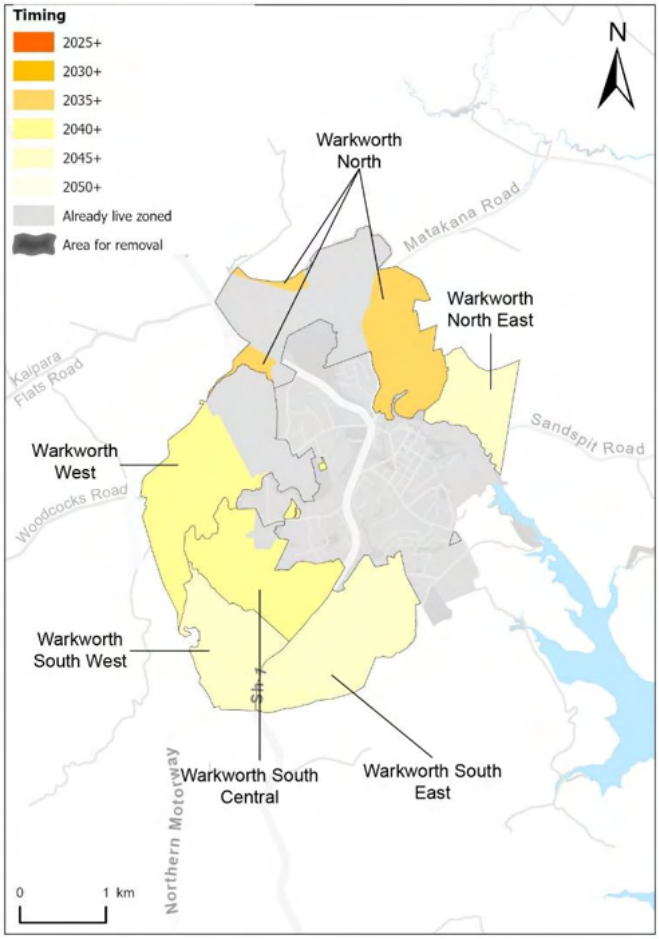


Figure 1 - Warkworth

Future urban form

The vision of the Warkworth structure plan[14] is:

Warkworth is a satellite town that retains its rural, natural, and cultural character. It is centred around the Mahurangi River and has easy walking and cycling access around the town. There are a variety of high-quality residential neighbourhoods. Warkworth is largely self-sufficient with plenty of employment, education, shopping, and recreation opportunities. Transport and other infrastructure are sequenced to support Warkworth's planned growth (Auckland Council, 2019).

Some of the key high-level features of the Warkworth Structure Plan are:

- Ecological and stormwater areas are set aside from any built urban development.
- The new residential areas across the Future Urban zone enable around 7,500 dwellings and offer a range of living types. From spacious sections around the fringe to more intensive dwellings

[14] Warkworth Structure Plan 2019: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/place-based-plans/structure-plans/A%20copy%20of%20the%20Warkworth%20Structure%20Plan/warkworth-structure-plan-summary.pdf

such as town houses and apartments around the new small centres and along public transport routes.

- Warkworth's local and rural character is protected through various measures including provisions to protect the bush-clad town centre backdrop along the Mahurangi River, and retaining the Morrison's Heritage Orchard as a rural feature of the town.
- New employment areas are identified, comprising land for new industry (e.g. warehousing, manufacturing, wholesalers, repair services) and land for small centres (e.g. convenience retail, local offices, restaurants/cafés). The existing Warkworth town centre by the Mahurangi River will remain the focal point of the town.

The land uses are supported by infrastructure including:

- Prioritising active transport in Warkworth through a separated walking and cycling network providing connectivity to new and existing centres, employment areas, schools and public transport stations.
- A roading network including a potential southern interchange on Ara Tūhono – Pūhoi to Warkworth (south facing ramps only).
- A public transport network built upon the recently introduced 'New Network for Warkworth' which in the long term has a bus station/interchange in Warkworth's southern local centre and a park and ride near the potential Ara Tūhono – Pūhoi to Warkworth southern interchange.
- Other infrastructure providers for utilities such as wastewater, water, power supply, telephone, broadband, community facilities, schools, and healthcare have plans underway to service the planned growth of Warkworth.

Current development activity

As of 31 March 2023, approximately 270ha of future urban land has been live zoned in Warkworth. This mostly occurred in Warkworth North. This includes the business area in Warkworth North which was live zoned as part of the AUP process and several private plan changes. A moderate delay is anticipated due to delivery of wastewater servicing and the required transport infrastructure including State Highway extensions and arterial road upgrades.

A small amount of residential development has happened in Warkworth in the past five years, most of this is clustered in the Woodcocks Road area which is located on the southwestern edge of the existing urban Warkworth. The remaining future urban zoned land is mostly located in the south and northeast.

Approximately 8.2ha of land in Warkworth South is currently subject to a plan change. It is located adjacent to existing urban area of Warkworth. Table 3 below outlines the plan changes that have been made operative or are in progress in Warkworth.

Plan Change	Land Area	Proposed development	Status
Plan Change 25 Warkworth North	99ha	Rezone approximately 99ha of Future Urban land to a mix of business and residential zone land.	Operative in part on 12 November 2021
Plan Change 40 Warkworth – Clayden Road	102ha	Rezone approximately 102ha of Future Urban land and Light Industry Zone land.	Fully operative on 11 June 2021
PC72: McKinney Road, Warkworth	8.2ha	Rezone approximately 8.2ha of Future Urban land to Residential – Mixed Housing Suburban Zone and enable approximately 150 to 200 dwellings to be built.	In progress - Appeals closed March 2023

Table 2 – Plan changes in Warkworth

Considerations

Infrastructure

While a large proportion of Warkworth North has been live zoned, a range of infrastructure is still required to support anticipated growth. Growth in Warkworth will require upgrades to bulk and local infrastructure in order to connect the area with the existing urban Warkworth, and provide access to the town centre and the wider region.

The bulk transport infrastructure required to support land to be live zoned is not planned to be delivered before 2035+ in Warkworth North, 2040+ in Warkworth West and South Central and 2045+ in Warkworth South Central, South East and North East. There is no rapid transit network planned so this area would not contribute to a reduction in vehicle kilometres travelled (VKT) for journeys between central Auckland and Warkworth.

Distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes for Auckland are unlikely to be achieved. However, it is noted that VKT may be reduced for local journeys within Warkworth due to proposals for public transport and active travel routes within the Warkworth Structure Plan and private plan changes.

The opening of Ara Tūhono - Pūhoi to Warkworth motorway will allow traffic travelling further north and freight traffic to bypass Warkworth township, creating opportunity for a safer and more walkable local urban environment. It will also provide more direct and efficient access to the northern light industrial area in Warkworth.

Wastewater infrastructure upgrades such as a new pipeline, pump station, wastewater treatment plant, outfall pipe and ancillary works are also required to support land to be live zoned.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the Warkworth FUA than other FUAs and existing urban areas, due to Warkworth being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services compared to other FUAs. However, it is recognised that due to the unique nature of Warkworth as a rural satellite town, and the inclusion of local employment opportunities, public transport and active travel routes within the Warkworth Structure Plan, VKT and CO_2 emissions could reduce over time if the FUAs develop as planned.

Natural hazards and natural environment

Warkworth North East FUA has moderate hazard constraints, including approximately 8% of the FUA within the 1% AEP floodplain, and a small section at the southern end of the FUA bordering the Mahurangi River that is at risk of coastal inundation. The whole FUA is in an area of moderate-risk slope instability. Similarly, Warkworth South FUA has moderate hazard constraints, including approximately 25% of the FUA within the 1% AEP floodplain, and small to moderate areas of the FUA containing some risks of settlement, liquefaction and slope instability. Due to the context and nature of these hazards, development of the FUA can occur, provided it appropriately avoids and mitigate these risks.

Watercourses in the area tend to be of high natural and ecological value. To the south of the North East FUA, the Mahurangi River is scheduled as a “Natural Stream Management Area” and is bordered on its

northern edge by a mixture of kauri, podocarp broadleaf forest and kahikatea forest which are also scheduled as Significant Ecological Areas (SEAs). These SEAs run along the southern border of the FUA and also extend north into the FUA along two of the tributaries of the Mahurangi River. There are also patches of the same forest types (although not scheduled) extending further along the westernmost tributary. There are terrestrial SEAs along the western and southern boundaries of the Warkworth South FUA comprising puriri forest (to the west) and large fragments of kauri, podocarp, broadleaf forest along the southern boundary and extending within the FUA in some places. There is also an area of unscheduled kanuka scrub/forest within the FUA along a tributary of the Mahurangi River running south from Woodcocks Road.

Warkworth North East is about 80% Land Use Capability (LUC) Class 3 (approximately 159 ha) and Warkworth South is about 85% LUC 3 (approximately 421 ha), and both have smaller areas of LUC 4 and 5[15].

Social and cultural

The West Mahurangi Harbour Outstanding Natural Landscape (ONL) borders the southern edge of Warkworth North East (and overlaps in part) as does the Mahurangi River southern escarpment - a High Natural Character area. The Combes/Daldy historic heritage lime works site is also located in the southwestern corner of Warkworth North East.

The West Mahurangi Harbour ONL also borders the southern edge of Warkworth South. There are no other areas identified for their natural, cultural or historic heritage or sites of significance to mana whenua in this part of the FUA.

Options

The initial options considered for the Warkworth FUAs included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify the existing FUAs which not suitable for development.
    a. Initiate a council-led plan change to rezone the FUAs to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended a hybrid of ‘option 2 and 4’.

For the final FDS, further investigation considered infrastructure, VKT emissions and the presence of moderate hazard constraints. This confirmed the Warkworth FUAs are suitable for development and their boundaries should be retained. The timing changes made in the draft FDS to reflect infrastructure prerequisites should also be retained.

The future of Warkworth

The future urban area timing is as follows:

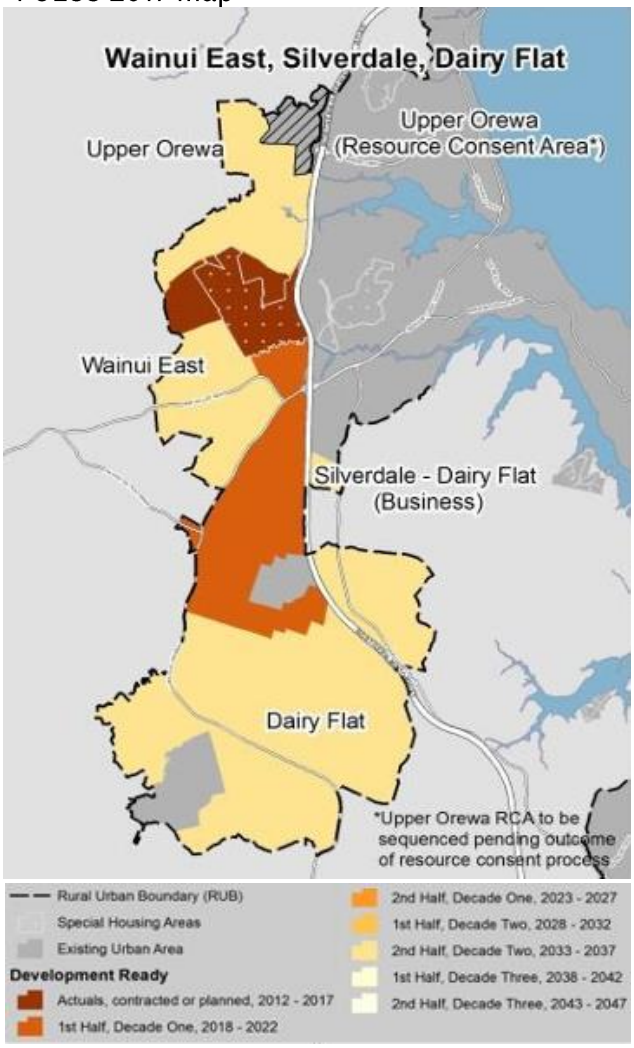
- North (2035+)

[15] The Land Use Capability (LUC) classification system is the main database used in New Zealand to describe the productive capability of land. The LUC assigns land to a class between 1 and 8, class 1 being the most productive and versatile, and class 8 having severe limitations to productive use.

- West (2040+)
- South-central (2040+)
- South-east (2045+)
- South-west (2045+)
- North-east (2045+)

Silverdale-Dairy Flat, Wainui East, Upper Orewa

FULSS 2017 map



FDS map

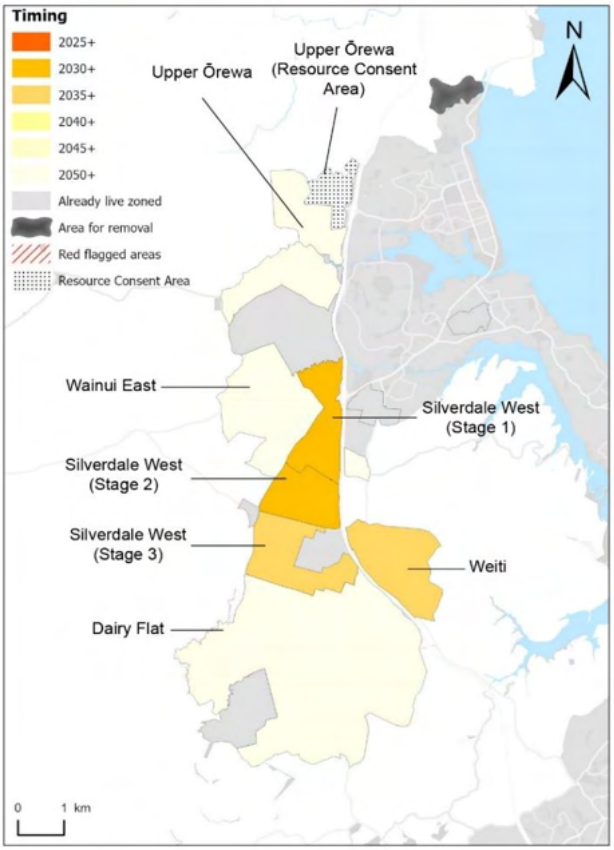


Figure 2 – Silverdale-Dairy Flat, Wainui East, Upper Orewa

Future urban form and current development activity

The Wainui Silverdale Dairy Flat and Upper Orewa a key growth area. However any growth that happens will require significant new provision of business land, including industrial and commercial land and other retail and services space, to provide employment and meet the future business and service needs of the growing community.

The Silverdale West Dairy Flat area is the initial focus for future industrial growth in the urban north due to the extensive future urban land identified in the area. As such, the Silverdale West Dairy Flat

Industrial Area Structure Plan was developed and adopted in April 2020[16]. There is the imminent exhaustion of light industrial land in the North Shore, Silverdale and the Highgate Business Park. Silverdale West Dairy Flat is the next suitable area for industry in the north nearest to urban Auckland.

The land is identified for industrial activity because of its proximity to an existing motorway interchange at Silverdale and the existing Silverdale industrial area, it is relatively flat and the southern area is subject to adverse effects from the adjoining North Shore Airport which renders it unsuitable for residential or other more intensive uses.

The wider Wainui Silverdale Dairy Flat and Upper Orewa future urban area will be subject to a structure plan process in the future. This will include identifying the appropriate land uses, including residential areas of varying densities, a town centre, and retail and other commercial activities.

As of 31 March 2023, approximately 320ha of land has been live zoned in Silverdale-Dairy Flat. This includes:

- the Special Housing Area known as Milldale (or Wainui precinct in the AUP),
- approximately 41ha of business plus residential land located on the corner of Hibiscus Highway and SH1,
- a small pocket of light industrial land at the intersection of Dairy Flat Highway and Kahikatea Flat Road, and
- a large reserve (Green Road Park) at the southern end of the FUA.

Most of the recent residential building consent activities in the live zoned area are concentrated in the Milldale (or Wainui) area and a small cluster just south of the Hibiscus Coast bus station. A moderate delay is anticipated for the delivery of transport infrastructure such as the Wainui Improvements.

Some individual building consents for housing are scattered across the currently future urban zoned land, such as the Dairy Flat area. These housing developments are on large sections with on-site wastewater system and are generally consistent with the rural characteristics of these FUAs. Therefore, they are not considered as part of the urban development.

Considerations

Infrastructure

The bulk Infrastructure required to support land to be live zoned is not planned to be delivered before 2030 in Silverdale West Stages 1 & 2, not before 2035 in Silverdale West stage 3 and Weiti, in Dairy-Flat, Upper Orewa and Wainui East not before 2050.

Due to the expected need for vacant business land, Silverdale West stage 1 and 2 have been timed to allow business to take advantage of the existing infrastructure network capacity. Wastewater network upgrades including an upgrade to the Army Bay Wastewater Treatment Plant are required to support land to be live zoned.

Rapid transit, frequent transit routes, key arterials and network upgrades are required across the area to support land to be live zoned and achieve strategic outcomes. Transport infrastructure is not planned to be delivered before 2050+ in Dairy-Flat, Upper Orewa and Wainui East.

[16] Silverdale West Dairy Flat Industrial Structure Plan, April 2020: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/place-based-plans/Silverdale%20West%20Dairy%20Flat%20Industrial%20Area%20Structu/silverdale-west-dairy-flat-industrial-area-structure-plan-april-2020.pdf

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in these three FUAs than other southern FUAs and existing urban areas. However, it is recognised that VKT and CO_2 emissions could reduce over time if the FUAs develop as planned in the Silverdale West Dairy Flat Industrial Area structure plan and plan change proposals.

Natural hazards and natural environment

Upper Orewa, Wainui East and Dairy Flat have moderate hazard constraints, including approximately 15-20% of each FUA within the 1% AEP floodplain, and a very small section along the southern boundary of the Upper Orewa FUA bordering the Orewa River that is at risk of coastal inundation and erosion. Some parts of the FUAs are also subject to moderate-or high-risk slope instability. Due to the context and nature of these hazards (i.e. often flood plains are confined to the margins of waterways), development of the FUA can occur, provided it appropriately avoids and mitigate these risks.

Watercourses in these FUAs are generally heavily modified and degraded due to the surrounding rural production and countryside living land uses and lack of overhead vegetation. However, portions of the Orewa River in the Upper Orewa FUA, Rangitopuni Stream in the Dairy Flat FUA and Weiti Creek in the Wainui East FUA extend through forest SEAs, and therefore have higher natural character and ecological values. These SEAs border and/or extend slightly into each of the FUAs (and three small SEAs are wholly within the Upper Orewa FUA) and are a mixture of kauri, podocarp, broadleaved forest, kahikatea, pukatea forest and mānuka, kānuka scrub.

Dairy Flat is about 23% LUC 3 (approximately 348 ha), Upper Orewa contains around 13% (34 ha) LUC 3 and Wainui East has no LUC 1 to 3.

Social and cultural

The Sunnyside Road, Coatesville ONL borders and slightly overlaps the southwestern corner of the Dairy Flat FUA, and the Wainui Road ONL borders the north western boundary of the Wainui East FUA. There are no other areas identified for their natural, cultural or historic heritage or sites of significance to mana whenua in the Silverdale-Dairy Flat, Wainui East, Upper Orewa FUAs.

Options

The initial options considered for the Silverdale-Dairy Flat, Wainui East, Upper Orewa FUAs included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify that the FUAs are not suitable for development.
    a. Initiate a council-led plan change to rezone the FUAs to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered but based on the considerations, the draft FDS recommended a hybrid of ‘option 2 and 4’. For the final FDS, further investigation considered infrastructure, VKT emissions and the presence of moderate hazard constraints. This confirmed the FUAs are suitable for development and their boundaries should be retained. However, timing should be changed to reflect infrastructure prerequisites and business land response.

The future of Silverdale-Dairy Flat, Weiti, Wainui East, Upper Orewa

The existing FUA is retained, the timing is as follows:

- Silverdale West (Stage 1) and (Stage 2) 2030+
- Silverdale West (Stage 3) and Weiti 2035+
- Upper Orewa, Wainui East and Dairy Flat 2050+

5.1.2 North-western FUAs

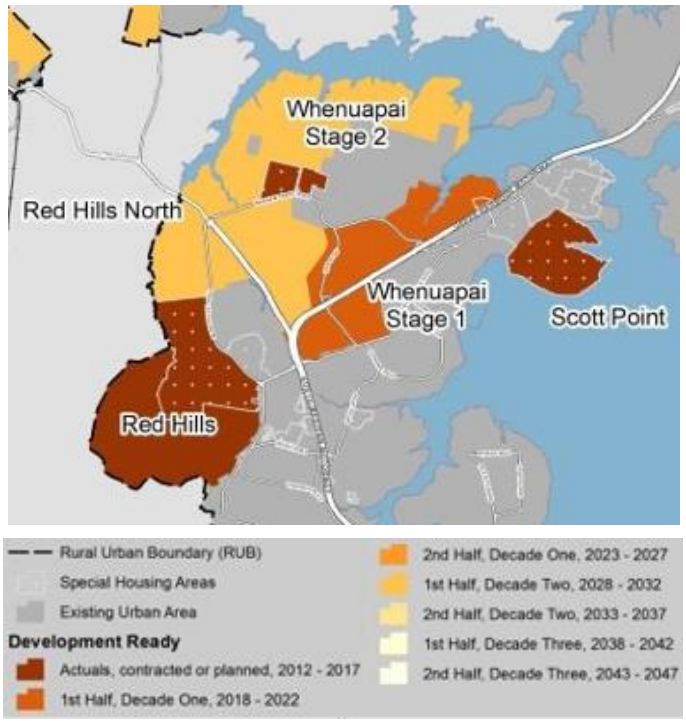
Overview

Sub-region FUA cluster	Future urban areas	Status in 2023	FULSS 2017 timing	FDS New timing
Whenuapai	*Scott Point*	*Live zoned*	*2012-2017*	*N/A*
	Whenuapai	*Live zoned*	*2012-2017*	*N/A*
	Whenuapai North (Stage 1)	Future Urban zoned	2028-2032	2035+
	Whenuapai North (Stage 2)	Future Urban zoned	2028-2032	2050+
	Whenuapai Business	Future Urban zoned	2028-2032	2025+
	Whenuapai East	Future Urban zoned	2018-2022	2035+
	Whenuapai West	Future Urban zoned	2028-2032	2035+
	Whenuapai South	Future Urban zoned	2018-2022	2035+
Red Hills	*Red Hills*	*Live zoned*	*2012-2017*	*N/A*
	Red Hills North	Future Urban zoned	2028-2032	2035+
Kumeū-Huapai and Riverhead	*Kumeū Huapai*	*Live zoned*	*2012-2017*	*N/A*
	Kumeū Huapai and Riverhead	Future Urban zoned	2028-2032	2050+ (including red flag) Strategic direction to remove portion of FUA associated with flood plain (refer to map for indicative boundary)

Table 3 – North-western FUAs

Whenuapai and Red Hills

FULSS 2017 map



FDS map

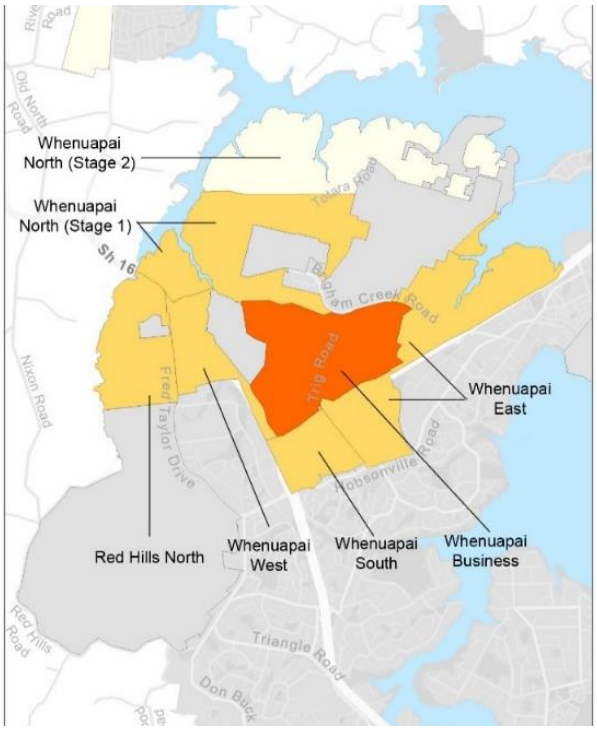


Figure 3 – Whenuapai and Red Hills

Future urban form

The Vision in the Whenuapai Structure Plan[17] is:

Whenuapai is a liveable, compact and accessible place with a mix of high quality residential and employment opportunities. It makes the most of its extensive coastline, is well connected to the wider Auckland Region, and respects the cultural and heritage values integral to its distinctive character.

Development of the Structure Plan considered the constraints and opportunities in the area. The following key elements were been explored to ensure sustainable development in the structure plan area.

- Land use and activities – the Structure Plan identifies low, medium and high density residential land development areas taking into account the airbase and other constraints, and following the Neighbourhood Design Statement.
- Transport – higher residential densities are located in proximity to Rapid Transit Network stations and park and ride facilities. Whenuapai will have a well-connected cycling and pedestrian network.
- Infrastructure – significant upgrades to existing water supply and waste water networks are required as well as stormwater management is needed to manage these effects of growth. Development has to take into account the noise contours and flight paths of Whenuapai Airbase as well as the National Grid Corridor.

[17] Whenuapai Structure Plan 2016: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/place-based-plans/Documents/whenuapai-structure-plan-september-2016.pdf

- Natural environment and heritage – retention of permanent and intermittent streams is crucial and will help determine where roads, open space and residential development will be located. Significant Ecological Areas and riparian margins are to be enhanced while existing archaeological and built heritage sites are to be protected.
- Open space and recreation – esplanade reserves, a sports field, three suburban parks, a network of 14 neighbourhood parks and a civic space are to be provided in the structure plan area.

The Redhills Precinct[18] is a new suburb forming a significant part of the north western extent of Auckland's wider metropolitan area. Although first identified in the FULSS 2015 as a future urban area, Redhills was live-zoned by the IHP through development of the AUP in 2016.

The Redhills Precinct encompasses some 600ha of land to the west of Fred Taylor Drive and the Westgate / Massey North Metropolitan Centre. With its boundaries being ridgelines, the precinct is a natural amphitheatre shape, interspersed with gullies and vegetated streams that ultimately drain to Brighams Creek and the Waitemata Harbour.

The purpose of the Redhills Precinct is to implement Redhills Precinct: Precinct Plan 1 to ensure that the Precinct creates high quality residential development with a local centre established centrally within the precinct to provide a heart and focal point for the Redhills community. Arterial roading connections through the precinct will provide connectivity east-west between Fred Taylor Drive and Nelson Road, and north-south between Royal Road and Henwood Road. This will facilitate direct strategic roading connections between on/off ramps of the northwestern motorway to rural communities and future urban areas to the north and west of Redhills.

Current development activity

Two Special Housing Areas on Brigham Creek and Totara Roads were live zoned through the AUP, these included residential and business land.

Approximately 152ha in Scott Point was identified as Special Housing Area and subsequently live zoned through the AUP.

As of 31 March 2023, approximately 255ha of land has been live zoned in Whenuapai and Scott Point. A moderate delay is anticipated due to the delivery of required transport infrastructure. 1,090ha is still future urban zoned.

Parts of Red Hills were live zoned in 2018 as a Special Housing Area. A moderate delay is anticipated due to the delivery of required transport infrastructure such as arterial upgrades. Water and wastewater infrastructure is underway and stormwater management is anticipated to be delivered by the developer.

Auckland Council is working with the major landowner in the Red Hills area on a master plan for over 200 hectares of the live zoned land. Approximately 590ha of land has been live zoned in Red Hills. 190ha is still future urban zoned.

Plan Change 5: Whenuapai was a council-initiated plan change seeking to rezone approximately 360 hectares of mostly Future Urban zoned land to a mix of business and residential zones. It was withdrawn in June 2022 due to issues around infrastructure provision and funding.

[18] Auckland Unitary Plan – Operative in Part - Redhills Precinct: https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20I%20Precincts/6.%20West/I610%20Redhills%20Precinct.pdf

Approximately 57.2ha of land is subject to plan change. Table 4 below outlines the two plan changes that are currently in progress which are located along Brigham Creek Road and the Special Housing Area that has been developed.

Plan Change	Land Area	Proposed development	Status
PC 69: Spedding Block	52ha	Rezone land at 23-27 & 31 Brigham Creek Road and 13 & 15-19 Spedding Road, Whenuapai from Future Urban Zone to Business – Light Industry Zone	Fully operative on 12 March 2023
PC 86 (Private): 41-43 Brigham Creek Road	5.2ha	rezone land at 41 -43 Brigham Creek Road, Whenuapai from Future Urban Zone to Residential Mixed Housing Urban	Further submissions closed December 2022

Table 4 – Plan changes in Whenuapai and Red Hills

Considerations

Infrastructure

The bulk Infrastructure required to support land to be live zoned is not planned to be delivered before 2035+ for Whenuapai North stage 1, East, West, South and Red Hills North. Key transport infrastructure is not planned to be delivered before 2050 for Whenuapai North stage 2. Due to the expected need for vacant business land, Whenuapai Business area is timed for 2025+, to allow some business to take advantage of the existing network capacity.

Rapid transit, frequent transit routes, key arterials and network upgrades as well as the provision of active modes are required to support development across the area and achieve strategic outcomes. Upgrades to the Water supply and wastewater network such as a reservoir, watermain and pump station projects are also required to support land to be ready for live zoning.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the Whenuapai and Red Hills FUAs than southern FUAs and existing urban areas. However, it is recognised that VKT and CO_2 emissions could reduce over time if the FUAs develop as planned in the Whenuapai structure plan and live zoned areas, particularly when rapid public transit is delivered.

Natural hazards and natural environment

Whenuapai North (Stage 2) has mostly moderate hazard constraints, including approximately 10% of the FUA within the 1% AEP floodplain, there is some risk of coastal inundation along the north and eastern boundary. However, a large area of the FUA adjacent to the estuary is susceptible to coastal erosion, extending up to 35m into the site in places. A site-specific coastal hazard assessment was undertaken for this site as part of the evidence gathering for AUP Plan Change 5 in 2017. This report found that although coastal erosion is confined to the boundary of the site, it can be significant in those locations. There is a small proportion of the Whenuapai North (Stage 2) FUA subject to high-risk slope instability, and some small portions along the western boundary where liquefaction damage is possible.

The Red Hills FUA has a small portion (approximately 15%) within the 1% AEP floodplain associated with the Ngongetepara Stream extending slightly into the western border of the site. This FUA is not at

risk of coastal erosion, but there is a very small section of this FUA, at the northern tip, which will be subject to coastal inundation. Red Hills FUA also has small areas of the FUA vulnerable to liquefaction, and there may be some settlement risks in localised areas.

In most cases, development can appropriately avoid these hazard risks through design and mitigation solutions. However, particular regard is required to coastal instability and erosion risks within Whenuapai North (Stage 2) to ensure this is appropriately managed in all future master planning, plan changes or other land use applications.

Watercourses in the area tend to be heavily modified and degraded due to the surrounding rural land uses and little vegetation cover. Whenuapai North (Stage 2) FUA borders a significant ecological area – marine (SEA-M). The SEA-M is scheduled as a muddy, mangrove-lined inlet, which is an important habitat for threatened and coastal fringe birds and important migratory pathway for native fish. There is also one terrestrial SEA within the FUA, which is a broadleaved/scrub forest along Totara Creek near the southwestern edge.

Red Hills FUA has a relatively high proportion of watercourses, which tend to have a higher proportion of overhead coverage, however, they are still highly modified and degraded. There are no SEAs or other notable non-scheduled biodiversity areas within the FUA, although from aerial photography there does appear to be some riparian shrubs and trees along the Ngongetepara Stream on the western boundary and the Totara Creek in the south eastern corner, plus some existing tall trees/shelter belts along property boundaries.

Both Whenuapai North (Stage 2) and Red Hills FUAs are almost entirely LUC 1 and LUC 2 (totalling 1,156 ha and 197 ha respectively for each FUA).

Social and cultural

There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua in the Whenuapai and Red Hills FUAs.

Options

The initial options considered for the Whenuapai and Red Hills FUAs included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify that the FUAs are not suitable for development.
    a. Initiate a council-led plan change to rezone the FUAs to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended ‘option 2’. For the final FDS the FUA timing reflects the infrastructure prerequisites and business land supply response.

The future of Whenuapai and Red Hills

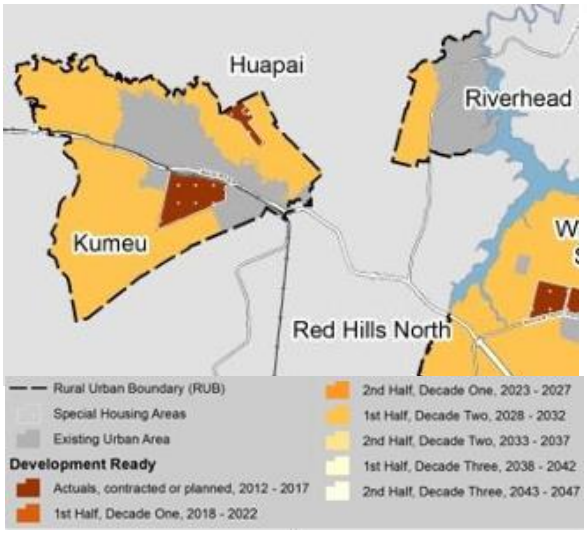
The existing FUA is retained, but the timing is changed, as follows

- Red Hills North (Stage 1) (2035+)
- Whenuapai Business 2025+

- Whenuapai North (Stage 1), Whenuapai East, Whenuapai South, Whenuapai West (2035+)
- Whenuapai North (Stage 2) (2050+)

Kumeū-Huapai-Riverhead

FULSS 2017 map



FDS map

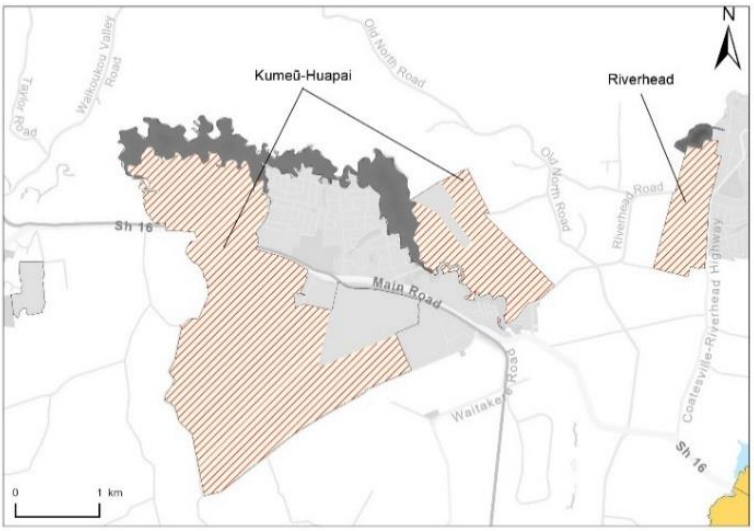


Figure 4 - Kumeū-Huapai-Riverhead

Future urban form

The location of Kumeū -Huapai and Riverhead offers significant development potential given its proximity to the existing urban area. The motorway extensions to SH16 and SH18 that were completed in 2011 have significantly increased the accessibility of the northwest area to the rest of Auckland.

Kumeū-Huapai and Riverhead are rural towns right on the edge of Auckland, just a 10 minute drive (8km) to the emerging metropolitan centre of Massey North. Massey North will consolidate the existing Westgate centre and create a regionally significant metropolitan centre providing significant retail, social facilities, and employment opportunities.

The preferred urban form for the Kumeū-Huapai, Riverhead areas comprises:

- Medium density residential in the 'core' of the town to build on the density being developed in the Huapai Triangle SHA (Mixed Housing Suburban zone). It is envisaged that the medium density residential extends west and surrounds the new centre. A separate area of medium density residential is envisaged in Kumeū North East as it is within the catchment of the existing Kumeū Town Centre.
- Low density residential on the western edge of Kumeū-Huapai and a portion of Kumeū North East to recognise the steeper hills in Kumeū-Huapai West and to reflect the proximity of both these areas to the edge of the town. There is also a corridor of low density residential in Kumeū North East, just north of the Kumeū River. This area contains some steep land and the Electricity Transmission Corridor and therefore limits the ability of this land to be developed for intensive urban uses.
- Riverhead West is also envisaged to be low density residential as this reflects the intensity of the current Riverhead urban area.

- A new Local Centre at Huapai South (around the Trigg Rd/Motu Rd intersection). This centre is deliberately located off SH16 and creates a walkable catchment for the centre that is near the geographic centre of the expanded urban area.
- An area of business land (Group 1 – land extensive) within Kumeū-Huapai, reflecting the desire to service and provide employment for the new population in the area. It is expected that the business land would be a mix of light industry (in particular manufacturing and production activities that are smaller and generally less noisy, dirty or noxious than heavy industry), warehousing, transport and logistics activities, and opportunities for associated commercial activities, including office, trade and service activities.

Current Development

As of 31 March 2023, approximately 87ha of land has been live zoned in Kumeū-Huapai. This includes two Special Housing Areas: Huapai Triangle which is just south of the existing town centre and Huapai 2 precinct approximately 1.1km north of the town centre. Most of the recent residential consent activities have occurred within the two live zoned areas.

As of 31 March 2023 a plan change request was lodged[19] for the Riverhead FUA which seeks to rezone approximately 80.5 hectares of land located generally to the west of the existing Riverhead urban area from Future Urban Zone (FUZ) to a mix of residential zones with a small Business - Local Centre and a Business - Neighbourhood Centre. The rezoning is proposed to provide capacity for approximately 1500-1800 dwellings. In addition to this, a recent resource consent was granted for a 422 unit retirement village via the COVID-19 Recovery (Fast-track Consenting) Act 2020.

Considerations

Infrastructure

The bulk Infrastructure required to support land to be live zoned is not planned to be delivered before 2050+ for Kumeū-Huapai and Riverhead. As Kumeū River presents a physical barrier for alternative routes into the town centre from the northern part of Kumeū-Huapai, the upgrades to and provision of transport infrastructure is critical in providing more efficient and safe connection.

Improving the transport network will play a key part in alleviating the pressure on the area's already congested roads, less traffic on this section of road (SH16 Main Road) will enable it to become part of a revitalised town centre, providing more transport choice and reducing the severance of one side of Kumeū-Huapai from the other.

Rapid transit, frequent transit routes, key arterials and network upgrades as well as the provision of active modes are required to support development across the area and achieve strategic outcomes. Wastewater upgrades are also required to support land to be ready to be live zoned.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the Kumeū-Huapai-Riverhead FUA than southern FUAs and existing urban areas. However, it is recognised that VKT and CO_2 emissions could reduce over time if the FUAs develop in a

[19] The Riverhead South private plan change was lodged 6 July 2022. The Planning, Environment and Parks Commitee rejected the request at its 4 May 2023 meeting (Resolution number PEPCC/2023/61).

well-planned way with sufficient provision of a range of jobs, education and other services and high quality public transport.

Natural hazards and natural environment

The initial high-level assessment of natural hazards in Kumeū-Huapai-Riverhead highlighted significant potential hazard exposure within the FUA. Approximately 30% of the FUA is covered by the 1% AEP floodplain as shown in Figure 5 (top). As shown in Figure 5 (bottom), a significant portion of this is classified as high hazard risk within the northern portion of the Riverhead FUA, as well as the existing Kumeū – Huapai township and adjacent portion of the future urban area.

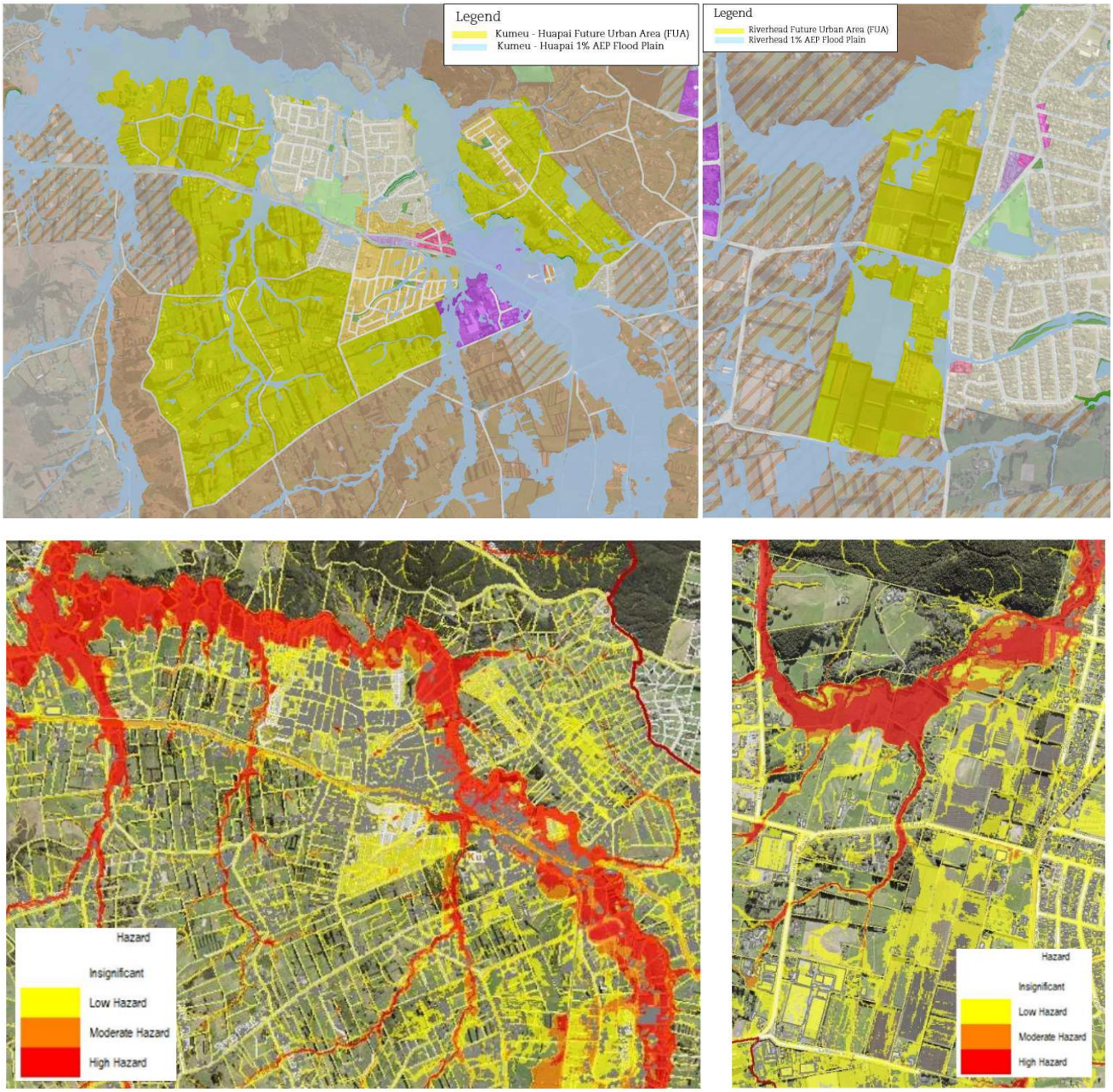


Figure 5 – 1% AEP floodplain (top) and flood hazard (bottom) within Kumeū-Huapai (left) and Riverhead (right)

Although this FUA is treated together from a geographical perspective the Kumeū–Huapai FUA discharges to the Kaipara Harbour to the northwest, whilst the Riverhead FUA discharges to the Upper

Waitemata Harbour in the east. These areas have therefore been discussed and assessed separately from a hazard perspective.

Within the Kumeū–Huapai portion of the FUA there are areas of land that are significantly impacted by flooding from the Kumeū River. Development in these locations is not appropriate due to the risks to life and property. In these areas the modelled 1% AEP flood flow is in excess of 200 cubic metres per second. There is no CAPEX solution to manage the risk associated with these flows.

Because the Kumeū River provides drainage of an extensive upstream catchment, there is no feasible opportunity to undertake CAPEX works to reduce the floodplain through the Kumeū – Huapai FUA without having potentially significant impacts on the existing urban areas of the Kumeū – Huapai township, as well as Helensville and Parakai located downstream. If not appropriately managed, development of the remaining portion of the FUA (not directly within the floodplain) could have effects on these downstream urban areas, which are already at risk of significant flooding.

The Riverhead FUA is located upstream of the existing urban area and has the Riverhead Stream flowing along part of the northwestern FUA boundary. There are significant areas of 1% AEP flooding identified within the FUA boundary, which as previously identified, pose a high risk to life and property. Similar to the Kumeū – Huapai FUA, there is a significant upstream catchment associated with the Riverhead Stream flowing close to the western and northern boundaries of the FUA. Due to the large flows associated with the stream there is no feasible CAPEX opportunity to reduce the natural floodplain through the FUA itself. Any works to reduce the floodplain within the Riverhead FUA will likely increase flood risk to the existing urban area.

Hydraulic modelling of the Riverhead catchment indicates that areas of the existing urban area immediately downstream of the FUA are within the 1% AEP floodplain. The flood risk to these areas was recognised during the significant flooding of Duke Street and Te Reora Place in response to the Auckland Anniversary weather event in January 2023. If not appropriately managed, development of the remaining portion of the FUA (not directly within the floodplain) could have effects on these downstream urban areas, which are already at risk of significant flooding.

While some watercourses in this FUA are modified and degraded, the FUA contains a high proportion of high ecological value watercourses. This includes proportionally higher overhead vegetation coverage / riparian planting, particularly in the northern portion of Kumeū, where the FUA abuts the Kumeū River. The FUAs contains several natural wetlands, particularly in Kumeū. These natural wetlands tend to be located in lifestyle blocks and/or adjacent to the northern SEA-T. As such, they are vegetated and likely in a higher ecological condition than natural wetlands in other FUAs. There are fragments of kahikatea forest, puriri forest, kauri, podocarp, broadleaved forest and kanuka scrub/forest SEAs abutting and in some places extending into the northern edge of the Kumeū and Huapai portions of the FUA, and a smaller patch of broadleaved scrub/forest on the northern boundary of the Riverhead portion. There is also a small area of tawa, kohekohe, rewarewa, hīnau podocarp forest and a larger area of kauri, podocarp, broadleaved forest SEA to the south west.

The Kumeū-Huapai-Riverhead FUA is almost 99% LUC 1 to 3 (1,595 ha in total) with a very small patch of LUC 4 in the southwestern corner of the Kumeū-Huapai part of this FUA.

Social and cultural

The Taylor Road, south of Helensville ONL borders and slightly overlaps the northern boundary of the Kumeū-Huapai FUA. There are no other areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua in the Kumeū-Huapai-Riverhead FUAs.

Options

The initial options considered for the Kumeū-Huapai-Riverhead FUAs included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify that some or all of the FUAs are not suitable for development.
   a. Initiate a council-led plan change to rezone the FUAs to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended a hybrid of 'option 2, 3 and 4'. For the final FDS, further investigation was carried out on these FUAs. This considered infrastructure, VKT emissions and the presence of moderate hazard constraints. This confirmed that parts of the FUA are not suitable for development due to the hazard risk posed to life and property (see areas shown on Figure 4). These areas should be removed as part of the FUA. While other areas could be developed, it is critical that an integrated catchment approach is taken and all development is appropriately mitigated at a sub-catchment scale. Therefore, while the wider boundaries should be retained (excluding the areas proposed for removal), the remaining area should be "red flagged". The timing reflects the infrastructure prerequisites.

The future of Kumeū-Huapai-Riverhead

Northern parts of the Kumeū-Huapai-Riverhead FUA will be removed as they are not suitable for development. The remaining parts of the Kumeū-Huapai-Riverhead FUA boundaries are retained, but the timing is delayed for infrastructure reasons until 2050+, and the remainder of the FUA will be red flagged to highlight the critical need for an integrated catchment approach to development outcomes.

5.1.3 Southern FUAs

Overview

Sub-region FUA cluster	Future urban areas	Status in 2023	FULSS 2017 timing	FDS New timing
Ōpaheke, Drury East, Drury West	*Hingaia*	*Live zoned*	*2012-2017*	*N/A*
	Ōpaheke -Drury (Bellfield Rd)	*Live zoned*	*2012-2017*	*N/A*
	Drury South	*Live zoned*	*2012-2017*	*N/A*
	Drury West (Bremner Rd)	*Live zoned*	*2012-2017*	*N/A*
	Ōpaheke-Drury (Drury East, Gatland Road, Great South Road)	*Partially live zoned*	*2028-2032*	*N/A*
	Ōpaheke *(previously named as Ōpaheke -Drury)*	Future Urban zoned	2028-2032	2050+ (including red flag) Strategic direction to remove portion of FUA associated with flood plain (refer to map for indicative boundary)
	Drury East	Future Urban zoned	2028-2032	2035+ (including red flag)

	(previously named as Ōpaheke Drury)			Strategic direction to remove portion of FUA associated with flood plain (refer to map for indicative boundary)
	Drury West (Stage 1)	Partially live zoned	2018-2022	2035+
	Drury West (Stage 2)	Future Urban zoned	2028-2032	2035+
	Drury West (Stage 3)	Partially live zoned	2028-2032	2035+
Pukekohe and Paerata	*Paerata (Wesley)*	*Live zoned*	*2012-2017*	*N/A*
	Pukekohe (Belmont)	*Live zoned*	*2012-2017*	*N/A*
	Paerata South	Future Urban zoned	2018-2022	2035+
	Paerata West	Future Urban zoned	2018-2022	2040+
	Pukekohe North-east	Future Urban zoned	2023-2027	2040+
	Pukekohe North-west	Future Urban zoned	2023-2027	2040+
	Pukekohe East	Future Urban zoned	2023-2027	2035+
	Pukekohe South-east	Future Urban zoned	2023-2027	2040+
	Pukekohe South-west	Future Urban zoned	2023-2027	2035+
Puhinui	*Puhinui (Stage 1)*	*Live zoned*	*2012-2017*	*N/A*
	Puhinui (Stage 2)	Future Urban zoned	2028-2032	2030+
Takaanini	*Takaanini (Walters Rd)*	*Live zoned*	*2012-2017*	*N/A*
	Takaanini (Cosgrave Rd)	Future Urban zoned	2023-2027	2050+
	Takaanini	Future Urban zoned	2043-2047	2050+ (including red flag) Strategic direction to remove portion of FUA associated with flood plain and peat soils (refer to map for indicative boundary)

Table 5 – Southern FUAs

Takaanini and Cosgrave Road

FULSS 2017 map

FDS map

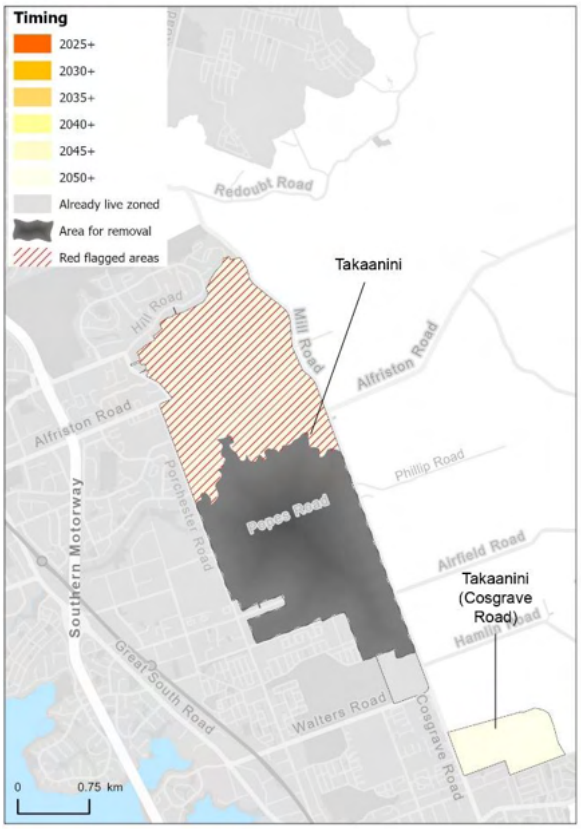


Figure 6 – Takaanini and Cosgrave Road

Future urban form

The future urban zone in Takanini is located within the large Papakura Stream catchment and the majority of the area is low lying and subject to significant flooding hazards. Much of the area is also subject to significant geotechnical constraints due to peat soils.

Due to the environmental constraints in Takaanini, it is likely that the urban form will relatively low density unless significant investment in stormwater infrastructure is undertaken.

Any development that happens in this area will be supported by the Takaanini Town Centre as well as nearby industrial land, south of the future urban area.

Current development activity

The Addison is a large masterplanned residential development in Takanini, just north of the Papakura Town centre. The overall development is on 84 hectares, and will eventually be home to 1,500 houses at a range of densities. The development has started in 2003 and has been development using a staged approach since then.

A small proportion (20ha) of Takanini was live zoned through the AUP. The special housing area of Takanini Strategic Area accounts for the cluster of development at the southern end of Takanini.

There is 648ha land still future urban zoned however there has been some interest in develop in this area, including the proposed Sunfields development that spanned an area both in and outside the rural urban boundary

Considerations

Infrastructure

Infrastructure is not expected to be available to support land to be live zoned in Takaanini and Cosgrave Road FUA until at least 2050+. Key arterials and frequent transit routes are required to support land to be ready to be live zoned and achieve strategic outcomes. There are significant flood constraints and costs anticipated in parts of the FUA due to the required stormwater infrastructure.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

While the high level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the Takaanini FUAs than existing urban areas, these FUAs are likely to have slightly lower VKT and CO_2 emissions compared to the FUAs in the north and north west, due to being closer to high quality existing or planned public transport, a wide range of jobs, education and other services.

Natural hazards and natural environment

The initial high-level assessment of natural hazards in the Takaanini FUA highlighted significant potential hazard exposure within the FUA. The floodplain in the Takaanini FUA is significant in extent, particularly south of the Papakura Stream, with more than 50% of the FUA exposed to the 1% AEP floodplain (see Figure 8). The Papakura Stream catchment is a large catchment covering 56 km^2 and producing 10,600,000m^3 of runoff, resulting in an extensive floodplain. The Papakura Stream's headwaters are in the Clevedon Hills, and the predominantly rural stream catchment drains through the township of Takaanini before discharging into the Manukau Harbour.

Development of the Takaanini FUA would almost double the urban area within this catchment. The northern part of the FUA is characterised by steep outcrops of land draining to the flat southern part of the FUA through two watercourses and numerous overland flowpaths. The southern part of the FUA is flat, underlain by peat soils. Over time the natural watercourses that would have provided drainage of this area have been infilled and altered to align with the current agricultural land use. As a result, there is limited potential to drain this area without significant stream restoration works. Due to the topographical constraints associated with the southern part of the FUA, there is very limited grade meaning that any conveyance channels would need to be extremely wide.

Due to the peat soils under the existing agricultural land use covering a large portion of the FUA (see Figure 8), rainfall can easily infiltrate through the topsoil (when not already saturated) and therefore does not contribute to runoff. Development will result in a significant increase in impervious areas, which will result in limited opportunity for infiltration to occur. This will not only significantly alter the natural hydrology but will significantly increase rates and volumes of runoff to the Papakura Stream, resulting in large areas of high and moderate flood hazard which poses risks to life and property within the FUA and downstream through the existing Takaanini urban area (see Figure 7).

Furthermore, these geological constraints pose technical challenges to the construction of long-term sustainable infrastructure and buildings. Geological conditions within the FUA have been determined to be challenging within the lower land in the southern part of the FUA and feature deep, very weak peat soils. These soils are highly subject to significant short and long-term settlement risks and irreversible

shrinkage risks associated with construction of houses and infrastructure and dewatering respectively. Due to this underlaying geology, liquefaction damage is also possible.

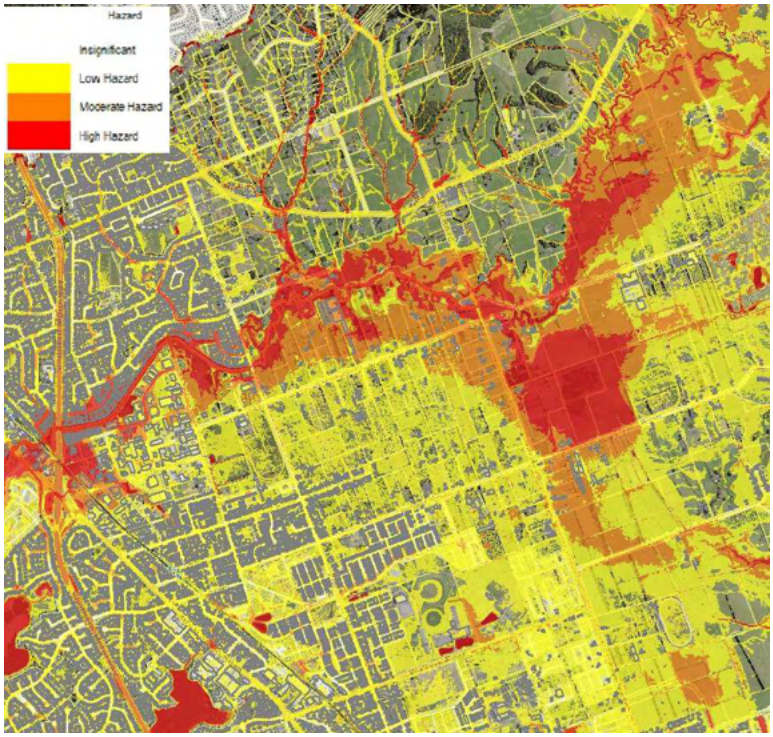


Figure 7: 1% AEP flood hazard within the Papakura Stream and in the vicinity of the Takaanini FUA

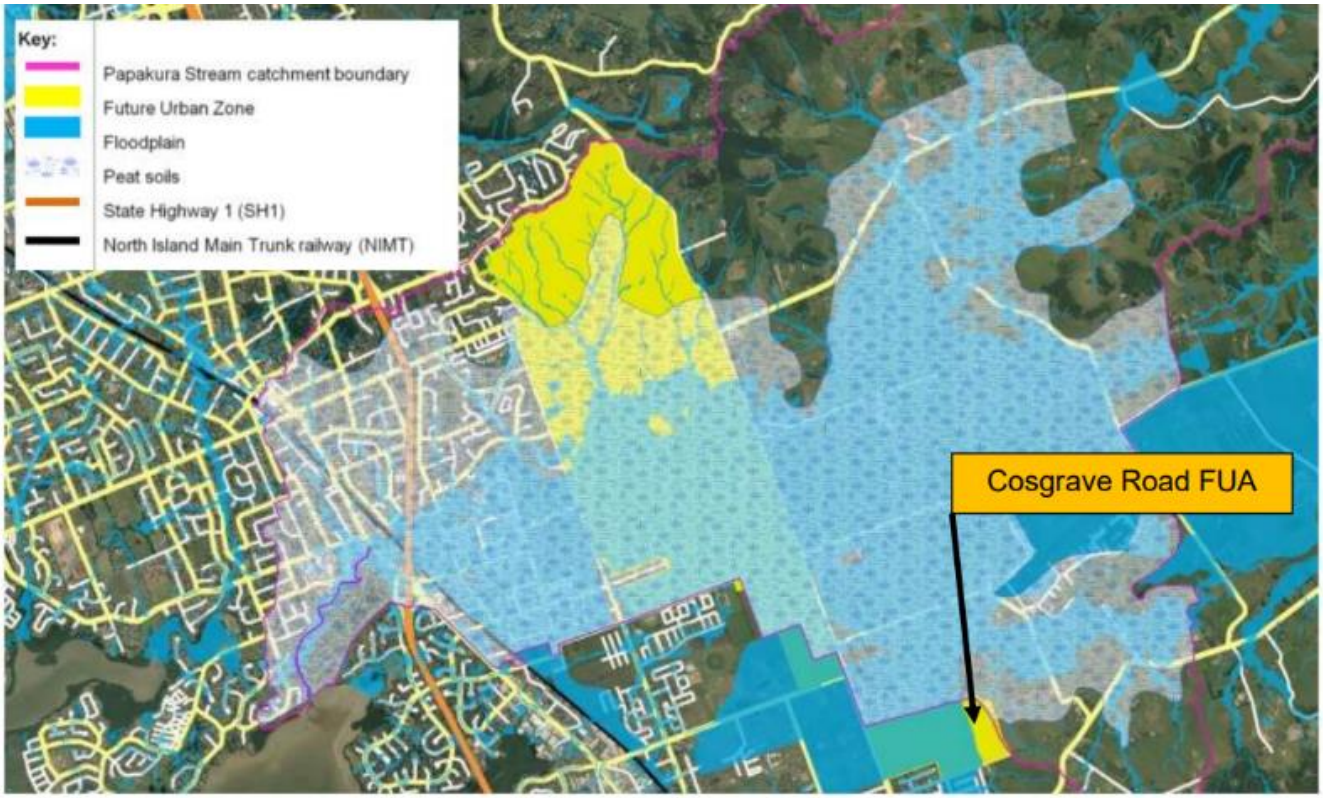


Figure 8: Extent of peat soils in the Takaanini area overlain with the 1% AEP floodplain (note that the image above uses a 2.1 degree climate change scenario and so the floodplain appears smaller than currently estimated).

The scale of the stormwater management infrastructure required to service the Takaanini FUA is extremely large (up to 80m wide for conveyance structures in some locations and approximately 20% of the FUA outside of the 1% AEP floodplain would need to be reserved for attenuation purposes to control flows). This is well beyond that considered for stormwater management elsewhere in the Auckland Region and it is likely that the scale of CAPEX projects to service this area would be prohibitive and would not be able to support a holistic, integrated approach to define a FUA-wide approach to stormwater management implementation.

Watercourses in this FUA are most likely to be in poor health and have low existing ecological value. This is supported by aerial photography analysis, which demonstrates that much of the portion of the Papakura Stream that transects the FUA west to east has low overhead coverage / vegetated riparian margins. This is except for areas to the west through lifestyle blocks, the headwaters of the tributaries in the northern most part of the FUA north of Ranfurly Road, which appear to have some native kanuka/manuka scrub vegetation along them, as well as a small remnant of taraire/tawa podocarp forest along the tributary in the northernmost corner, which is scheduled as an SEA. There are a few other very small non-scheduled areas of kanuka scrub also in the northern section of the FUA. There is a single notable tree (magnolia) near the centre of the southern portion of the FUA, which would need to be protected in line with the AUP.

There are a number of modified watercourses running through the Cosgrave Road FUA in a grid-like pattern, with a piped watercourse (drain) running along part of the southern boundary and due to the existing rural land uses, it is considered likely that these waterbodies will have lower natural value. There are no SEAs or other notable non-scheduled biodiversity areas within the FUA.

Approximately 90% of the Takaanini FUA is classified as LUC 1 to 3 (about 621 ha), with a small area of LUC 4 in the northern corner of the site, and about 80% of the Cosgrave Road FUA is LUC 1 to 3 (about 45 ha).

Social and cultural

A historic heritage site (Alfriston Hall, including World War I Memorial) is adjacent to the eastern boundary of the Takaanini FUA. A modified Ridgeline Protection overlay borders and slightly overlaps the northern boundary of the Takaanini FUA. The Rings/Kirikiri redoubt historic heritage site is just over 400 m to the southeast of the Cosgrave Road FUA. There are no other areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of the Takaanini or Cosgrave Road FUAs.

Options

The initial options considered for Takaanini and Cosgrave Road included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify that part or all of the FUA is not suitable for development.
    a. Initiate a council-led plan change to rezone the FUA to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended that option 3 should be pursued for Takaanini and option 2 for Takaanini (Cosgrave Road). Further analysis on Takaanini confirmed that overlapping hazard constraints in the south mean development is not suitable

due to the hazard risk posed to life and property within the FUA and downstream in the existing urban area of Takaanini. The relatively fewer constraints in the northern portion of the FUA mean that development could occur, but in doing so it is critical that an integrated catchment approach is taken and all development is appropriately mitigated at a sub-catchment scale. Therefore, for the final FDS, the area for removal was refined. The southern portion of the Takaanini FUA is not considered appropriate for urban development and strategic direction is given within the FDS is to remove this area as part of the FUA, while the northern portion of the Takaanini FUA is to be retained but "red flagged". The boundaries of Takaanini (Cosgrave Road) should be retained. The timing for both areas reflects the infrastructure prerequisites.

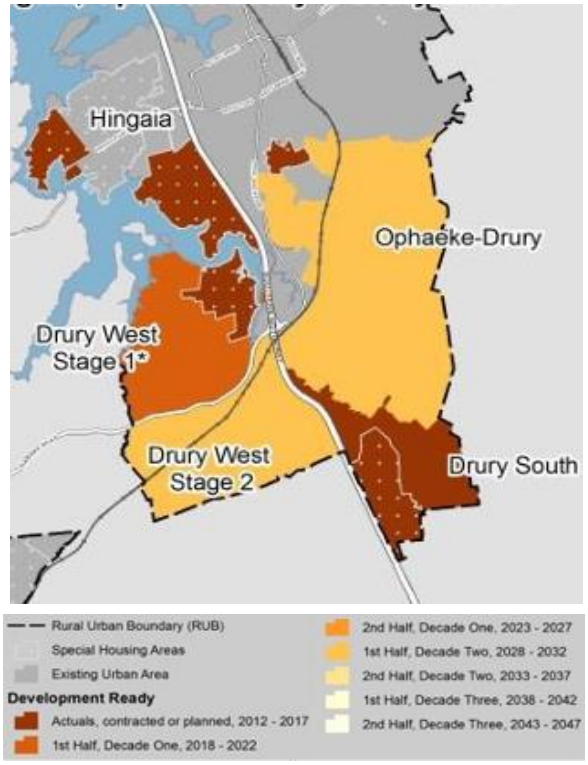
The future of Takaanini and Cosgrave Road

Takaanini will be partially removed due to parts of the FUA not being suitable for development. The remaining parts of the Takaanini FUA boundary are retained, but will be "red flagged". The timing of this remaining area is delayed for infrastructure reasons until 2050+.

The Cosgrave Road FUA boundary is retained, the timing is delayed for infrastructure reasons to 2050+.

Ōpaheke-Drury

FULSS 2017 map



FDS map

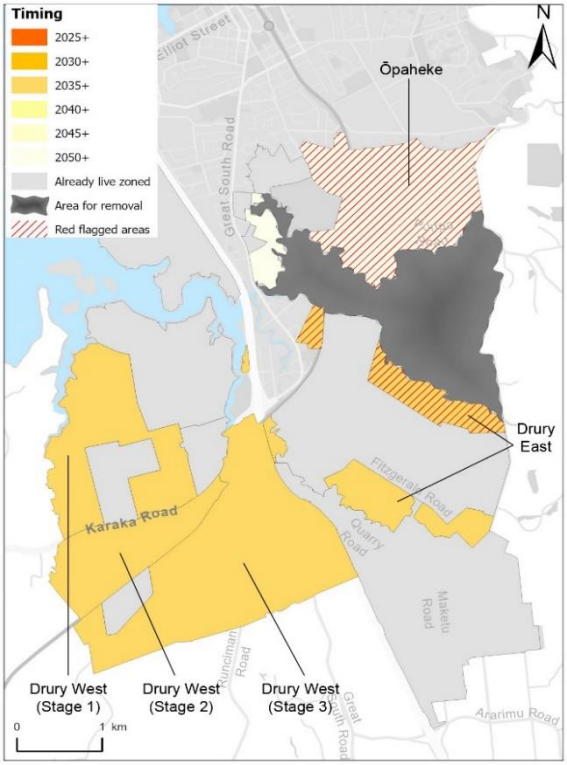


Figure 9 - Ōpaheke-Drury

Future urban form

The vision in the Drury – Ōpaheke Structure Plan[20] is:

[20] Drury – Opaheke Structure Plans 2019: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/place-based-plans/drurystructureplandocument/drury-opaheke-structure-plan.pdf

Drury – Ōpaheke is a sustainable, liveable, compact and accessible place with successful centres and residential options close to a variety of employment opportunities. It is well connected to the wider Auckland region through the rail and road networks. Cultural and heritage values are respected.

Key urban form outcomes envisaged by the plan are as follows:

1. Community focus
    a. Drury – Ōpaheke has a strong community focus with an accessible town centre, local and neighbourhood centres and provides business and employment opportunities for residents.
    b. Employment areas and community facilities are located within short to medium distances from residential areas as well as elsewhere in Auckland.
    c. Social infrastructure (such as education, healthcare, retirement village facilities) provision is provided and enabled.
2. Quality-built environment
    a. A range of housing choices within Drury – Ōpaheke area recognising the diverse needs of communities and the changing demographics.
    b. Drury – Ōpaheke has a compact urban form with increased residential densities close to centres and public transport services.
    c. Integrated open space and parks in urban residential areas, linked by transport networks (roads, cycleways, footpaths).
    d. Public spaces including parks and roads are safe and attractive.
    e. Drury – Ōpaheke is a place that respects and celebrates its relationship with mana whenua and protects its historic heritage and character.
    f. Te Aranga Māori Design Principles are adopted in the planning and development of Drury – Ōpaheke.
3. A well-connected Drury – Ōpaheke
    a. The transport network responds to anticipated economic growth by providing efficient, resilient and safe connections to employment areas, centres and other destinations within Drury – Ōpaheke and the wider Auckland region.
    b. Frequent, reliable and attractive public transport options provided by enhancing network connections to support the growth of centres and high-density residential development along key transport routes.
    c. Safe, well connected cycle and pedestrian network provide high amenity linkages between localised activities and surrounding areas.
4. Integration with infrastructure delivery
    a. Land development and infrastructure delivery is highly coordinated.
5. Natural hazards
    a. The location and form of development avoids the impacts of natural hazards
6. The natural environment
    a. Management of the natural environment in a way that respects and is guided by Māori tikanga.
    b. Freshwater quality within the catchment is improved.
    c. The quality of the marine receiving environment is maintained or improved.
    d. The freshwater management functions of riparian margins are improved.
    e. Protect and improve biodiversity

Current development activity

A small proportion of Drury West and Ōpaheke-Drury and all of Drury South industrial area were live zoned through the AUP.

Most of the building activities are clustered around the north east portion of Drury West. Part of this area formed the Bremner Road Special Housing Area.

Several plan changes were made operative and subsequently live zoned since the FULSS.

As of 31 March 2023, approximately 1,375ha of land has been live zoned in Drury-Ōpaheke, Drury West, Drury South.

A moderate delay is anticipated for the delivery of wastewater services and transport infrastructure such as railway station construction, state highway upgrades and arterial road improvements.

The table below outlines the plan changes that have been made operative or are in progress in Drury-Ōpaheke, Drury West, Drury South.

Plan Change	Land Area	Proposed development	Status
PC 6: Auranga B1 Drury West	83.05ha	Rezone Future Urban zoned land to residential zone	Fully Operative February 2020
PC 46: Drury South	366ha	Rezone land from Light Industry to Mixed Use and rezone a further 20 hectares of land from Heavy Industry to Light Industry.	Fully Operative October 2021
PC 48: Drury Centre Precinct	95ha	Rezone land from Future Urban to Metropolitan Centre zone, Mixed Use zone and Informal Recreation zone.	Fully Operative on 16 December 2022
PC 49: Drury East Precinct	184ha	Rezone land from Future Urban to Mixed Use zone, Terrace Housing and Apartment Buildings zone, Mixed Housing Urban zone, and Mixed Housing Suburban zone.	Fully Operative on 16 December 2022
PC 50: Waihoehoe Precinct	48.9ha	Rezone land from Future Urban to Terrace Housing and Apartment Buildings zone.	Fully Operative on 16 December 2022
PC 51: Drury 2 Precinct	33.65ha	Rezone land from Future Urban Zone to Town Centre zone, Terrace Housing and Apartment Buildings zone and Mixed Housing Urban zone.	Fully Operative on 16 December 2022
PC 52: 520 Great South Road, Papakura	4.63ha	Rezone the land from Future Urban zone to Mixed Housing Urban zone.	Fully Operative December 2021
PC 58: 470 and 476 Great South Road and 2 and 8 Gatland Road, Papakura	6.1ha	Rezone land from Future Urban zone to Mixed Housing Suburban and Neighbourhood Centre zone.	Fully Operative March 2022
PC61: Waipupuke	56ha	Rezone Future Urban Zoned land to Neighbourhood Centre zone, Terrace Housing and Apartment Buildings zone, and Mixed Housing Urban zone.	Fully Operative on 16 December 2022
PC 76 (Private): Kohe	30.6ha	Rezone land from Future Urban Zone to Mixed Housing Urban Zone.	Decision notified March 2023

Table 6 – Plan changes in Ōpaheke-Drury

Considerations

Infrastructure

The bulk Infrastructure required to support land to be ready for live zoning is not planned to be delivered before 2050+ for Ōpaheke. Key arterial upgrades and frequent transit routes are required to support development across the area and achieve strategic outcomes. There are significant flood constraints and costs anticipated in parts of the FUA due to the required stormwater infrastructure.

The bulk infrastructure is not expected to be available to support land to be live zoned in Drury East, Drury West (Stages 1, 2 and 3) until onwards of 2035+. Significant transport infrastructure such as rail stations, key arterials and a frequent transit network are required to support growth. Upgrades to the water supply and wastewater network such as watermain and pump station projects are also required to support land to be live zoned.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

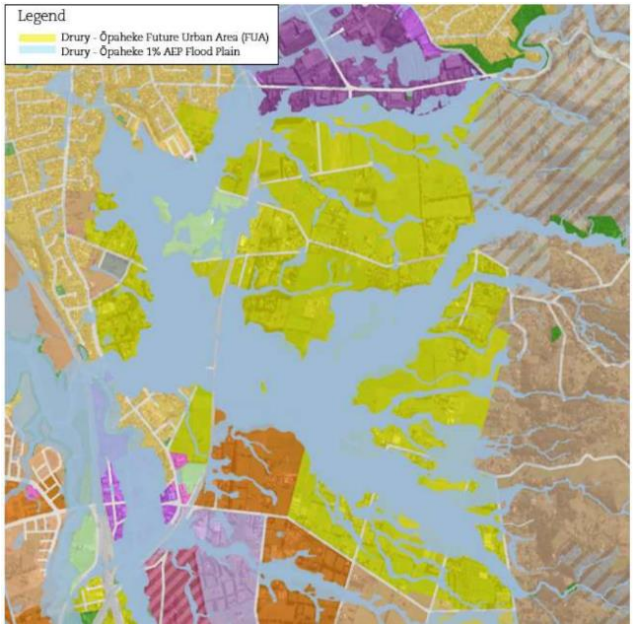
While the high level modelling (see Appendix 5) showed there is potential for higher VKT and CO2 emissions per household at 2048 in the Drury West (Stage 2) and Ōpaheke-Drury FUAs than existing urban areas, these FUAs are estimated to have the lowest VKT and CO2 emissions compared to the rest of the FUAs, due to being closer to high quality existing and planned public transport, a wide range of jobs, education and other services.

Natural hazards and natural environment

Approximately 25% of the Drury West (Stage 2) FUA is exposed to flooding in a 1 in 100 year event, with the flood extent being wide in some parts. A minor portion of the FUA is exposed to coastal inundation in the north, adjacent to Ngakaroa Creek within the Ngakaroa Reserve. The FUA is not prone to coastal erosion / instability. A moderate proportion of the FUA is subject to a high risk of slope instability. However, while hazard risks exist within the FUA, due to the context and nature of these hazards, development of the FUA can occur, provided it appropriately avoids and mitigates these risks.

However, unlike Drury West (Stage 2), the initial high-level assessment of natural hazards in the Drury-Ōpaheke FUA highlighted significant potential hazard exposure. The Drury - Ōpaheke FUA is located in the Otūwairoa Stream (Slippery Creek) catchment. Primary drainage of the Drury – Ōpaheke FUA is provided through the Otūwairoa Stream and its tributaries. The 1% AEP floodplain of the Otūwairoa Stream is one of the most extensive floodplains in the Auckland region, draining almost 5,000 hectares of predominantly rural land (Figure 9). Figure 10 demonstrates that large areas of this flood plan are categorised as high flood hazard. The outlet to the Otūwairoa Stream is located in the existing urban area of Drury where it joins with the mouth of the Hingaia Stream before discharging to the Drury Creek and ultimately the Manukau Harbour.

There is no feasible CAPEX solution identified to resolve or reduce the flood risk within the Otūwairoa Stream catchment. Due to the large extent of the Otūwairoa Stream floodplain, safe development is not considered feasible, and the risk associated to lives and property is considered too high. Development within the floodplain would be inappropriate.



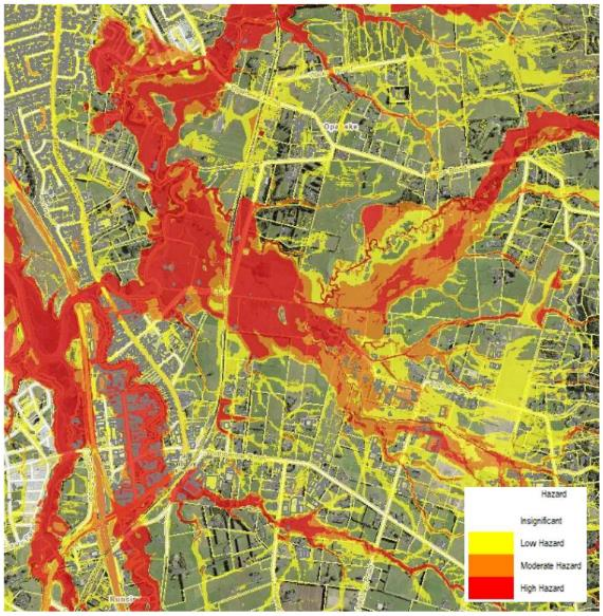


Figure 10 (left): 1% AEP floodplain; Figure 10 (right): 1% AEP flood hazard

Although the eastern portion of the FUA may not be within high hazard locations, it is likely that the scale of CAPEX projects to service this area would be prohibitive and would not be able to support an integrated approach within the remaining FUA, given the location of the surrounding extensive and high hazard flood plain to north, south and west.

In other parts of the Otūwairoa Stream (Slippery Creek) catchment within the FUA but not within the floodplain itself, development can occur but poses risks associated with exacerbating downstream flooding within the existing Drury urban area, including interactions with flows from the neighbouring Hingaia Stream catchment.

Beyond flooding hazards, the FUA includes small pockets of alluvium / colluvium geology, where there are settlement risks and also areas subject to high risk slope instability and possible liquefaction damage.

The Drury West (Stage 2) FUA and Ōpaheke-Drury FUA both have a relatively high proportion of watercourses, compared to other FUAs. All watercourses in these FUAs have very little vegetation cover and freshwater habitats have been highly modified and degraded, with the majority of watercourses having no-low (<10%) overhead coverage, apart from some reaches within the Slippery Creek catchment in the Ōpaheke-Drury FUA, which have more coverage. There are small pockets of natural wetlands identified within the Drury West (Stage 2) FUA, particularly in the southern portion, where there are noticeable clusters of larger wetlands. There are few small isolated natural wetlands identified in the southernmost portion of the Ōpaheke-Drury FUA and adjacent to some reaches within the Slippery Creek catchment. However, these are predominantly located within pastoral land uses and are degraded as a result of stock access. There are no terrestrial SEAs or other notable non-scheduled biodiversity areas within the Drury West (Stage 2) FUA, but there are two small fragments of kahikatea forest SEAs in the northern half of the Ōpaheke-Drury FUA and no other notable non-scheduled

biodiversity areas. There are two notable trees (kahikatea) in the north western portion of the Ōpaheke-Drury FUA, which would need to be protected in line with the AUP.

Almost 95% of the Drury West (Stage 2) FUA is classified as LUC 1 to 3 (approximately 755 ha), with a small patch of LUC 4 in southwestern corner. Approximately 99% of the Ōpaheke-Drury FUA is classified as LUC 1 to 3, which accounts for a total area of 1,133ha.

Social and cultural

There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of the two FUAs but there are three settlement sites approximately 250 m to the east of the boundary of the Ōpaheke-Drury FUA, one approximately 290 m to the north east, and the Ballards Cone pa site approximately 1.2 km to the south east. The Ponga Road Outstanding Natural Landscape is 1-2 km to the east of the Ōpaheke-Drury FUA. The West Ramarama and Bombay ONLs and the Ingram Road III and Raventhorpe tuff rings (Outstanding Natural Features) are approximately 2-3 km to the south of the Drury West (Stage 2) FUA. The Shepherds Bush Redoubt site is 1.6 km to the south.

Options

The initial options considered for Ōpaheke-Drury included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify that part or all of the FUAs are not suitable for development.
    a) Initiate a council-led plan change to rezone the FUAs to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended a hybrid of ‘option 2 and 3’. For the final FDS, additional investigation confirmed that the area proposed for removal within the Ōpaheke-Drury FUA was inappropriate for development due to the hazard risk posed to life and property and should be removed. This includes the eastern portion of the FUA that would become geographically isolated, where development could result in poor urban form outcomes, result in reverse sensitivity effects and would be cost prohibitive to service with infrastructure. While the remaining portions of the FUA within the Otūwairoa Stream (Slippery Creek) catchment (but not within the 1% AEP floodplain) (including within the remaining portion of the Ōpaheke-Drury FUA and northern portion of the Drury East FUA) would be “red flagged”. The timing for all remaining FUAs should be changed to reflect infrastructure prerequisites.

The future of Ōpaheke-Drury

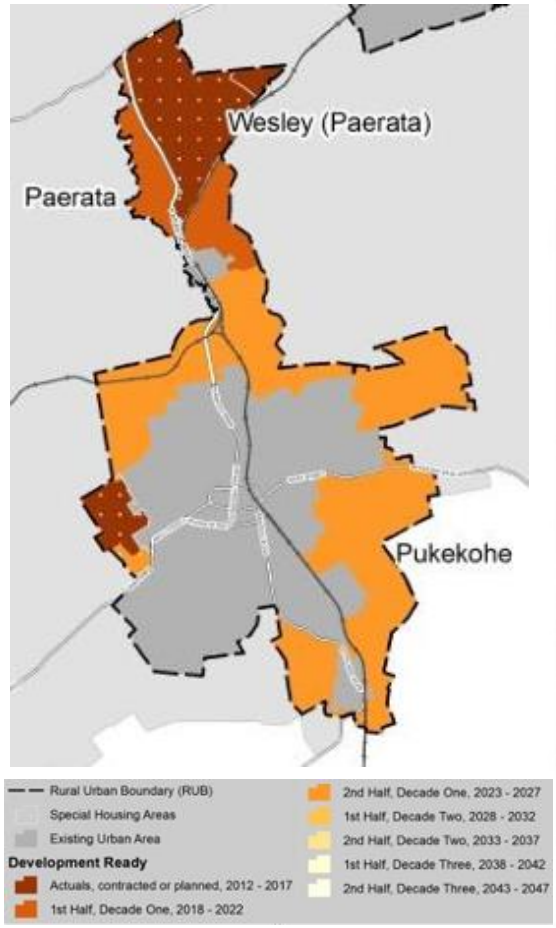
Part of the Ōpaheke-Drury FUA will be removed (the area associated with the Slippery Creek floodplain and some land to east adjacent to the floodplain) due these parts not being suitable for development. The remaining parts of the FUA are to be renamed Ōpaheke (north of Slippery Creek) and Drury East (for land not live zoned), and will be “red flagged”. The timing of these remaining area is delayed for infrastructure reasons as follows:

- Drury East 2035+

- Drury East 2035+Drury West (Stage 2) & (Stage 3) 2035+
- Ōpaheke 2050+

Pukekohe-Paerata

FULSS 2017 map



FDS map

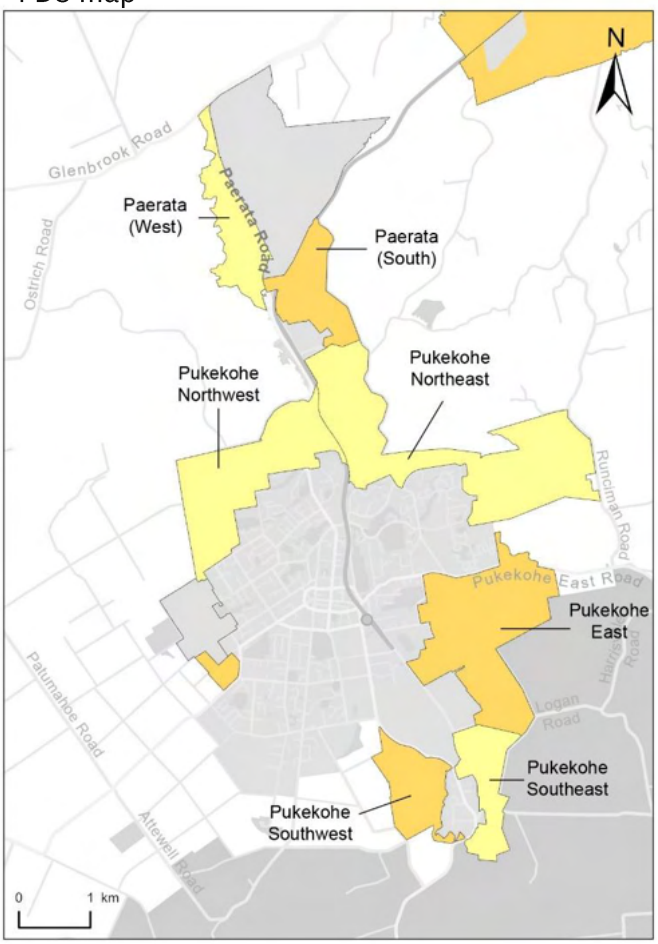


Figure 11 - Pukekohe-Paerata

Future urban form

The following vision has been developed for the Pukekohe-Paerata Structure Plan 2019[21].

New growth areas will enhance Pukekohe as a focal point and place to further support the surrounding rural economy. These areas will offer a range of housing choice and employment opportunities for people at all stages of life. It will be well connected to the wider Auckland and Waikato regions, while protecting and enhancing the natural, physical and cultural values that contribute to Pukekohe's unique character and identity.

To implement the vision, the Pukekohe-Paerata Structure Plan 2019 aspires to provide the planning outcomes below.

[21] Pukekohe-Paerata Structure Plan 2019: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/place-based-plans/structure-plans/Documents/pukekohe-paerata-structure-plan-2019.pdf

1. A place for people
    a) Ensure a high-quality urban environment that people want to live and work in.
    b) Encourage the use of Te Aranga Māori Design Principles in the planning and development of Pukekohe-Paerata.
    c) Provide a range of housing choices to support a growing and diverse community, with increased residential densities close to public transport and amenities.
    d) Provide an integrated and accessible network of high-quality open space and recreational facilities.
    e) Promote sustainable and low-carbon development.
    f) Encourage development which minimises the risk of natural hazards and effects of climate change.
    g) Provide for local employment opportunities.
2. Our shared stories
    a) Protect and enhance Pukekohe's heritage including built heritage, natural heritage, archaeological sites, and Māori cultural heritage and landscapes.
    b) Recognise and celebrate Pukekohe's history and diverse stories.
    c) Acknowledge that new development should respect and enhance local character, identity and heritage.
3. A healthy, flourishing and sustainable community
    a) Promote safer journeys, together with positive health, recreation and social benefits.
    b) Provide for accessible social infrastructure that supports education opportunities and community well-being.
    c) Encourage local business and job development that stimulates economic prosperity.
    d) Ensure infrastructure is developed and operated in a way that is sustainable, efficient and considers economic, social, cultural and spiritual effects.
    e) Recognise the importance of Auckland and Waikato's cross-boundary relationship.
4. Valuing our natural environment
    a) Recognise the fundamental relationship between Māori cultural values and the natural environment.
    b) Manage the natural environment in a way that respects and is guided by Māori tikanga.
    c) Enhance freshwater quality throughout the area.
    d) Improve the overall biodiversity of the area and ensure ecosystems are functioning and healthy.
    e) Protect outstanding geological features, such as tuff rings and the Pukekohe East explosion crater from inappropriate development.
    f) Protect and enhance the stream network including the Whangapouri and Oira creeks and Tutaenui Stream.
    g) Promote a water-sensitive design approach to manage stormwater and protect the existing stream network.
5. Rural Pukekohe
    a) Recognise the regional importance of the rural economy such as equine and horticultural industries.
    b) Recognise Pukekohe's contribution to the food supply for Auckland and New Zealand.
    c) Enable rural industries to continue to support businesses and provide a diverse range of jobs, goods and services.

6. Servicing our future community
    a) Deliver a transport network with strong local and regional connections that responds to anticipated growth and maximises connectivity for both commuters and freight.
    b) Provide frequent and attractive public transport options, supported by greater density along key routes.
    c) Infrastructure delivery and land development are coordinated with funding and provide networks that are cost effective.

Current development activity

Development in the live zoned areas is progressing in stages. A local centre is live zoned as part of the SHA. The pace of development reflects the developer's schedule. Delivery has slowed down especially in Paerata since 2019, potentially due to market changes. Changes in consenting numbers for future urban areas are shown in its monitoring of the Development Strategy (Auckland Council, 2022).

The location of the live zoned Wesley SHA at Paerata in conjunction with a new Paerata railway station (to be constructed) provides an opportunity the future urban growth to take advantage of this to focus growth. The Wesley development will benefit from existing and planned infrastructure upgrades including the Paerata railway station, Pukekohe railway station upgrades as well as rail electrification and several arterial upgrades.

Parts of Paerata and Pukekohe were live zoned through the AUP. As of 31 March 2023, approximately 387ha of land has been live zoned in Pukekohe Paerata. 1,316ha is still future urban zoned.

The table below outlines the plan changes that have been made operative or are in progress in Pukekohe Paerata. A minor delay is anticipated for the delivery of transport infrastructure such as rail station construction.

Plan Change	Land Area	Proposed development	Status
PC87: 301 and 303 Buckland Road, Pukekohe	7.8ha	Rezone land from the Future Urban Zone to the General Business Zone.	In progress – Appeals close 7 December 2023
PC76: Kohe	30.61ha	Rezone the land from Future Urban Zone to Residential – Mixed Housing Urban Zone.	In progress – Appeals closed May 2023

Table 7 – Plan change in Pukekohe-Paerata

Considerations

Infrastructure

The bulk infrastructure required to support land to be live zoned is not planned to be delivered before 2035+ for Paerata South, Pukekohe East and South-west, and not before 2040+ for Paerata West, Pukekohe North-east, North-west and South-east.

A railway station, key arterials, and upgrades to the network (including safety improvements and provision of active modes) are required to support land to be live zoned across the area and achieve strategic outcomes. Upgrades to the wastewater and water supply network are also required, this includes staged pumpstation and watermain projects.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

While the high level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the Pukekohe FUA than existing urban areas, this FUA is likely to have slightly lower VKT and CO_2 emissions compared to the FUAs in the north and northwest, due to being closer to high quality existing or planned public transport, a wide range of jobs, education and other services.

Natural hazards and natural environment

Due to being sequenced in the 2017 FULSS for development prior to 2023, the Paerata FUAs were not subject to natural hazards and natural environment assessments as part of this project.

The information discussed here relates to the Pukekohe North-west, Pukekohe North-east, Pukekohe East, Pukekohe South-east and Pukekohe South-west portions of the Pukekohe FUA only.

A moderate proportion of the FUA is exposed to flooding in a 1 in 100 year event (~22%). However, floodplain extents are typically narrow. The FUA is not exposed to coastal inundation or coastal erosion / instability. A small-moderate proportion of the FUA is identified as a high risk of slope instability and there is a small area of alluvium / colluvium geology where settlement risks exist.

The FUA has a high proportion of watercourses, which due to the existing rural land uses, tend to have lower natural value. There do not appear to be many known natural wetlands associated with those watercourses. There are some isolated pockets of natural wetland in the north-east and southern portion of the FUA, most of which are unfenced and therefore likely to be damaged by stock. There are two notable totara trees and nine small remnant forest SEAs (kahikatea, puriri or taraire/tawa dominated) dotted around the Pukekohe FUA, with a cluster in the northeastern parcel of the FUA (adjacent to William Andrew Road) and another cluster in the southern parcel west of Buckland.

Approximately 70-75% of the FUA is classified as LUC 1 to 3, comprising a total of 830 ha.

Social and cultural

There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of the Pukekohe FUA, but there are three historic heritage sites close to the western edge of Pukekohe East (within the existing town of Pukekohe). The Ponga Road Outstanding Natural Landscape is 1-2 km to the east of the Ōpaheke-Drury FUA. The Pukekohe East tuff ring Outstanding Natural Feature abuts the boundaries of Pukekohe East and Pukekohe North-east portions of the FUA and the West Ramarama and Bombay ONLs are close to the northern boundary of Pukekohe North-east. There are also the Ingram Road III and Raventhorpe tuff ring outstanding natural features (ONFs) are just over 1 km to the east.

Options

The initial options considered for Pukekohe-Paerata included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.
3. Identify that part or all of the FUAs are not suitable for development.
    a. Initiate a council-led plan change to rezone the FUAs to an appropriate zone that is not future urban nor urban.

4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended 'option 2'. For the final FDS the FUA timing reflects the infrastructure prerequisites.

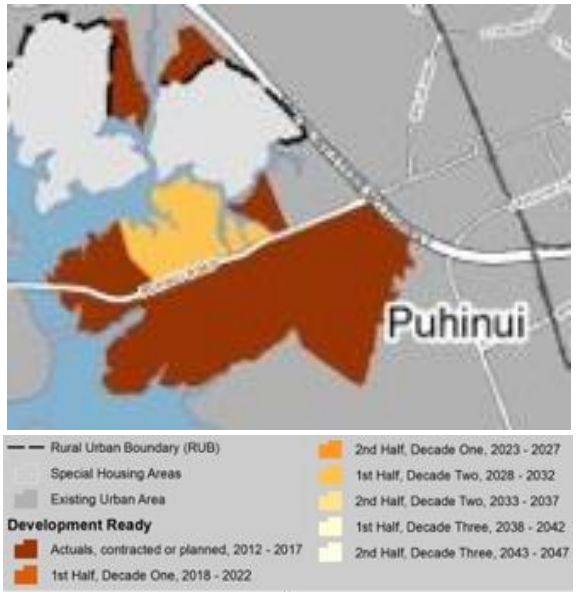
The future of Pukekohe and Paerata

The existing FUA is retained, but the timing is delayed for infrastructure reasons until:

- Paerata South (2035+)
- Pukekohe East, Pukekohe South-west (2035+)
- Paerata West, Pukekohe North-east, Pukekohe North-west, Pukekohe South-east (2040+)

Puhinui

FULSS 2017 map



FDS map

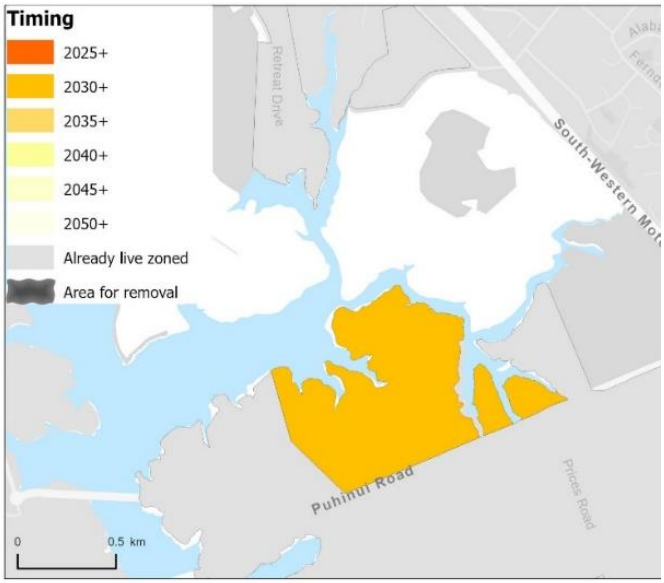


Figure 12 - Puhinui

Future urban form

The Puhinui precinct was created via the AUP to manage the transition from rural to urban development, while recognising the cultural, spiritual and historical values and relationships that Te Ākitai Waiohua have with the land and sea in Puhinui as part of the Māori cultural landscape.

Current development activity

Parts of Puhinui FUA (409ha) were live zoned Business - Light Industry Zone through the AUP. There are 70ha land still future urban zoned. As the area was predominantly planned for business activity, only a small amount of residential dwelling yield was anticipated.

The live zoned land provides for predominately land extensive industrial activities such as light industrial and airport related activities.

Considerations

Infrastructure

Transport infrastructure is not expected to be available to support land to be live zoned in Puhinui until 2030+. State highway upgrades are required to support development and achieve strategic outcomes.

See the Future Development Strategy, Appendix 6 for further detail on infrastructure prerequisite projects.

Emissions/VKT reduction

Puhinui was not included in one of the clusters of FUAs assessed for CO_2 emissions, as it is not in the same MSM zone as any of the other FUAs (see Appendix 5). However, given the overall finding that the FUAs are likely to result in higher transport-related emissions than the existing urban areas, but less than rural areas, it is likely to have slightly lower VKT and CO_2 emissions compared to the FUAs in the north and northwest, in line with the other large FUAs in the south, due to being closer to high quality existing or planned public transport, a wide range of jobs, education and other services

Natural hazards and natural environment

This FUA is located on the edge of an estuary that feeds into the Manukau Harbour. The 1% AEP floodplain encroaches slightly into the edge of the site, where it borders the estuary but only represents about 5% of the total area of the FUA. The FUA has minor exposure to coastal inundation along the northern boundary. This area is also susceptible to coastal erosion and instability. The FUA has some exposure to geotechnical hazards, including a moderate proportion of slope instability and a high prevalence of the Puketoka geological formation where there may be some settlement risks in localised areas.

The Puhinui FUA has a low proportion of watercourses relative to other FUAs. Of the few watercourses in the area, the significant majority have no-low (<10%) overhead coverage. There are no identified natural wetlands or potential barriers to the passage of fish. There are no terrestrial SEAs or other notable non-scheduled biodiversity areas within the FUA, however, there are a number of mangrove forests on the tributaries of the Waokauri Creek (an inlet of the Manukau Harbour) which are all mangrove forests scheduled as a marine SEA.

Approximately 95% of the FUA is classified as LUC 1-3, comprising a total of 122ha.

Social and cultural

There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of the Puhinui FUA, but there are a number of ONFs and sites and places of significance to mana whenua immediately to the north, and between 1-2 km to the east and south of the FUA. These include the Crater Hill ONF, Pukaki Lagoon volcano ONF and urupā, Kohuora and Kohuora explosion crater ONF, Wiri North Stonefield and Wiri lava cave ONF, Puhinui volcanic explosion craters ONF, Maunga Matukutureia, Puhinui fish traps and the Matukuturua lava field and tuff ring ONF.

Options

The initial options considered for Puhinui included:

1. Maintain existing FUA boundaries and timing.
2. Maintain existing FUA boundaries and change timing.

3. Identify that part or all of the FUA is not suitable for development.
    a. Initiate a council-led plan change to rezone the FUA to an appropriate zone that is not future urban nor urban.
4. Identify that further investigation is needed to determine if the FUAs are suitable for development.

All options were considered, but based on the considerations, the draft FDS recommended 'option 2' For the final FDS the FUA timing reflects the infrastructure prerequisites.

The future of Puhinui

The existing FUA boundaries are retained, but the timing is delayed for infrastructure reasons until 2030+.

5.2 Urban edge and rural and coastal settlement FUAs

5.2.1 Overview

The following table summarises the status of all the urban edge and Rural and Coastal Settlement FUAs in terms of whether they have been live zoned, or partially live zoned or are still zoned as Future Urban. The final column provides an overview of the FDS approach with more detail below.

Those urban edge and Rural and Coastal Settlement FUAs that were already live zoned have been reviewed to understand the current status of any planned infrastructure to support the development. The remaining non-live zoned FUAs have been assessed in more detail against natural environment, natural hazard, highly productive land, CO_2 emissions, social and cultural considerations.

Given the scale of the rural and coastal settlement FUAs, boundary adjustments have not been considered. Instead, options for each FUA included:

- maintaining the area and its sequencing
- maintaining the area but changing its sequencing
- identify that part or all of the FUA is not suitable for development. Initiate a council-led plan change to rezone the FUA to an appropriate zone that is not future urban nor urban.
- indicating that further investigation is needed to determine if the FUA is suitable for development.

Sub-region FUA cluster	Future urban areas	Status in 2023	FULSS 2017 timing	FDS New timing
North	*Hibiscus Coast (Silverdale)*	*Live zoned*	*2012-2017*	*N/A*
	Hibiscus Coast (Red Beach)	*Live zoned*	*2012-2017*	*N/A*
	Hatfields Beach 1	*Live zoned*	*2012-2017*	*N/A*
	Albany Village 1	*Live zoned*	*2012-2017*	*N/A*
	Waimauku	*Live zoned*	*2012-2017*	*N/A*
	Swanson	*Live zoned*	*2012-2017*	*N/A*
	Wellsford	Future Urban zoned	2023-2027	2030+

	Algies Bay	Future Urban zoned	2023-2027	2025+
	Albany Village 2	Future Urban zoned	2023-2027	2025+
	Helensville 1	Future Urban zoned	2023-2027	2035+
	Helensville 2	Future Urban zoned	2028-2032	2035+
	Hatfields Beach 2	Future Urban zoned	2028-2032	N/A Strategic direction to remove the entire FUA (refer to map for indicative boundary)
South	*Maraetai 1*	*Live zoned*	*2012-2017*	*N/A*
	Oruarangi 1	*Live zoned*	*2012-2017*	*N/A*
	Clevedon	*Live zoned*	*2012-2017*	*N/A*
	Clevedon Waterways	*Live zoned*	*2012-2017*	*N/A*
	Karaka North	*Live zoned*	*2012-2017*	*N/A*
	Kingseat	*Live zoned*	*2012-2017*	*N/A*
	Clarks Beach 1	*Live zoned*	*2012-2017*	*N/A*
	Glenbrook Beach 1	*Live zoned*	*2012-2017*	*N/A*
	Patumahoe	*Live zoned*	*2012-2017*	*N/A*
	Oruarangi 2	Future Urban zoned	2018-2022	2025+
	Clarks Beach 2	Future Urban zoned	2023-2027	2030+
	Glenbrook Beach 2	Future Urban zoned	2023-2027	2030+
	Maraetai 2	Future Urban zoned	2028-2032	2035+

Table 8 - Urban edge and rural and coastal settlement FUAs

5.2.2 Live zoned urban edge and Rural and Coastal Settlement FUAs

The following table summarises the infrastructure consideration of the urban edge and Rural and Coastal Settlement FUAs that were already live zoned from 2012-2017. As stated above, as live zoned areas they have been reviewed to understand the current status of any planned infrastructure to support the development.

Rural and Coastal Settlements	Infrastructure consideration
North	
Hibiscus Coast (Silverdale)	Complete. Enabled growth can be serviced by Hibiscus Coast Bus Station.
Hibiscus Coast (Red Beach)	Complete. Enabled growth can be serviced by Hibiscus Coast Bus Station.
Hatfields Beach 1	Complete. No bulk transport infrastructure projects planned to support this development.
Albany Village 1	Complete. No bulk transport infrastructure projects planned to support this development.
North-west	
Waimauku	Unserviced by Watercare, intention that this area would be serviced independently.

	Stormwater issues downstream of Waimauku Railway Station area. Stormwater management needs to be assessed and carefully planned for during plan change and structure planning processes to ensure that it is not exacerbated. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Swanson	Complete. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
South	
Maraetai 1	Significant delay anticipated due to wastewater servicing. Beachlands-Maraetai servicing is needed to support land to be live zoned . As the issue is the Wastewater Treatment Plant (WWTP) all Maraetai areas are subject to constraint.
Oruarangi 1	Complete. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Clevedon	Complete. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Clevedon Waterways	Precinct Plan operative, development not yet occurring. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Karaka North	Unserviced by Watercare currently. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Kingseat	Anticipated delay due to the South-West Wastewater Upgrade needed to support land to be live zoned. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Clarks Beach 1	Complete. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Glenbrook Beach 1	Precinct Plan operative, some development occurring. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.
Patumahoe	Complete. No bulk transport infrastructure projects planned to support this development. The area will be car-dependent so further development will likely increase emissions.

Table 9 - Live zoned urban edge and Rural and Coastal Settlement FUAs

Northern rural and coastal FUAs

Wellsford

Current picture of growth

The Wellsford FUA comprises six land parcels, four around the north of the existing town and two to the south. No land has been live zoned in Wellsford FUA.

There has been no residential consent activity in the FUA. Some new housing development has occurred on the northern residential area of the existing urban and some scattered across the southern part.

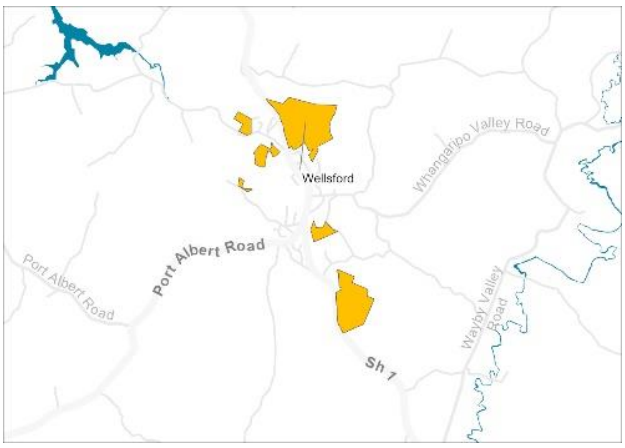


Figure 13 - Wellsford

Considerations

Wellsford is approximately 20 km north of Warkworth, and is close to Auckland's northern boundary. No bulk transport improvements are planned to support development at Wellsford and as there is no rapid

transit network planned, this area would not contribute to VKT reduction. Distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved. Upgrades of the Wellsford Wastewater and Water Treatment Plants are also needed to support land to be live zoned.

Overall, the FUA has minor exposure to flooding, associated with tributaries of the Oruawharo River in the northern section of the FUA, as well as small, isolated sections of floodplain within the smaller sections of this FUA. The two southernmost sections of this FUA are within the Hoteo catchment, and this floodplain extends slightly into the eastern boundary of each site. None of the Wellsford FUA sections are at risk of coastal inundation or erosion. However, there is some exposure to geotechnical hazards, including a moderate proportion of slope instability and a high prevalence of the Puketoka geological formation where there may be some settlement risks in localised areas.

There are no SEAs or other notable non-scheduled biodiversity areas within the FUA itself but there are two small remnants of kauri forest SEA between 1-200m from two of the smaller northern sections of FUA to the west of State Highway 1, behind Rodney College and Wellsford School. The FUA is mostly LUC 4 with small patches of LUC 3 along the eastern edges of the southern portions of the FUA, comprising approximately 10 hectares in total. There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services. compared to other FUAs.

The future of Wellsford

The existing FUA boundaries are retained, but the timing is delayed for infrastructure reasons to be no earlier than 2030+.

Algies Bay

Current picture of growth

No land has been live zoned in Algies Bay FUA.

There has been no residential consent activity in the FUA. Most of the recent housing development has occurred in the nearby area of Snells Beach with much less in the Algies Bay area.

Figure 14 – Algies Bay

Considerations

There is minimal to no delay anticipated in providing infrastructure to service growth in Algies Bay. No bulk transport improvements are planned to support development and as there is no rapid transit network planned, this area would not contribute to VKT reduction. Distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved. An upgrade of the Snells Beach Wastewater Treatment Plant is required to support land to be live zoned.

Algies Bay FUA has minor exposure to flooding, with only 5% coverage of floodplain associated with small streams that drain directly into Algies Bay. These sections of floodplain do not extend far past the banks of the streams and are small in extent. The FUA has very low exposure to geotechnical hazards, no exposure to coastal inundation and only a very small portion (0.1km^2) in the northeastern corner of this FUA would be within the area susceptible to coastal erosion.

There are two SEAs crossing through the middle of the FUA which are scheduled for their kauri, podocarp, broadleaved forest and tawa, kohekohe, rewarewa, hīnau podocarp forests. Both have streams running through them, making the watercourses in this FUA of higher natural character and value. Aerial imagery also suggests there are a number of large natural wetlands in the FUA, currently surrounded by pasture. The FUA is approximately half LUC 3 (~17 ha) and the rest LUC 4. There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA. However, the Te Kapa River headwaters (Mahurangi) ONL is approximately 250 m to the southwest.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Algies Bay

The existing FUA boundaries are retained, timing remains as 2025+.

Hatfields Beach 2

Current picture of growth

Most of the land in Hatfields Beach is still future urban zoned.

There is no residential consent activity in the FUA and only a small amount of housing development in the existing urban area.

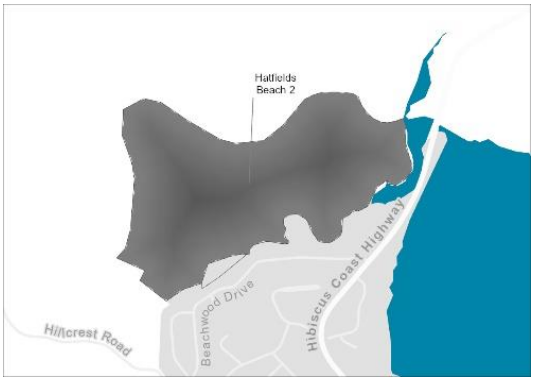


Figure 15 – Hatfields Beach 2

Considerations

There is uncertainty over timing and feasibility of providing infrastructure to service growth in the Hatfields Beach FUA. There are significant flood and coastal inundation constraints and substantial costs anticipated due to the required stormwater infrastructure.

Approximately 30% of this FUA is located within a 1 in 100 year floodplain (Figure 16). This floodplain, associated with the Otanerua Stream, is wide in extent and largely categorised as high risk (Figure 17).

Approximately 30% of this FUA is vulnerable to coastal inundation and a significant portion of the eastern side of this FUA is at risk of coastal inundation. Due to the low-lying nature of areas abutting the coast, mean high water springs is likely to extend into the site under a high emissions scenario (resulting in 2m SLR), meaning within 150 years all of the area subject to coastal inundation will be the new intertidal area and therefore under water daily. A significant proportion of the FUA consists of alluvium / colluvium geology, where settlement risks may be present. Approximately 50% of the FUA

has been identified as vulnerable to liquefaction damage. There is also a small area identified as being high risk of slope instability.

Despite the remaining portions of the FUA being outside of identified hazard zones, due to the location of these hazards, topographical constraints and other natural features, these areas would be geographically isolated from the existing urban area. It would be difficult to service these locations, particularly implementing an integrated stormwater management solution.

Figure 16 – 1% AEP floodplain and 1& AEP coastal inundation (+1 and +2 SLR)

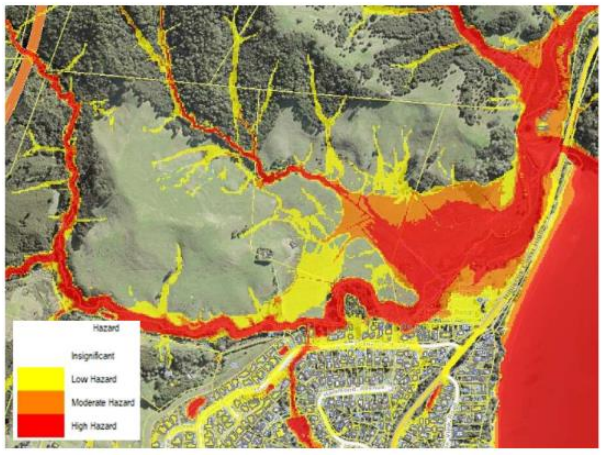


Figure 17 – 1% AEP flood hazard

There are four SEAs bordering and in places extending slightly into the FUA: the smaller Hatfield Reserve on the southern boundary, a mangrove forest and scrub SEA in the northeastern corner, a kānuka scrub/forest SEA to the west and a much larger SEA to the north scheduled for kauri, podocarp, broadleaved forest. The Otanerua Stream runs along the southern and eastern boundary of the FUA, with the river mouth entering / exiting into Hatfield Bay in the northern portion of the FUA. While reasonably well vegetated on some stretches, it is not protected as a significant ecological area. Aerial imagery also suggests there are scattered natural wetlands within the FUA. The FUA is just over half LUC 4 and the rest is LUC 5. There are no areas identified for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA. However, it is almost completely surrounded by the Mahurangi-Waiwera ONL which abuts most of the FUA's northern boundary.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Hatfields Beach 2

The whole of the Hatfields Beach 2 FUA is inappropriate for development and will be removed.

Albany Village 2

Current picture of growth

The Albany Village FUA is on the periphery of the existing Albany Village local centre. Most of the land is still zoned future urban.

There is no residential consent activity in the FUA and only a small amount of housing development in the immediate existing urban area.

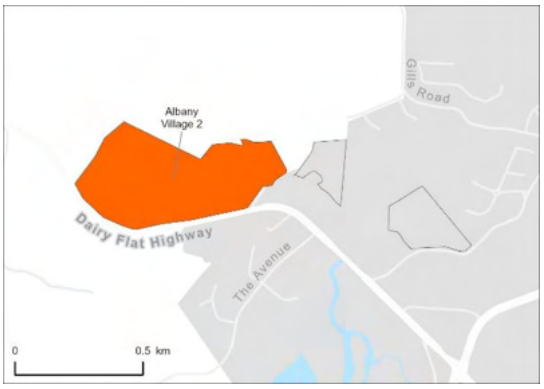


Figure 18 – Albany Village 2

Considerations

This area will be serviced by existing capacity from the bulk wastewater, water supply and transport network. Although no bulk transport improvements are planned to support development at Albany Village 2, future growth will likely benefit from the existing Albany Busway and the future rapid transit improvements (Harbour Connections).

Albany Village 2 FUA has minor exposure to flooding, with a few sections of 1% AEP floodplain located within the eastern half of this FUA, associated with tributaries of Lucas Creek. These sections of floodplain do not extend far past the banks of the streams and are small in extent proportionally across the FUA. The FUA has no exposure to coastal inundation or erosion. The entire FUA is identified as having a high risk of slope instability, but no settlement or liquefaction damage likely.

A watercourse surrounds the southern portion of the FUA, adjacent to the Dairy Flat Highway. However, this watercourse does not enter the developable area, except in some discrete instances. Another watercourse enters the site in the north. This watercourse is surrounded by vegetation, which is scheduled as a significant ecological area for its broadleaved scrub/forest. There are two SEAs within the FUA, which appear to be remnant forests associated with larger SEAs to the north and south, which are scheduled for their kauri, podocarp, broadleaved forest and taraire, tawa, podocarp forests. There is a single notable tree (English oak) near the centre of the western half of the FUA, which would need to be protected in line with the AUP. The FUA does not have any land classified as LUC 1-3; it is mostly LUC 4 with a small patch of LUC 5 in the western corner and patches of LUC 6 along the northern boundary. There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA. However, there are three historic heritage sites in Albany Village between 15-400 m to the southeast.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Albany Village 2

Based on the considerations, the draft FDS recommended the whole of Albany Village 2 FUA for further investigation. For the final FDS, further investigation considered infrastructure, VKT emissions, the relationship between Albany Village 2 and its proximity to the existing urban area and the Albany node and the presence of hazard constraints. This confirmed the Albany Village 2 FUA is suitable for development and its boundary and timing should be retained.

The existing FUA boundary is retained, timing remains as 2025+.

5.2.3 North-western rural and coastal FUAs

Helensville 1 and 2

Current picture of growth

Most of the land in Helensville is future urban zoned.

There is no residential consent activity in the FUA. A Special Housing Area (SHA) to the north of the FUA has been progressing with development, anticipated yield is approximately 60 dwellings.

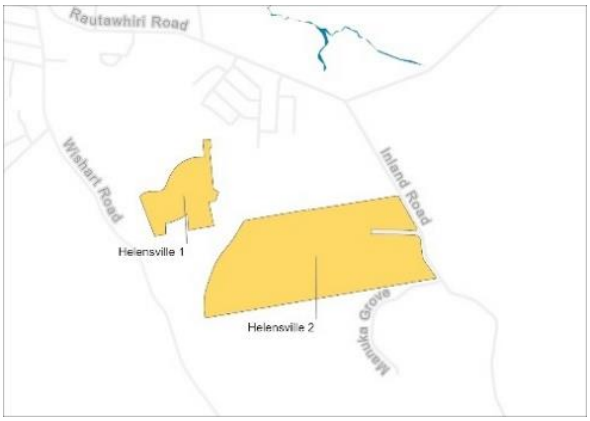


Figure 19 – Helensville 1 and 2

Considerations

No bulk transport improvements are planned to support development at Helensville 1 and 2 and as there is no rapid transit network planned, this area would not contribute to VKT reduction. Relative distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved. Upgrades to the Helensville Wastewater and Water Treatment Plants are required to support land to be live zoned.

Helensville 1 and 2 FUAs have minor exposure to flooding, with sections of 1% AEP floodplain following a tributary of the Awaroa Stream (Helensville 1) and the Rakauwhatia Creek (Helensville 2), both of which drain into the Kaipara River and ultimately the Kaipara Harbour. The sections of floodplain within Helensville 1 do not extend far past the banks of the streams and are small in extent proportionally across the FUA. While the floodplain within Helensville 2 also does not extend far past the boundaries of the creek and tributary, it drains into an extensive floodplain that encompasses a significant portion of the Helensville and Parakai townships. Therefore, while the FUA has a small portion (approx. 5%) of exposure, development still presents risks (largely associated with downstream flooding effects). Neither of the Helensville FUAs have exposure to coastal inundation or erosion, settlement issues or risk of liquefaction or slope instability.

There are no SEAs or other notable non-scheduled biodiversity areas within Helensville 1 FUA. However, there is a large remnant of kauri, podocarp, broadleaved forest SEA approximately 200m to the southwest of the FUA across Wishart Road, and a more extensive area of kauri, podocarp, broadleaved forest SEA including some regenerating kanuka/manuka scrub and exotic forest further to the south along Wishart Road. The FUA is mostly surrounded by exotic forest with what appears to be (from aerial imagery) patches of manuka/kanuka scrub within the FUA boundary. Helensville 2 FUA has the same forest SEAs to the west and southwest, but also has more of the same type of forest SEAs directly to the south with one extending into the FUA from the southern boundary associated with the Rakauwhatia Creek. This watercourse is primarily surrounded by exotic forest. While not resulting in significant ecological values, this forest does provide some benefit to the health of the watercourse. Helensville 1 and 2 FUAs do not have any land classified as LUC 1-3; they are mostly LUC 4 with the western third of Helensville 2 being LUC 5. There are no areas identified in the AUP for their natural, cultural or historic

heritage or sites of significance to mana whenua within or very near to the boundaries of these FUAs. However, there are a number of historic heritage sites in Helensville around 1 km to the northwest.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Helensville 1 & 2

The existing FUA boundaries are retained, timing is delayed for infrastructure reasons to be no earlier than 2035+.

5.2.4 Southern rural and coastal FUAs

Maraetai 2

Current picture of growth

A proportion of land in Maraetai is live zoned with the rest still future urban zoned.

Development in the live zoned area is progressing and there is no residential consent activity in the FUA.

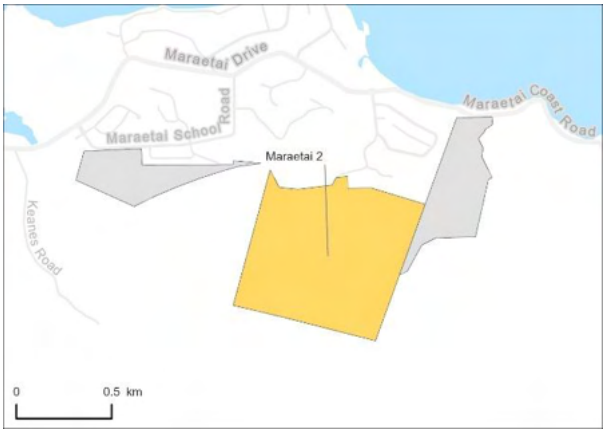


Figure 20 – Maraetai 2

Considerations

No bulk transport improvements are planned to support development at Maraetai 2 and as there is no rapid transit network planned, this area would not contribute to VKT reduction. Relative distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved. The Beachlands Maraetai Wastewater servicing upgrade is required to support land to be live zoned.

This FUA has a minor risk of flooding due to a few small sections of 1% AEP narrow and small floodplain mostly associated with small streams that flow directly to Maraetai beach. The southernmost section of floodplain is associated with Te Puru stream, which ultimately discharges at Kelly's Beach, west of Maraetai Beach. There is no risk of coastal inundation or coastal erosion, no settlement risks, or areas where liquefaction damage is possible.

The Maraetai 2 FUA includes two unnamed watercourses. The first extends into the site along the southern boundary, while the second runs through the centre of the site, south to north. The portion of the southern watercourse within the FUA is wholly within indigenous forest, comprised of tairaire, tawa and podocarp forest or kānuka scrub, making it of higher ecological value. This vegetation is not protected as a significant ecological area. However, the other watercourse, which has a much larger extent within the FUA appears to be of a lesser ecological condition, primarily surrounded by low lying exotic shrub. There are no SEAs within the FUA, but there is a remnant of kauri, podocarp, broadleaved forest SEA abutting the northern boundary of the FUA, and another fragment of taraire, tawa, podocarp

forest SEA abutting the western boundary. The FUA is entirely within LUC 6. There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA. However, the Waiomanu (Maraetai) Pa and the Maraetai-Umupuia Coast Road ONL are just under 700 m to the northeast. Omana Regional Park ONL is also just over 1 km to the northwest.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Maraetai 2

The existing FUA boundaries are retained, timing is delayed for infrastructure reasons to no earlier than 2035+

Clarks Beach 2

Current picture of growth

The live zoned proportion of Clarks Beach (SHA) is progressing with some residential development, very minimal development within the future urban zoned land.

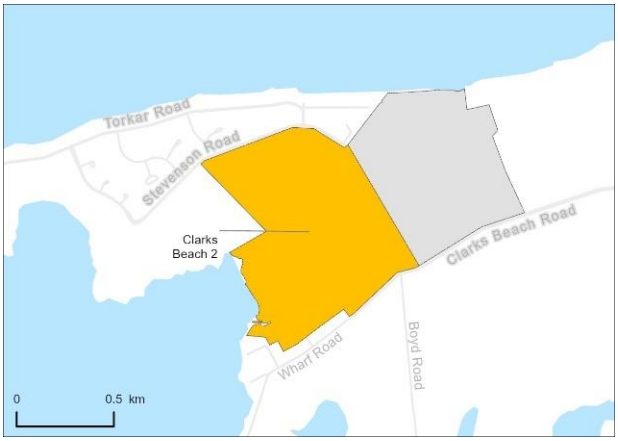


Figure 21 – Clarks Beach 2

Considerations

There is minimal delay anticipated in providing infrastructure to support land to be live zoned in Clarks Beach. No bulk transport improvements are planned to support development and as there is no rapid transit network planned, this area would not contribute to VKT reduction. Distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved. An upgrade of the South-West Wastewater Treatment Plant is required to support land to be live zoned.

The Clarks Beach 2 FUA has moderate exposure to flooding, with approximately one-fifth of the FUA located within a 1% AEP floodplain. These sections of floodplain are associated with small streams that flow directly into Waiuku River (and ultimately the Manukau Harbour), as well as some isolated sections of floodplain throughout the site. While many of these floodplains are narrow in extent and do not extend far past the banks of streams, there are pockets of wider, more significant flood exposure. There is some risk of coastal inundation in the southwestern corner of this FUA, where the site borders the Waiuku River, and a small area in the middle of the western boundary. The southwestern boundary of the FUA is also an area susceptible to coastal erosion. The FUA is not in an area with high risk of slope instability or where liquefaction damage is likely, however, there may be some settlement risks in localised areas.

The watercourses in this FUA appear degraded, including channelisation and lacking riparian vegetation. No natural wetlands have been identified in the FUA. There are no SEAs within the FUA, but there is a narrow area of coastal broadleaved forest SEA just over 100 m to the west and a large marine SEA scheduled due to its significant wading bird area in the Manukau Harbour about 150 m to the north of the FUA. The FUA is about two thirds LUC 1 and one third LUC 2, comprising around 73 ha in total. There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA. However, Waitete Pa is just under 500 m to the south.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Clarks Beach 2

The existing FUA boundaries are retained, timing is delayed for infrastructure reasons to no earlier than 2030+.

Glenbrook Beach 2

Current picture of growth

Both live zoned land and future urban zoned land in Glenbrook Beach are part of the Glenbrook SHA (anticipated yield approximately 800 dwellings). Housing development on the live zoned land is progressing.

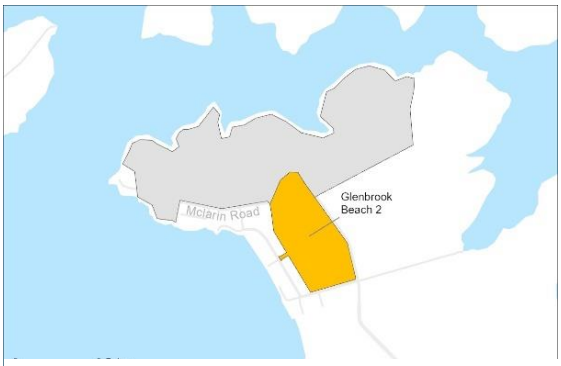


Figure 22 – Glenbrook Beach 2

Considerations

There is minimal delay anticipated in providing infrastructure to service growth in Glenbrook Beach. No bulk transport improvements are planned to support development and as there is no rapid transit network planned, this area would not contribute to VKT reduction. Distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved. Upgrade of the South-West Wastewater Treatment Plant is required to support land to be live zoned.

A moderate portion (approx. 15%) of the Glenbrook 2 FUA is at risk of flooding exposure during a 1 in 100 year event. The flood plain is mostly in the southwestern section of this FUA, associated with the Waiuku River, which tends to be proportionally wide in extent in this location. There is also a small section in the northern part of the FUA. The FUA has no exposure to coastal erosion, however, the southwestern section of this FUA is at risk of coastal inundation, where the FUA borders Waiuku River. The coastal inundation risk extends approximately 140m into the FUA in the southwestern corner of the site, and would also be below the mean high water springs line, meaning within 150 years all of the area subject to coastal inundation will be the new intertidal area and therefore under water daily. The FUA is not in an area with high risk of slope instability or where liquefaction damage is likely, however, there may be some settlement risks in localised areas.

The watercourses that are within the site are degraded, lacking riparian vegetation and channelised in parts. There are no SEAs within the FUA, but there is a small, narrow area of coastal broadleaved forest that is not a SEA abutting the western boundary, which is part of the Glenbrook Beach Beachfront Reserve and a large marine SEA covering the Waiuku River inlet about 150 m to the west of the FUA. The FUA is about 70% LUC 2 and 30% LUC 1, comprising around 19 ha in total. There are no areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA or very nearby.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Glenbrook Beach 2

The existing FUA boundaries are retained, timing is delayed for infrastructure reasons to earlier than 2030+.

Oruarangi 2

Current picture of growth

Parts of Oruarangi have been live zoned with the rest still future urban zoned.

There has been no residential consent activity in both the live zoned land or the future urban zoned land.

No residential consenting activity has occurred in the immediate existing urban area as it is predominately industrial.

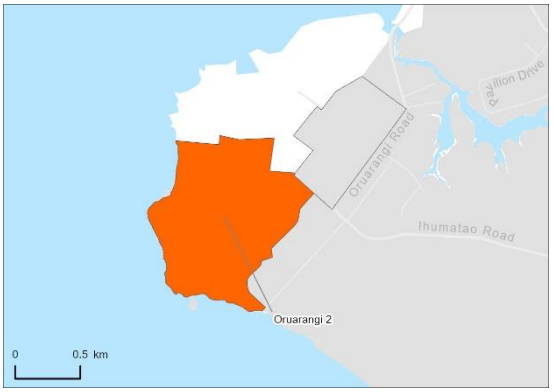


Figure 23 – Oruarangi 2

Considerations

There are no bulk transport infrastructure projects planned to support this area which will be car-dependent so further development will likely increase emissions. Relative distance from the existing urban area, lack of rapid transit and lower opportunities for mode shift mean strategic outcomes are unlikely to be achieved.

A moderate portion (approx. 30%) of the FUA is at risk of flooding exposure during a 1 in 100 year event. The flood plain is mostly associated with the Maungataketake quarry, and streams along the eastern boundary and in the northern part of the FUA. The western and southern boundaries of the FUA are exposed to coastal erosion and at risk of coastal inundation. The coastal inundation risk extends between 150-180m into the FUA in the north-western corner of the site, meaning within 150 years all of the area subject to coastal inundation will be the new intertidal area and therefore under water daily. Approximately one quarter of the FUA is identified as having a high risk of slope instability (associated with Maungataketake quarry in the southern half of the FUA), as well as a small area along the south eastern boundary where liquefaction damage is possible, but there are no soft soils or areas where settlement is likely.

The watercourses that are within the site are degraded, lacking riparian vegetation and channelised in parts. There are no SEAs within the FUA, but there is a large terrestrial SEA abutting the northern boundary comprising a mixture of pūriri and taraire forest, exotic grassland and woodland and a large

marine SEA (part of the Manukau Harbour) scheduled for a significant wading bird area adjacent to the western boundary of the FUA. The FUA is about 40% LUC 2 (in the northern part of the FUA) and 10% LUC 1 (along the south-eastern boundary), comprising a total area of around 50 hectares.

The area adjacent to Oruarangi 2 was recently the subject of major protest about development. This stems from the initial Crown confiscation of land across the peninsula and the subsequent injustices and impacts this has had on mana whenua, who have an unbroken history of occupation of the area since European arrival.

There are a number of areas identified in the AUP for their natural, cultural or historic heritage or sites of significance to mana whenua within the boundary of this FUA or very nearby: the Ihumatao Mission Station historic heritage site, including Māori settlement, Ellett Homestead, stone walls and structures, and fig tree lies on the western coastal edge of the FUA; the Maunga Taketake site of significance to mana whenua is in the southern half of the FUA; and the Rennie Homestead historic heritage site is in the northeastern corner of the FUA. In addition, the Otuataua/Puke Taapapa (Pukeiti) site of significance to mana whenua lies adjacent to the northern boundary of the FUA, and this area is also identified as the Otuataua lava flows ONF and Pukeiti scoria cone and lava field (Puketapapa) ONF. Te Puna Wai a Hape site of significance to mana whenua lies adjacent to the Otuataua/Puke Taapapa (Pukeiti) site around 500m to the north of the FUA.

High level modelling (see Appendix 5) showed there is potential for higher VKT and CO_2 emissions per household at 2048 in the rural and coastal FUAs than all the larger FUAs and existing urban areas, due to these settlements being relatively distant from high quality existing or planned public transport, a wide range of jobs, education and other services.

The future of Oruarangi 2

Based on the considerations, the draft FDS recommended the whole of Oruarangi 2 FUA for further investigation. For the final FDS, further investigation considered infrastructure, VKT emissions, the relationship between Oruarangi 2 and the surrounding environment and the presence of hazard constraints. This confirmed the Oruarangi 2 FUA is suitable for development and the existing FUA boundaries are retained, but the timing is delayed for infrastructure reasons to no earlier than 2025+.

However, any future work to live zone the FUA must be done in collaboration with mana whenua.

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Appendices

The following appendices are included:

Appendix 1: Map of FUAs 2017

Appendix 2: Information from Auckland Plan 2050 Development Strategy on FUAs

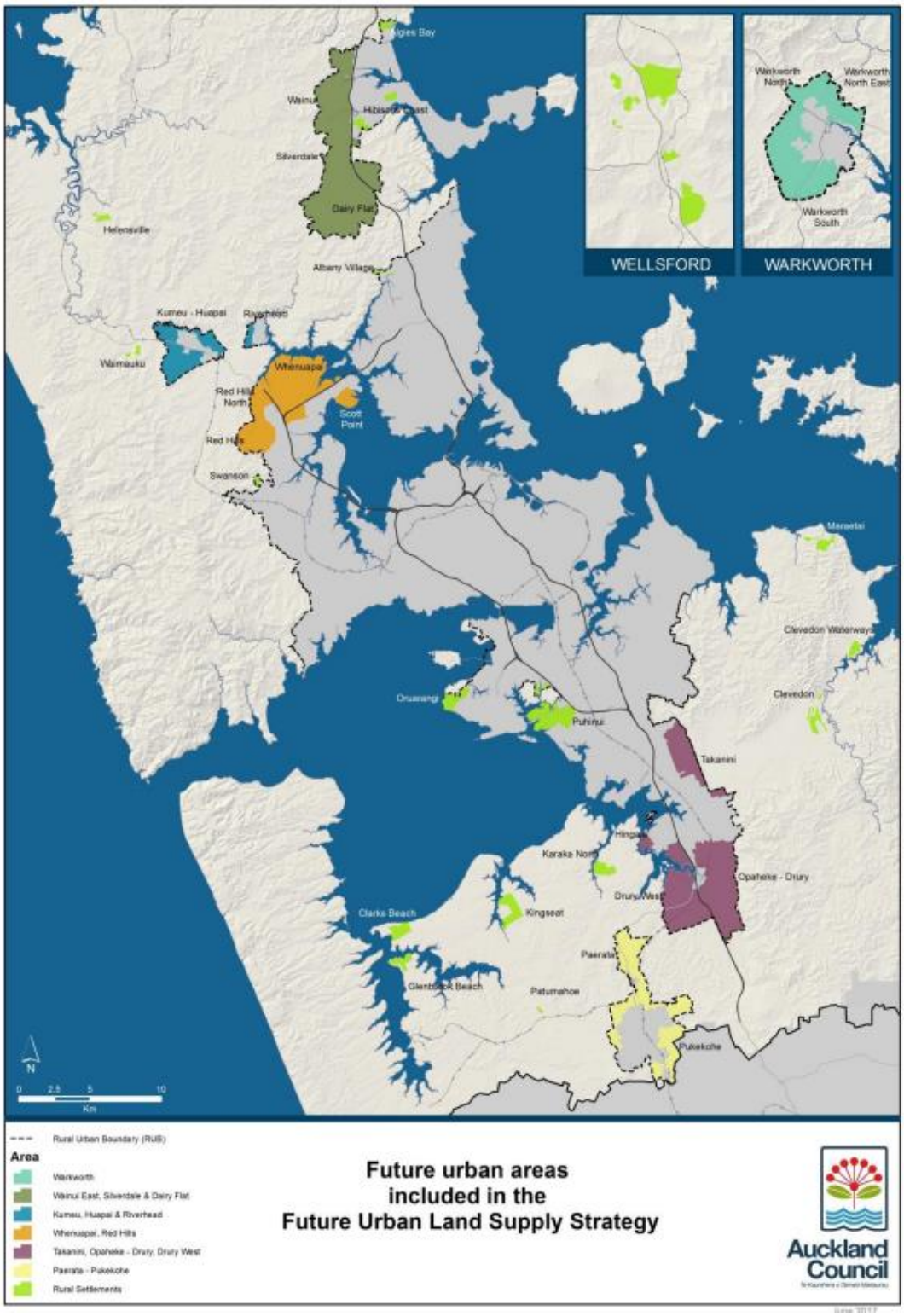
Appendix 3: Summary of structure plan requirements from the AUP

Appendix 4: Data inputs and assumptions regarding significance of hazard constraints to development for future urban areas

Appendix 5: Enabled carbon emissions in Greenfield Areas Report

Appendix 1: Map of FUAs 2017

Map of FUAs that formed the areas sequenced in the FULSS (Auckland Council, 2017)



Appendix 2: Information from Auckland Plan 2050 Development Strategy on FUAs

This appendix includes copies of the capacity and timing of future urban areas, as set out in the Auckland Plan 2050 Development Strategy. This information aligns with information in the FULSS and is provided here for context.

Proposed timing – development ready	Area^	Anticipated dwelling capacity for each area (approx.)	Anticipated dwelling capacity subtotals (approx.)	Anticipated Employment (jobs) (approx.)#
Actuals, contracted or planned 2012 - 2017	Live zoned areas and SHAs			
	Warkworth North	Business	31,590	15,350
	Wainui East	4,500		
	Whenuapai	1,150		
	Scott Point	2,600		
	Red Hills	3,600 (SHA) + 7,050 (live zone)		
	Puhinui	Business		
	Kumeū Huapai	1,400		
	Hingaia	3,070		
	Wesley (Paerata)	4,550		
	Belmont (Pukekohe)	720		
	Drury South	1,000		
	Bremner Rd (Drury West)	1,350		
	Bellfield Rd (Opaheke)	300		
	Walters Rd (Takanini)	300		
Decade One 1st half 2018 – 2022	Warkworth North*	2,300	14,300	27,250
	Paerata (remainder)	1,800		
	Whenuapai (Stage 1)	6,000		
	Silverdale West / Dairy Flat (business land)	Business		
	Drury West Stage 1*	4,200		
Decade One 2nd half 2023 – 2027	Pukekohe	7,200	7,700	
	Cosgrave Rd, Takanini	500		
Decade Two 1st half 2028 - 2032	Kumeū Huapai Riverhead	6,600	36,900	21,350
	Warkworth South	3,700		
	Whenuapai (Stage 2)	11,600		
	Drury West (Stage 2)	5,700		
	Opaheke Drury	7,900		
	Red Hills North	1,400		
	Puhinui	Business		
Decade Two 2nd half 2033 – 2037	Silverdale Dairy Flat (remainder)	20,400	29,400	
	Wainui East (remainder)	7,400		
	Warkworth North East	1,600		
Decade Three 1st half 2038 – 2042				50
Decade Three 2nd half 2043 – 2047	Takanini+ Yet to be determined new growth areas	4,500	4,500	
Total		124,390		64,000

^Refer sequencing maps for staging/areas

Anticipated employment figures do not include anticipated employment in centres

* Drury West (Stage 1) and Warkworth North development ready from 2022

+Significant flooding and geotech constraints – further technical investigations required
Further information: Refer Future Urban Land Supply Strategy (2017)[294]

Note: for information on total anticipated growth, population and dwellings and feasible development capacity see the anticipated growth in population and dwellings (2018-2048)

Auckland Plan 2050 – Anticipated development and employment capacities and timing for future urban areas – rural settlements

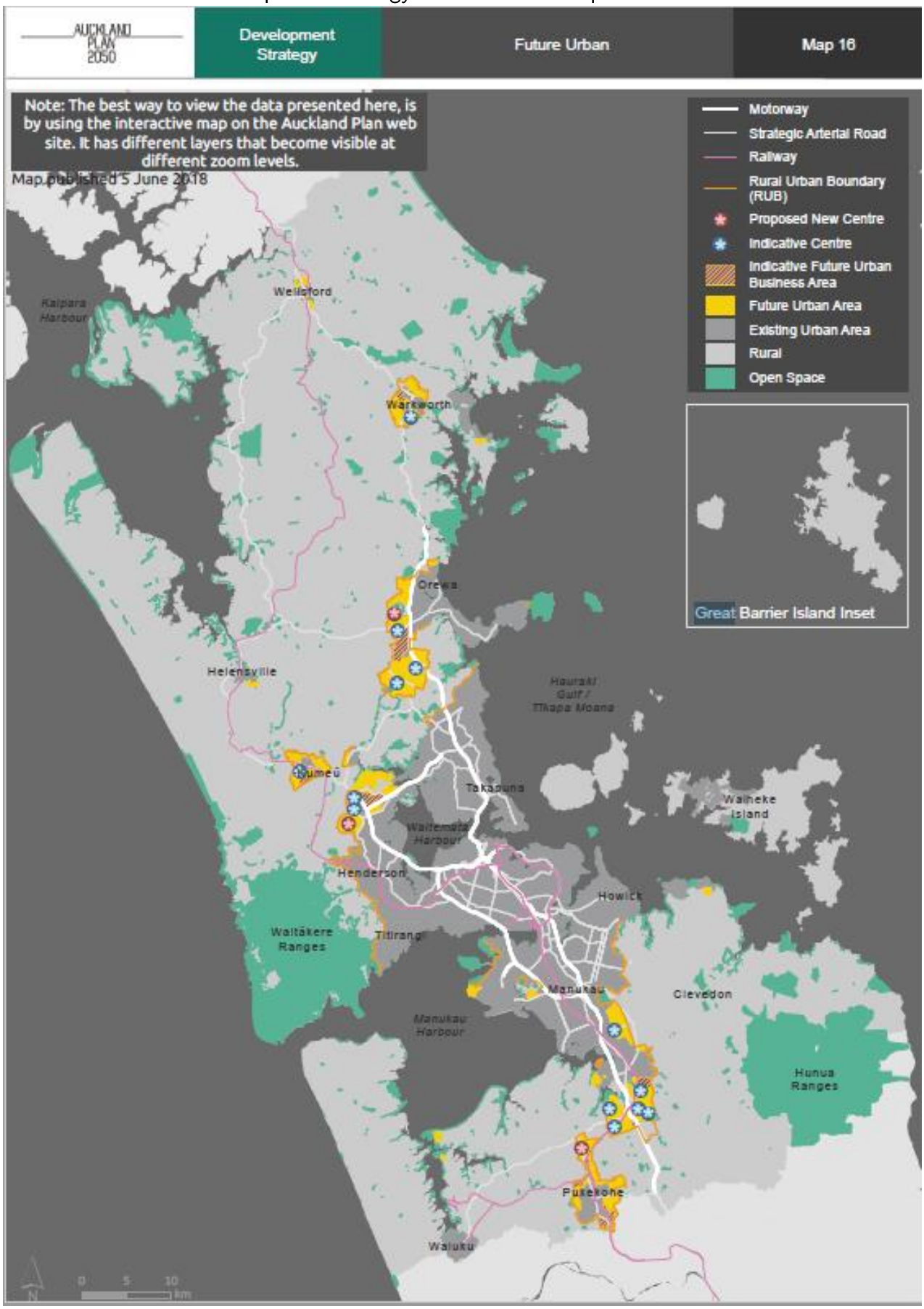
Proposed timing – development ready	Area	Anticipated dwelling capacity for each area (approx.)	Anticipated dwelling capacity subtotals (approx.)	Anticipated Employment (jobs) (approx.)
Actuals, contracted or planned 2012 - 2017	Live zoned areas and SHAs			
	Hatfields Beach 1	9	8,236	1,000
	Hibiscus Coast (Silverdale)	963		
	Hibiscus Coast (Red Beach)	570		
	Albany Village 1	4		
	Waimauku	231		
	Swanson	290		
	Maraetai 1	110		
	Ōruarangi 1	480		
	Clevedon Waterways	350		
	Clevedon	1041		
	Karaka North	744		
	Kingseat	1,842		
	Clarks Beach 1	650		
	Glenbrook Beach 1	843		
	Patumahoe	109		
Decade One 1st half 2018 – 2022	Ōruarangi 2	258	258	2,100
Decade One 2nd half 2023 – 2027	Wellsford	832	2,717	
	Algies Bay	455		
	Albany Village 2	450		
	Helensville 1	72		
	Clarks Beach 2	701		
	Glenbrook Beach 2	207		
Decade Two 1st half 2028 – 2032	Hatfields Beach 2	671	1,250	0
	Helensville 2	362		
	Maraetai 2	217		
Decade Two 2nd half 2033 – 2037				
Decade Three 1st half 2038 – 2042				
Decade Three 2nd half 2043 – 2047				
Total		12,461		3,100

Further information: Refer Future Urban Land Supply Strategy (2017)[295]

For more information: Development areas provide further detail on sequencing and timing of development areas.

Note: for information on total anticipated growth, population and dwellings and feasible development capacity see the anticipated growth in population and dwellings (2018-2048)

Auckland Plan 2050 Development Strategy – Future urban map



Appendix 3: Summary of structure plan requirements from the AUP

Appendix 1 of the AUP requires a structure plan to identify, investigate and address the following matters:

- urban growth (e.g, future supply and projected demand for residential and business land, phases and timing for the staged release of land in coordination with infrastructure, the location, type and form of the urban edge, linkages and integration with existing urban-zoned and/or rural-zoned land adjoining the structure plan area and, opportunities to improve access to landlocked parcels, including Māori land)
- natural resources (e.g, the protection, maintenance and enhancement of natural resources, integration of green networks with open space and pedestrian and cycle networks, measure to manage natural hazards and contamination and the location of mineral resources)
- natural and built heritage (the existence of natural and physical resources that have been scheduled in the AUP in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character)
- use and activity (e.g, contribution to a compact urban form and the efficient use of land)
- urban development (e.g, a desirable urban form at the neighbourhood scale)
- transport networks (e.g, integration of land use and development with the local and strategic transport network including public transport network and active modes)
- infrastructure (e.g, location and protection of existing and planned infrastructure)
- feedback from stakeholders.

Appendix 4: Data inputs and assumptions regarding significance of hazard constraints to development for future urban areas

Criterion	Assumptions	Geomaps Data Layer used
Flooding: the extent that a future urban area is exposed to flooding in a 1 in 100-year weather event, adjusted for climate change.	Flood exposure assessments have considered the proportional extent of the 1% AEP floodplain within a future urban area to determine the likelihood of requiring significant engineering solutions to enable avoidance. Where there are large areas of contiguous flood extent, avoidance is considered less likely and/or requiring significant mitigation. Where flood extent is limited to the margins of watercourses, avoidance is considered more likely, as a result of esplanade reserve and yard requirements. The assessment has also considered potential downstream flooding effects. Flood risk has not formed part of this assessment, including depth or velocity, due to a lack of available data at the time of assessment.	1% AEP (Annual Exceedance Probability) adjusted to a 3.8˚C climate scenario
Coastal inundation: the extent that a future urban area is exposed to coastal inundation in a 1 in 100-year weather event, adjusted for climate change.	Assessment of coastal inundation considered the extent to which a future urban area would be exposed to coastal inundation in a 1% AEP weather event. Where the coastal inundation extent covered a large part of the future urban area, this was considered to be a significant constraint to development. In particular, where the mean high water springs line covers the same extent meaning the area will not just be inundated during extreme events, but also on a more frequent basis in the future.	1% AEP + 2m sea level rise
Coastal Erosion: the extent that a future urban area is exposed to coastal erosion and instability, adjusted for climate change.	As coastal erosion results in permanent physical loss of land (and structures on it), future urban areas that contain larger amounts of coastline and land within the susceptible area were considered to have a significant constraint to development.	Areas Susceptible to Coastal Instability and Erosion 2130 RCP 8.5 H+
Geohazards: the extent to which a future urban area has geotechnical limitations, including slope instability, liquefaction potential or settlement as a result of geological formations/softer soils.	It has been assumed that many geotechnical limitations can be appropriately mitigated, therefore, generally geohazards were considered to be more of a minor to moderate constraint to development. However, if a future urban area contains large extents of a combination of geohazards (i.e. high landslide susceptibility and/or areas potentially vulnerable to liquefaction and/or peat and soft soils prone to settlement issues) then it was considered to have significant constraints to development. High landslide susceptibility is identified as Class D: Class D - High Hazard: 20% or more of slopes fail in the Geomaps data layer.	Rain induced landslide susceptibility 1997 Liquefaction vulnerability areas 2021 (Level A Basic Assessment) GNS Geological Maps

Criterion	Assumptions	Geomaps Data Layer used
	Liquefaction vulnerability is identified as 'Liquefaction Damage is Possible' in the Geomaps data layer. Peat soils and alluvium / colluvium geological formations which pose settlement risks to development and infrastructure were identified using the GNS Geological Maps.	

Appendix 5: Enabled carbon emissions in greenfield areas report

Ranking the relative performance of Future Urban Areas - Transport Enabled Carbon Emissions

Findings Summary

Analysis of this data suggests there is strong support for the hypothesis that locations further away from the central business district (CBD), are generally less carbon efficient in terms of travel than locations closer in. However, there is significant variation at the Future Urban Area (FUA) level, and between otherwise similar urban locations, including at the same radial distance.

That is to say, a location's distance from the CBD is a strong indicator of likely vehicle kilometres travelled (VKT) and CO_2 emissions (CO_2e), this alone appears to be too simplistic a measure to capture all of the interrelated factors that account for variations in those same transport related emissions, based on data from this particular model run (ATAPv2 transport system, I11v6 land use), at this particular time (2048). This is potentially unsurprising, as while the CBD is a regionally important employment location and location of important amenities, and is the 'best' location, it is not the only location with (or the potential for) at least some of these features, including more localised, smaller scale substitutes, that could enable people to live 'more locally' and reduce their VKT.

This is not to say that some locations more distant perform worse than locations close in, but that overall there is a lot of noise in the data, and it is likely that local conditions, including the availability of high quality public transport (PT), proximity (accessibility) to a wide range of jobs, education and other services, play a significant role in terms of modelled (and actual) transport outcomes, in addition to radial distance.

The ranking of Future Urban Areas has focussed on relative performance (amongst Future Urban Areas) against a range of variables. The final ranking is based on normalised (per capita) variables. Locations that are 'well located' (relative to the amenities mentioned above) seem to perform best. For example, Takaanini performs well (Ranked 4th) as it is close to a wide range of employment areas, schools and has both existing rail transport and a planned high frequency bus corridor on Mill Road.

A focus on ensuring a good mix of land uses and amenities, and prioritising areas with good public transport options (aspects which are captured in the model's outputs and relative performance) should be maintained through strategic and more detailed planning to ensure the most carbon efficient lifestyle opportunities are available to these areas' future residents – the size and scale of Auckland, and its evolving polycentricity means even with a well functioning city centre and high quality PT enabling ready access around the region, high amenity local offers will remain important to reduce the need for movement of people over long distances, which is the driver of VKT, irrespective of transport mode or propulsive energy source.

Background

This report adds to the research undertaken for TERP[1], which outlines a pathway to reduce transport emissions by 64% relative to 2016 by 2030. A key means to achieve this is reducing distance travelled (the indicator being vehicle kilometres travelled, or VKT) in light vehicles.

One of the Key Actions identified is 'Build up not out' which alongside other actions to improve sustainable modes, reduce VKT, and enhance intensification in areas with good proximity and services, includes Action 6.2 which states:

> **"6.2 Reduce the scale of planned urban expansion.**
>
> 6.2.1 Defer live-zoning, or potentially revoke previous zoning decisions, if they are likely to be fundamentally detrimental to light vehicle VKT reduction targets"

Research quoted[2] in background reports for TERP based on findings from Melbourne and Sydney identified that people who live in greenfields areas generate approximately four times the transport emissions of people who already live in developed and well served urban areas.

This paper largely confirms, (with some caveats), that this pattern of greater VKT and therefore transport emissions per capita from greenfields areas (which tend to be further outlying) relative to existing urban areas is generally appears to hold true in Auckland in the future based on the scenario modelled (effectively current plans or business as usual). However, the very high per capita level of emissions from greenfields residents (400% more) relative to residents in more central locations does not appear to be as great (findings[3] suggest between -2% and +65% more) as reported in Sydney and Melbourne[4].

This paper also summarises key factors that relate to transport use (and spatial planning) that may account for some of the differences in findings, including the degree to which our model incorporates aspects of them compared to the approach used by the Australian researchers:

- The further that people live from their frequented travel destinations, the less likely they are to accomplish that travel through active means, whether it is by walking or cycling.
- Areas with poor or no transit services are reliant on private vehicle travel.
- The more people living or working in a particular area, the more viable public transport becomes to that place.

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[1] Transport Emissions Reductions Pathway: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/Pages/transport-emissions-reduction-pathway.aspx

[2] Trubka, R., Newman, P., & Bilsborough, D. (2010). The costs of urban sprawl–predicting transport greenhouse gases from urban form parameters. Environment Design Guide, 1-16.

[3] The closest comparison would be CO2 per Car per HH+Empl*0.5 Origin, which is 25% worse across all FUAs relative to all urban areas - See Figure 10 for other potential relative comparisons. Exact comparisons are not possible as the method is not the same.

[4] perhaps reflecting a combination of the sheer scale of these cities, the more intensive built form and option rich and mature transport systems particularly PT, and in particular the more distinct variation between these factors on the fringes of these cities and their more developed cores, particularly when compared to Auckland which is much smaller, has a much 'flatter' density gradient, and only a nascent PT system with relatively incremental improvements planned in current model runs. Recent announcements around major expansion of future RTN networks may amend these findings in future model runs, including reducing VKT potential by providing high quality alternatives along their corridors, including in more distant areas.

- The easier it is to walk or cycle in an area the more likely it is that they will do that.
- The closer that a development is to the CBD then all these factors come into play providing increased amenity and economy for less car dependent travel.

These factors should be kept in mind when considering the reasons for modelled differences between FUAs as a whole and urban areas, and FUAs between themselves, and the potential solutions/intractable problems to solving transport emissions problems though built form.

However, the main focus of this paper is to identify which of our current planned FUAs areas could be priorities for further investigation (including potential improvements to emissions), based mainly on their performance relative to other FUAs.

To do so, this paper explores data provided by Auckland Forecasting Centre (AFC) from the Macro Strategic Model (MSM) run undertaken for the Auckland Transport Alignment Project version 2 (ATAPv2), utilising Auckland Plan 2050 informed development assumptions as used for the 2021 LTP (i11v6 land use).

This scenario was chosen as it represents current BAU land use and transport planning assumptions, including agreed/funded greenfields supporting transport projects, and provides for the development of most[5] FUA areas to have commenced by 2048, in accordance with The Future Urban Land Supply Strategy [6].

Macro Simulation Model

The purpose of this assessment is not to definitively determine the carbon cost of Greenfields but to rank existing 'Future Urban Area'[7] Greenfields areas against each other to help inform priority or reconsideration discussions for the new Future Development Strategy.

Most comparisons are undertaken on a 'normalised' basis, where gross transport emissions modelled for the MSM zone (and the Greenfields, rural or existing urban development it is a proxy for) are converted to a per household or similar basis.

The MSM model calculates estimated inter-zone[8] non-active mode[9] trips by persons and households for a range of purposes (journey to work, education, other) across a range of times (AM peak, Interpeak, PM peak, other), and modes (Public Transport (PT), Car), for both trips originating in the zone, and those where the zone is the destination. The model also calculates trip length and volume of Heavy Commercial Vehicles (HCV) (i.e., trucks) in much the same way but these trips are largely 'business to business', and to and from key business or transport nodes (eg port, airport, industrial areas, and regional entry and exit points).

[5] Takaanini excepted, commencement is 2048+ in the FULSS

[6] FULSS: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/housing-plans/Documents/future-urban-land-supply-strategy.pdf

[7] Future Urban Areas are those Greenfields identified in the Future Urban Land Supply Strategy (2017)

[8] Intra-zone trips are not calculated in the model, as the origin and destination of these journeys (zone centroids) are the same, so theoretical trip length for such trips is zero.

[9] Active mode (walking, cycling, scooting etc) trips are exogenously determined as a proportion of all trips, based on location type, trip purpose and time dependent. For example, AM peak journey to work trips to a nearby town centre have a higher active mode share than other purpose trips by rural residents to their nearest subregional centre). Remaining trips are then available to be allocated between PT and Car by the model based on purpose, time of day, overall modelled time cost and network availability/congestion.

These modelled trips are then run through an assumed fleet emissions profile[10], to calculate CO_2e as a function of vehicle mix (embedded in the fleet profile), trip volumes, speed and distance (generated by the MSM model), as shown on Figure 1. Note that the Car (and total) fleet CO_2e curve trends downwards over time, reflecting assumed increases in efficiency, particularly of electrification, despite increased fleet size. Conversely, the HCV CO_2e trend is slightly upwards reflecting currently assumed limitations on the feasibility of widespread electrification for HCVs.

These figures are collated across a modelled 24Hr period (a weekday) to generate CO_2e totals for Cars and HCVs with trips that either have an origin or destination in the relevant zone (noting the regional totals for origin and destination values are equal, with a small number of 'boundary' zones standing in for RoNZ representing key entry and exit points to and from the region). Emissions from PT trips in 2048 are assumed to be zero (as the PT fleet is assumed to be fully electric by that point[11]), but PT trips are not irrelevant or ignored as the level or proportion of PT (and Active) modal share is still calculated (leaving a share or remainder for Cars) and so this affects the net emissions profile. Locations with poor PT mode share will all else being equal, perform worse on a normalised CO_2e basis than other areas with better PT mode share.

Given that PT mode share is a function of its availability, accessibility, frequency, price, travel time cost and attractiveness, these factors cannot be ignored when considering why some areas perform better than others, all else being equal. It is also true that some FUAs may not be feasibly provided with a high quality PT service even if BAU plans reflected in the model run being assessed, were amended.

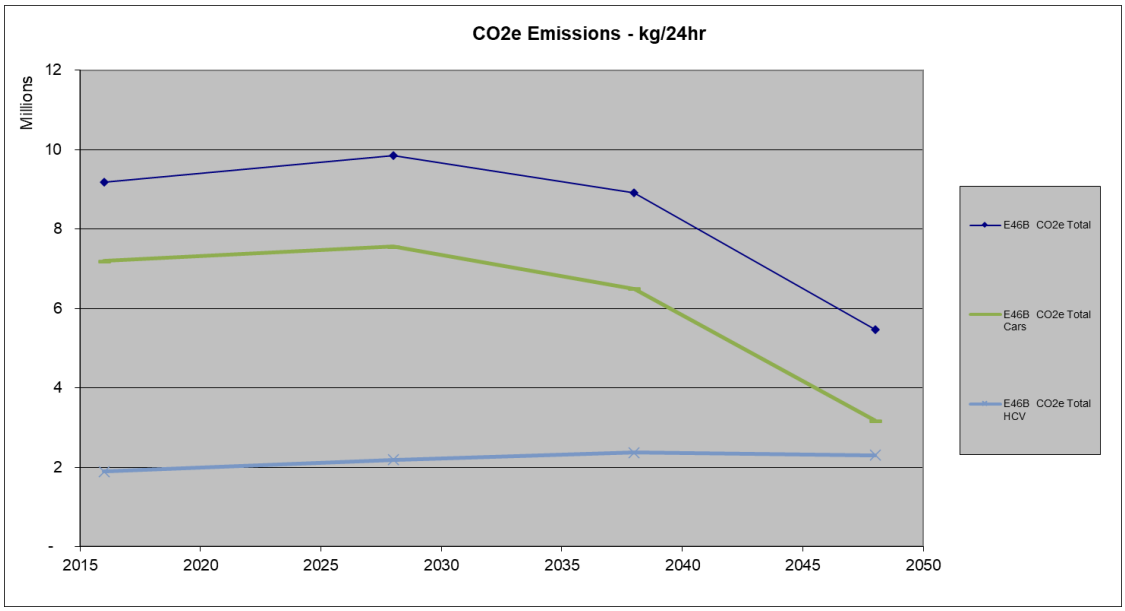


Figure 1: Summarised Fleet Emissions Profile, Source AFC, pers comm.

[10] Based on NZTA's Vehicle Emissions Prediction Model (VEPM) https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/environment-and-sustainability-in-our-operations/environmental-technical-areas/air-quality/vehicle-emissions-prediction-model/ , itself informed by MoT's Vehicle Fleet Emissions Model v3 (VFEM3) https://www.transport.govt.nz/statistics-and-insights/transport-outlook/sheet/updated-future-state-model-results

[11] Note that the PT emissions profile is assumed to be zero by 2048, reflecting policy decisions by Auckland transport to have a fully electric fleet by 2044.

Limitations and Assumptions

All models are simplifications of the real world and are therefore subject to assumptions and limitations. Models about the future are particularly fraught, as these assumptions and limitations are stretched out (projected) on the basis of current knowledge and assumptions about future conditions, which may not come to pass. IF <x> conditions exist THEN it is reasonable to assume that <y> will occur.

Strategic models are most useful for testing hypotheses, particularly on a comparative (i.e. one model run vs another) basis – they are less useful (though are very often tasked) with definitively determining a single future from the set of infinite potential futures.

The MSM model has been in use for a long time, and is based on globally accepted software and conceptual frameworks, is endorsed, reviewed and funded by Ministry of Transport, NZTA/WK, Auckland Transport and Auckland Council and continues to be used as a key tool across almost all of Auckland's transportation decision making processes.

For the purposes of this assessment (relative location comparison), most assumptions and limitations can be ignored *as they apply equally across all locations*, even as some of them change over time, but some key ones do need to be highlighted:

- VKT, population, employment, mode share and ultimately relative CO_2e performance are a function of the relative availability and accessibility of land, jobs, infrastructure and services
    - some locations inputs may not have been optimised for one or more of these factors and so poor performance could be addressed by improving these factors. However the inputs reflect current plans – addressing one or more of these issues would imply adjustments regionally to address specific locational issues, which may not be desirable, practical, or commercially feasible.
- Presented data is a snapshot in time – some locations may be quite early in their development cycles and (modelled) travel behaviour may change as a result of further development (eg a FUA develops with stage 1 mostly residential, stage 2 mostly employment, but at the time of assessment, only Stage 1 residential development is underway, with PT services expected later, leading to long Car commutes (high VKT and low population) for early residents)
    - In particular this impacts the assessment of Takaanini, which is not scheduled to be 'development ready' until 2048+ in the FULSS, and is therefore essentially still a rural area in the modelled scenario (which extends only to 2048) with very low levels of existing development at this time.
- Detail of future development and the human decisions and behaviours it attempts to capture is extremely complex, nuanced and changeable. Different incentives and opportunities may result in different outcomes, however our models reflect current assumptions about these factors and their interactions, in the absence of definitive proof of alternatives being passed back from the future.
- 'Loose' fit between the FUA boundaries and MSM zones – this is a common issue in almost all geographic analyses where the 'data' geography does not match perfectly with the 'study area' geography. These geographies show a complex many to many relationship. A pre-existing Rural/Urban/Greenfields classification previously utilised for developing and assessing growth scenarios has been applied to this analysis. This MSM zone classification is based on a best fit approach whereby 'most' of the expected growth/ change/ development/ land area in the zone under the Auckland Plan can be attributed to one of

these 3 classes. Many smaller FUAs are located entirely in Rural or Urban classed MSM zones. Many Larger FUAs cross aver several MSM zones which contain some FUA, some existing urban development and some expected to remain rural areas. This detail however matters little to the model as all development potential and travel choices are effectively centralised to figures at the centroid of the MSM zone (the model doesn't care about our F/U/R categorisation), but it does mean that it is not possible to be absolutely definitive about differences in outcomes can be totally attributable to differences between 'brownfields' and 'greenfield' development typologies at the MSM level.

The limitations above are a key reason why this assessment focusses on *relative* performance of grouped FUA locations against each other, at the latest possible time period to be included in a broad assessment against a range of other criteria, and should not be used alone to definitively rule any FUA location in or out of the FDS. Absolute values are of course important but given the potential for these values to change over time, highly dependent on land use and transport system modelled scenarios, a more indicative approach to the results has been taken particularly as the assessment itself may eventually result in amendments to proposed timing, land use or transport systems.

It is also important to note that 'Greenfields' are not *necessarily* worse performing locations than 'brownfields' from an emissions perspective, simply by being greenfields or new development areas. As highlighted by the Australian research - *location, proximity and accessibility matters for all locations* – the difference between brownfields and greenfields areas is more to do with the high likelihood that greenfields are (typically) more distant, lower density, and have fewer options closer to them than brownfields areas, (resulting in high car mode share and VKT), because that is the nature of normal urban growth and development patterns. All brownfields' areas were greenfields once, they just happen to be closer to the urban centre, and so were developed sooner.

Relative distance to the centre matters, but, as the model's results highlight, local factors can and do play a part, and while generally locations that are further away from most destinations will require longer trips on average to reach those destinations, not everyone travels to and from the CBD twice per day at peak, and certainly not for all journey purposes – people live complex and diverse lives. The mix of amenities, and opportunities relative to the population being served is important to get right, including in more central areas, which do have a basic geometric advantage of being able to access the widest range of destinations and amenities, in the shortest distance by way of the greatest mix of modal opportunities prioritising active, and then PT, and only then SOV.

Overcoming this simple geometric reality in more distant, less option rich locations (which is a characteristic of many greenfield and rural areas) would require disproportionately more effort/intervention/expenditure to achieve. This is not impossible, but, there is an opportunity cost, especially when public investment resources are limited, which they almost always are, and where the alternative of more development in locations that already have these natural advantages exists.

Many existing urban areas also require considerable investment and in a financially challenged funding environment (which is a more or less permanent constraint!) may suggest more cost effective approaches to achieving well functioning urban environments should be prioritised. This however is an area for further research, and likely, much further discussion, submission and litigation.

Identifying locations of Interest

MSM zones have been classified against a number of spatial categories (e.g. business areas, Auckland Plan areas, greenfields, rural areas etc))..

Like many of these other spatial categorisations, the relationship between FUAs (our 'study areas' and MSM zone boundaries (our 'data areas') is not perfectly coincident , so MSM classifications are only a proxy for identifying specific FUAs, using a 'best fit' (not a perfect fit) approach, as indicated in Figure 2.

This map also highlights that a number of FUAs are not within MSM zones identified as greenfields and the boundary between rural and urban zoning is not always reflected in the MSM classification. MSM zones identified as green fields are not entirely FUAs either. This categorisation fuzziness also makes it difficult to definitely assign an MSMs zone results to the 'form' (or perhaps more correctly, age) of urban development. To compensate for this issue, only the larger FUAs are considered (as smaller ones are 'lost' in otherwise urban or rural classified zones) and several MSM zones are grouped by the FUA they correlate to, and compared en-masse with rural and urban categories for the final ranking assessment. This fuzziness also limits the utility of complex or deeper statistical analysis, with this analysis focussing instead on broad relativities between broad area types, between FUAs, and broader spatial patterns.

Appendix 1 and 2 contain tables showing the many to many relationship between FUAs and MSM zones and MSM zones and FUAs.

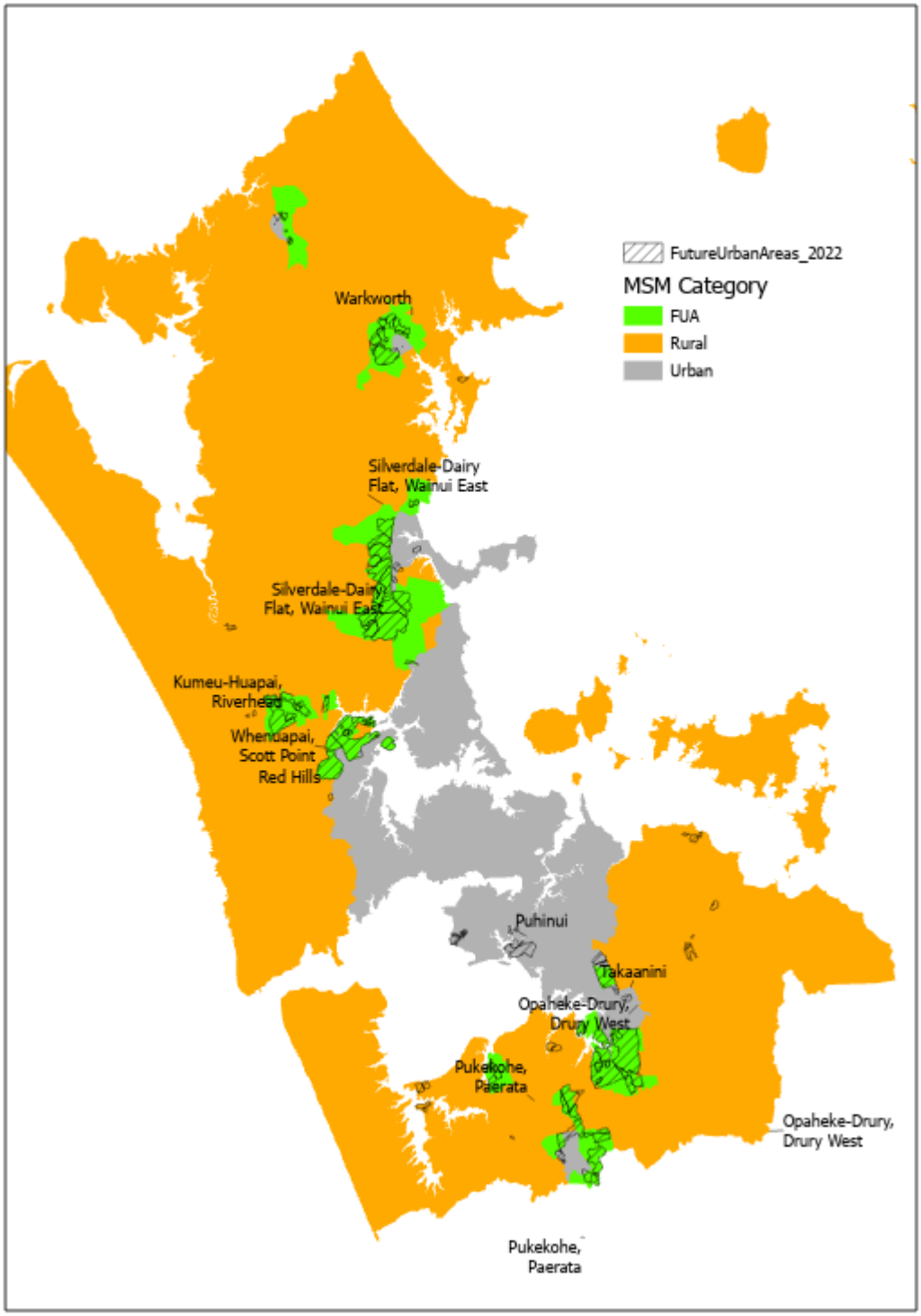


Figure 2: FUA boundaries as at 2022, and MSM Zone Classifications as used in this paper

Variables

The following variables have been obtained from the model and used in the assessment of relative performance between FUAs. The abbreviations for each variable shown in the first column have been used in Figures 7, 8, 10 and 11.

Variable	Source	Description
Pop	Model	**Population** in Households in Private Dwellings in zone(s)
HH	Model	**Households** in Private Dwellings in zone(s)
Emp	Model	**Employment** in zone(s)
VKT_Car_24hr_by_Orig	Model	**Vehicle Kilometres Travelled by Cars** for all trip purposes in a 24 period (weekday) summed to the origin zone of each trip
CO2e_Car_24hr_by_Orig	Model	**CO2 equivalent (kg) emitted by Cars** for all trip purposes in a 24 period (weekday) summed to the origin zone of each trip
VKT_HCV_24hr_by_Orig	Model	**Vehicle Kilometres Travelled by HCV** for all trip purposes in a 24 period (weekday) summed to the **origin zone** of each trip
CO2e_HCV_24hr_by_Orig	Model	**CO2 equivalent (kg) emitted by HCV** for all trip purposes in a 24 period (weekday) summed to the **origin zone** of each trip
VKT_Car_24hr_by_Dest	Model	**Vehicle Kilometres Travelled by Cars** for all trip purposes in a 24 period (weekday) summed to the **destination zone** of each trip
CO2e_Car_24hr_by_Dest	Model	**CO2 equivalent (kg) emitted by Cars** for all trip purposes in a 24 period (weekday) summed to the **destination zone** of each trip
VKT_HCV_24hr_by_Dest	Model	**Vehicle Kilometres Travelled by HCV** for all trip purposes in a 24 period (weekday) summed to the **destination zone** of each trip
CO2e_HCV_24hr_by_Dest	Model	**CO2 equivalent (kg) emitted by HCV** for all trip purposes in a 24 period (weekday) summed to the **destination zone** of each trip
VKT per Car per HH Origin	Derived	VKT Car Origin /HH – Normalise Origin Car VKT to resident Households
CO2 per Car per HH Origin	Derived	CO2e Car Origin/HH– Normalise Origin Car CO2 to resident Households
VKT per Car per HH+Empl*0.5 Origin	Derived	VKT Car Origin/(HH+Emp*0.5) – Normalise Car VKT to resident Households and Half of Employment
CO2 per Car per HH+Empl*0.5 Origin	Derived	CO2 Car Origin/(HH+Emp*0.5) – Normalise Car CO2 to resident Households and Half of Employment
VKT per HCV per Emp Dest	Derived	VKT HCV Dest/Emp – Normalise Destination HCV VKT to resident Employment
CO2 per HCV per Emp Dest	Derived	CO2 HCV Dest/Emp – Normalise Destination HCV CO2 to resident Employment
VKT per HCV per HH+Empl*0.5 Dest	Derived	VKT Car Origin/(HH+Emp*0.5) – Normalise Car VKT to resident Households and Half of Employment
CO2 per HCV per HH+Empl*0.5 Dest	Derived	CO2 Car Origin/(HH+Emp*0.5) – Normalise Car CO2 to resident Households and Half of Employment
Car Origin/Dest VKT Ratio	Derived	Car VKT Origin/Car VKT Dest – These ratios indicates the relative balance between MSM origin and destination trips. A value of 1 indicates balance, a value of less than one indicates less origin

Variable	Source	Description
		than destination VKT, and greater than one indicates more origin than destination VKT
Car OD CO2 Ratio	Derived	Car CO2 Origin/Car CO2 Dest
HCV OD VKT Ratio	Derived	HCV VKT Origin/HCV VKT Dest
HCV OD CO2 Ratio	Derived	HCV CO2 Origin/HCV CO2 Dest

Overall position at 2048

This paper focusses on one point in time, being 2048. This timeframe is the effective policy horizon of the Auckland Plan 2050 and ATAPv2.

The maps and graphs below show the regional picture in terms of total zone Population, Households (HHs), Employment, VKT and CO_2e at 2048.

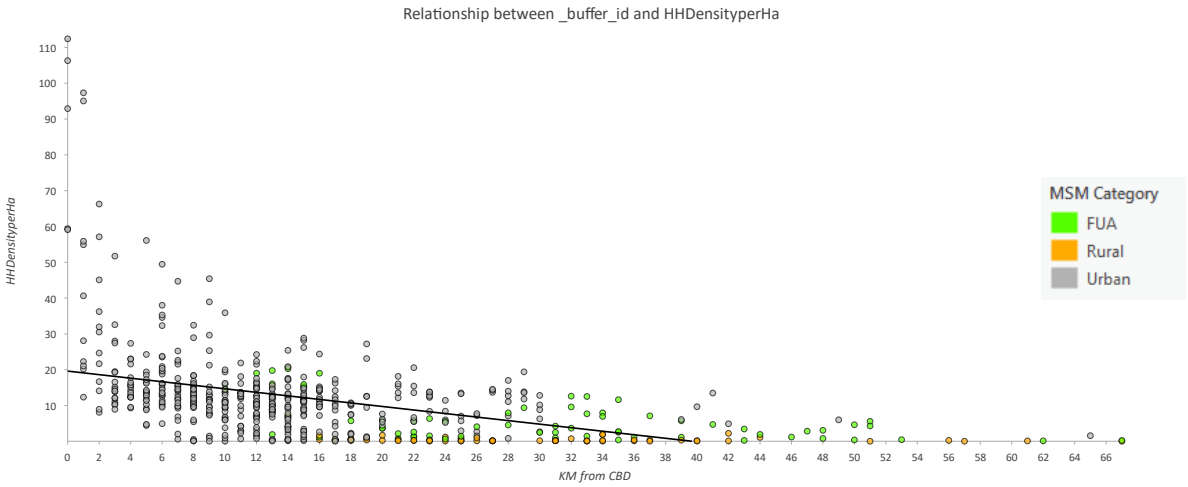
All maps below classify MSM zones into 10 quantiles or 'deciles' (where 10% of MSM zones are in each 'bin' – a median is the divider for a 2 bin quantile (50% in in each bin, or half of values are greater than and half are less than the median), and quartiles are a 4 bin quantile; 5th and 95th percentiles would require a 20 bin quantile, or 'ventiles' to determine and so on) for the indicated variable. In Figure 3 for example, the bottom 10% of all MSM zones have less than or equal to 278 households at 2048, and the top 10% have more than 2516 and less than or equal to 5262 households.

Figures 3 and 4 below highlight the considerably different patterns of Household and Employment in 2048, and Figure 5 shows the relative balance or ratio (HH/Emp) – while almost all locations have a mix, many locations are largely residential, some are entirely employment, and only a few have a balance.[12]

This is because for the most part, existing bulk employment areas concentrate in a few locations either set aside by zoning, and/or are naturally advantageous to this use, and remain the main employment areas, albeit with some additions in FUAs and general expansion of distributed employment in line with population.

Conversely, residential development is much more spatially widespread reflecting the greater number of and more diverse range of preferences of households and the less constrained locational requirements needed for residential development. It is also true that residential development is generally denser where there are a greater number of amenities accessible from that location, and aside from zoning/regulatory constraints (e.g. covenants, parkland, SCA, viewshafts etc) and amenity quirks (e.g. eastern coastal proximity and views), generally follows a classic bid rent curve from the centre (CBD) outwards as indicated in Figure 3a below, which graphs radial distance of the MSM zone centroid from the edge of the City Centre Zone in km against the gross density of HH in the MSM zone at 2048. The densest zones are close to the CBD, and reduces by distance. This graph also shows that FUAs start popping up at >12km and some rural class zones from >20km from the CBD respectively, amongst (generally denser) existing urban area classified zones.

[12] Of note is that relative specialisation occurs mainly in the urban or peri urban areas – more isolated urban areas tend to have a ratio closer to 1 as only people with work in that location would live there, and only employment with specific spatial requirements (farming, population servicing industries etc) would locate so far from the bulk of labour and consumer markets.



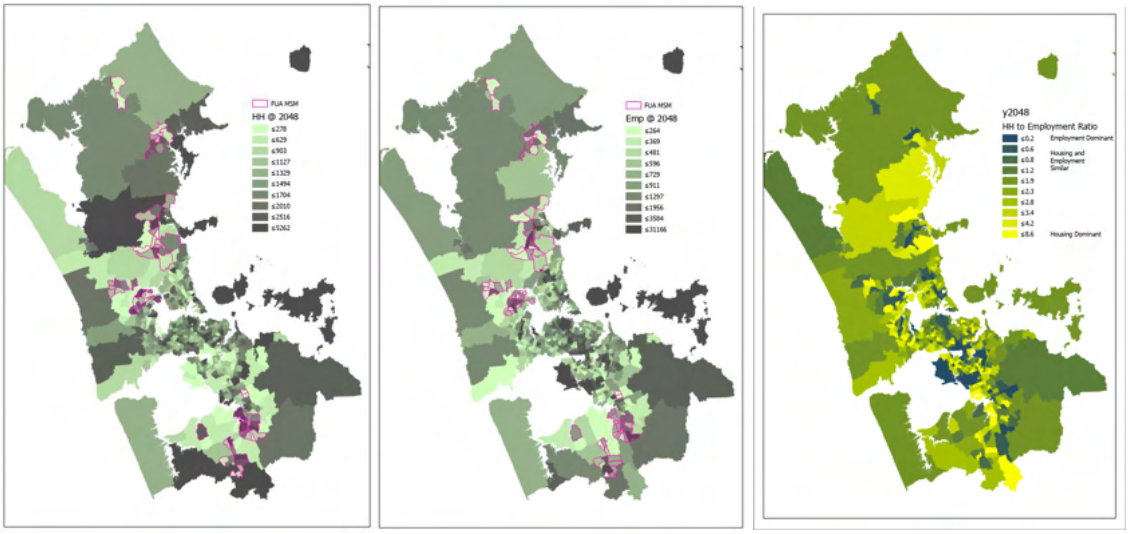


Figure 3a (top): Radial distance of the MSM zone centroid from the edge of the City Centre Zone in km against the gross density of HH in the MSM zone (total HH/gross MSM zone area in Ha) at 2048

Figure 3 (left): Total Households at 2048 by MSM Zone

Figure 4 (centre): Total Employment at 2048 by MSM Zone

Figure 5 (right): HH:Empl Ratio at 2048 indicating relative blanace of households and employment by MSM zone.

Interzone travel for journey to work (JTW, between the zone where the HH is and the zone where the Employment is) is a necessity for working members of most households, and while journeys to work are not the only purpose for trips, they are a significant driver of AM and PM peaks, and therefore also the 24hr VKT and therefore CO_2e. Other modelled trips, some of which incorporate the interpeak and other periods in the 24hrs modelled, include journeys to education (JTE), pleasure, and other purposes, inter-business travel, HCV and delivery vehicles. As noted above intrazonal travel is not modelled in terms of VKT (because for the strategic transport model, the trip length is zero) but the assumed share of interzone trips will impact the how many trips are needed beyond the origin zone to other zones, and therefore VKT and CO2e. The greater the potential for trip purposes to be met in or as close as possible to the origin zone the lesser the travel distance required, and therefore VKT and CO2e, all else being equal.

Figure 6 shows total modelled CO2e from cars originating in each zone, or gross emissions. Figure 7 shows the effect of 'normalisation' on those results, converting 'gross emissions' into 'emissions per

x' ((x in the figure being, HH plus half of Employment). Some locations distant from the main urban area have high gross values but some do not. Some areas just have very few households, and even if they make long trips this does not add up to as much CO_2e as a more populous zone even if their trips are shorter. Conversely some areas have high gross CO2e but also contain a lot of HH and Emp. This shows a highly mixed spatial pattern – distant areas tend to have high gross CO2e levels (but not all), but so do many central areas.

To account for this, the figure on the right is the same CO_2e data, but 'normalised' by the sum of all households, plus half of the employment in the zone[13], giving a distinctly different, more spatially organised pattern.

Figure 6: (left) 'Gross' CO2e emitted from cars going on trips originating in the zone in a 24 Hr period

Figure 7: (right) 'Normalised' CO2e emitted from cars going on trips originating in the zone in a 24Hr period, normalised by total Households plus Employment x 0.5

Summary results at Generalised Area Level

The summary data below highlights that on almost all measures, FUAs performed (collectively) slightly worse than the whole urban area, but better than Rural Areas[14] (see Figures 8 to 10).

In general, the pattern of Urban, FUA, Rural is one of increasing distance from the centre, but also decreasing provision of all transport options and reduced local employment options. While for many

[13] The use of HH and half of zone employment is commonly used to 'normalise' trips and trip data in exploring transport model results such as this. For Car based Origin trips, using all households make sense, but the purpose and function of trips relating to employment (ether origin or destination) is highly variable depending on industry and workplace – without knowledge of these specifics and to account for the mix of activities in any given zone, 50% of employment is used. The formula is *Co2e/(HH+Empl*0.5)*

[14] Out of Region data covers a small number of zones modelled to represent boundary regions/highway crossing points and some specific nearby settlements and can be ignored for present purposes.

rural people, work trips may be 'intrazonal', most other trip purposes will require either a trip to the nearest settlement, or potentially much further depending on the amenity, product or service sought. FUA residents will generally be adjacent to the urban area and its services and amenities, and may have new services and amenities developed within the FUA over time. Urban residents have the most access to the most jobs, services and amenities, and therefore the least distance to travel, on average, for the things they need or want.

A similar spatial pattern and reasons for this exist for HCVs as well.

Figure 8 below highlights the gross figures by generalised location, and Figure 9 highlights the normalised figures across the same generalised locations. The ratios highlight that the urban area is a destination for more trips than originate there (<1), and the rural and FUA have more origins than destinations (<1) confirming that the urban area is most likely the destination of trips originating from these locations[15].

Figure 10 compares the normalised values in Figure 9 against the urban area results, showing that on most measures FUA perform worse than Urban, and Rural performs worse than both FUA and Urban on all measures. For example, for 'VKT Car per HH+Empl*0.5', FUAs in aggregate show 31% more VKT than Urban, and Rural shows 75% more than Urban.

Figure 11 graphs the variables in Figure 9.

MSM Category	Population	Households	Employment	VKT Car 24hr by Origin	CO2e Car 24hr by Origin	VKT HCV 24hr by Origin	CO2e HCV 24hr by Origin	VKT Car 24hr by Dest	CO2e Car 24hr by Dest	VKT HCV 24hr by Dest	CO2e HCV 24hr by Dest
Urban	1868142	661882	836253	32166288	2190883	2934754	1850984	32511204	2214638	2982122	1876774
FUA	247653	98380	58614	4977110	324441	372340	212682	4852840	315878	345762	198013
Rural	143651	59598	40734	4156425	268636	359550	208006	4083437	263837	343868	199801
Out of region	16804	7318	2336	380109	24890	45162	25652	343234	22392	40039	22747
Total Auckland	**2276250**	**827178**	**937937**	**41679932**	**2808850**	**3711806**	**2297324**	**41790715**	**2816745**	**3711791**	**2297335**

Figure 8: Main Variables by top level location

MSM Category	VKT per Car per HH by Origin	CO2e Car per HH by Origin	VKT Car per HH+Empl *0.5 by Origin	CO2 Car per HH+Empl *0.5 by Origin	VKT HCV per Empl by Dest	CO2e HCV per Empl by Dest	VKT HCV per HH+Empl *0.5 by Dest	CO2 HCV per HH+Empl *0.5 by Dest	Car Origin/Dest VKT Ratio	Car OD CO2 Ratio	HCV OD VKT Ratio	HCV OD CO2 Ratio
Urban	48.60	3.31	29.78	2.03	3.57	2.24	2.76	2.05	0.99	0.99	0.98	0.99
FUA	50.59	3.30	38.98	2.54	5.90	3.38	2.71	2.47	1.03	1.03	1.08	1.07
Rural	69.74	4.51	51.98	3.36	8.44	4.91	4.30	3.30	1.02	1.02	1.05	1.04
Out of region	51.94	3.40	44.79	2.93	17.14	9.74	4.72	2.64	1.11	1.11	1.13	1.13
Total Auckland	**50.39**	**3.40**	**32.16**	**2.17**	**3.96**	**2.45**	**2.86**	**2.17**	**1.00**	**1.00**	**1.00**	**1.00**

Figure 9: Derived Variables by Top Level Location

[15] The transport model also produces highly detailed OD trip matrices from zone to zone, but exploration of this extreme detail is well beyond the scope of this paper, but the general finding is consistent with both expectations (see discussion in first section), and previous scenario analysis.

MSM Category	VKT per Car per HH by Origin	CO2e Car per HH by Origin	VKT Car per HH+Empl *0.5 by Origin	CO2 Car per HH+Empl *0.5 by Origin	VKT HCV per Empl by Dest	CO2e HCV per Empl by Dest	VKT HCV per HH+Empl *0.5 by Dest	CO2 HCV per HH+Empl *0.5 by Dest
Urban	0%	0%	0%	0%	0%	0%	0%	0%
FUA	4%	0%	31%	25%	65%	51%	-2%	21%
Rural	44%	36%	75%	66%	137%	119%	56%	61%
Out of region	7%	3%	50%	45%	381%	334%	71%	29%
Total Auckland	4%	3%	8%	7%	11%	9%	4%	6%

Figure 10: Derived Variables relative to 'Urban' results

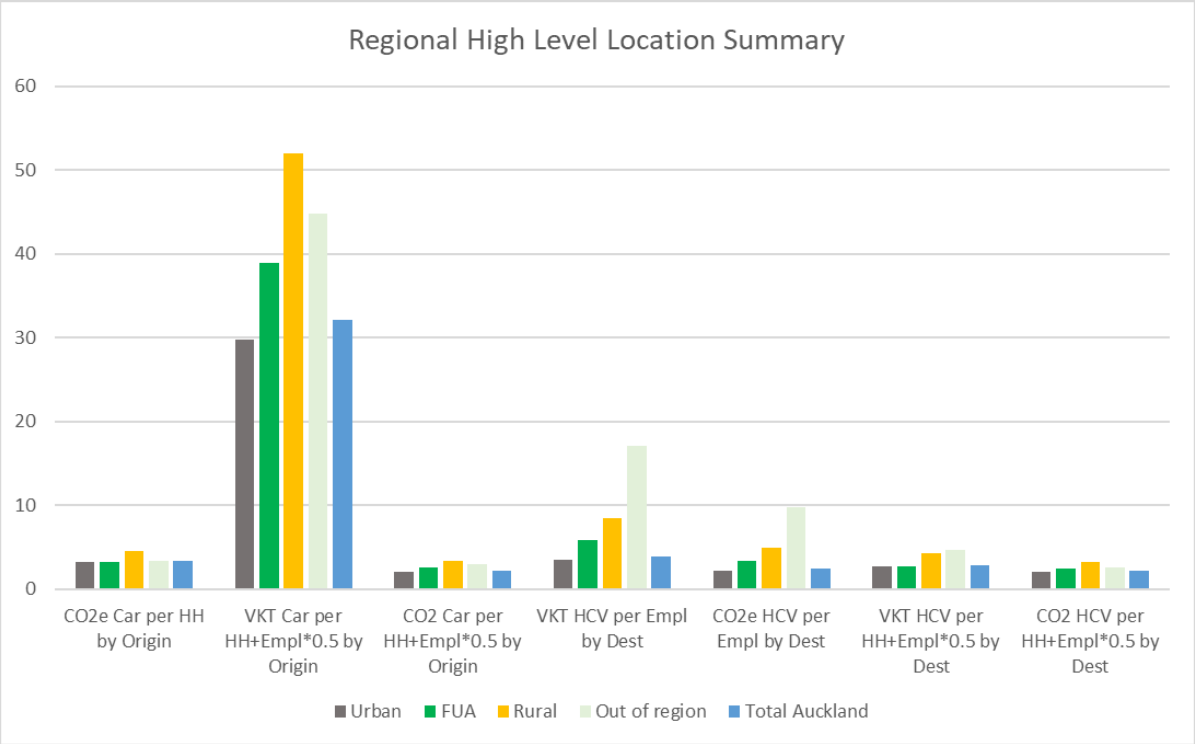


Figure 11: Graph of Key Variables by Top Level Location (Data from Figure 9)

FUA Cluster position at 2048

This section explores the FUA group data looking at the clusters of Future Urban Areas within the FUA category. This section primarily looks to explore relative performance of each FUA based MSM Zone cluster against the other identified FUA MSM zone clusters.

The methodology is a repeat of the Urban/Rural/Future Urban

These FUA clusters are shown on Figure 12 below, and MSM zone concordances are included in the appendices:

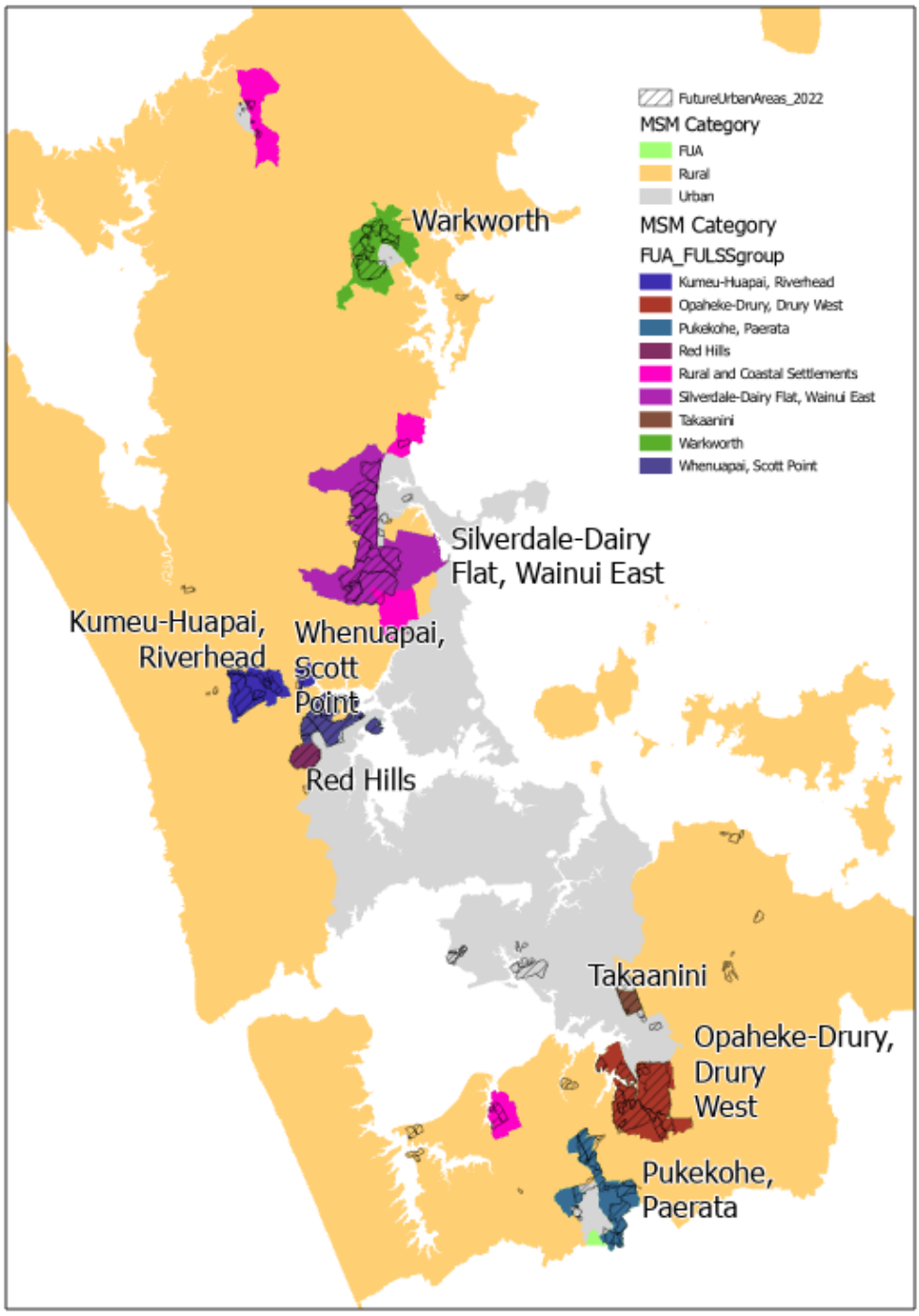


Figure 12: MSM Zone based FUA clusters (data area proxies) overlaid with FULSS Areas (study areas).

Figure 13 below provides the gross data for each cluster. The Proportion of FUA table shows how each FUA cluster performs for each variable relative to the total of all FUAs (as a percentage), and the final table converts this into a ranking for each variable.

Figure 14 provides VKT and CO_2e normalised to Households and Employment (and a combination) for both origin and destination trips. These figures have a similar format to those used for the area classifications above.

Note that the ranking is consistently applied from 1 = 'best' performing to 9 = 'worst' performing. The ordinality of the variable (whether a high or a low figure is 'best') is accounted for by utilising ascending or descending rank approaches[16].

[16] Depending on the particular variable, a lower value may be 'best', while larger numbers are (relatively) 'worse'. These variables are ranked in Ascending order (Smallest to largest). For example, the gross data in Figure 10 shows that estimated total VKT by car (4th column) from the FUA clusters range from around 15,000 in Takaanini to over a million in Silverdale-Dairy Flat/Wainui East and Opaheke-Drury/Drury West, hence their rankings as 1 (best) and 8/9 (worst) respectively. For other variables, larger numbers are considered good (i.e. population, HH and employment), and are ranked in Descending order (largest to smallest).For these three variables, FUAs with the higher population, household and employment numbers are ranked best (e.g. Opaheke-Drury with c. 62,000 is ranked 1 versus Takaanini with 975 population ranked 9).

Gross Data

FUA Cluster	Population	Households	Employment	VKT Car 24hr by Origin	CO2e Car 24hr by Origin	VKT HCV 24hr by Origin	CO2e HCV 24hr by Origin	VKT Car 24hr by Dest	CO2e Car 24hr by Dest	VKT HCV 24hr by Dest	CO2e HCV 24hr by Dest
Kumeu-Huapai, Riverhead	21652	9172	4890	458771	29214	51063	28759	454762	28993	43783	24830
Opaheke-Drury, Drury West	62731	24563	15251	1156151	76700	61415	36876	1144120	75282	58232	34859
Pukekohe, Paerata	32386	12464	4619	536860	34667	50383	28520	499088	32057	32562	18475
Red Hills	17455	7371	1486	261800	17074	1610	902	249890	16298	2331	1299
Rural and Coastal Settlements	11504	4574	1971	266978	17049	16179	9141	247954	15818	15279	8821
Silverdale-Dairy Flat, Wainui East	41798	15698	14106	1065693	69580	64569	36823	1019153	66756	64226	36658
Takaanini	975	373	264	15760	1042	954	585	16059	1056	1158	711
Warkworth	14567	6655	4791	355767	23358	45931	25738	377860	24830	43280	24279
Whenuapai, Scott Point	44476	17467	11166	855911	55540	80015	45215	840581	54575	84716	47974
Grand Total	247653	98380	58614	4977110	324441	372340	212682	4852840	315878	345762	198013

as a Proportion of total FUA Clusters

FUA Cluster	Sum of Pop	Sum of HH	Sum of Emp	Sum of VKT_Car_24hr_by_Orig	Sum of CO2e_Car_24hr_by_Orig	Sum of VKT_HCV_24hr_by_Orig	Sum of CO2e_HCV_24hr_by_Orig	Sum of VKT_Car_24hr_by_Dest	Sum of CO2e_Car_24hr_by_Dest	Sum of VKT_HCV_24hr_by_Dest	Sum of CO2e_HCV_24hr_by_Dest
Kumeu-Huapai, Riverhead	9%	9%	8%	9%	9%	14%	14%	9%	9%	13%	13%
Opaheke-Drury, Drury West	25%	25%	26%	23%	24%	16%	17%	24%	24%	17%	18%
Pukekohe, Paerata	13%	13%	8%	11%	11%	14%	13%	10%	10%	9%	9%
Red Hills	7%	7%	3%	5%	5%	0%	0%	5%	5%	1%	1%
Rural and Coastal Settlements	5%	5%	3%	5%	5%	4%	4%	5%	5%	4%	4%
Silverdale-Dairy Flat, Wainui East	17%	16%	24%	21%	21%	17%	17%	21%	21%	19%	19%
Takaanini	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Warkworth	6%	7%	8%	7%	7%	12%	12%	8%	8%	13%	12%
Whenuapai, Scott Point	18%	18%	19%	17%	17%	21%	21%	17%	17%	25%	24%

0 = Decending, 1 = Ascending

Clusters Rank Position	0	0	0	1	1	1	1	1	1	1	1

FUA Cluster	Sum of Pop	Sum of HH	Sum of Emp	Sum of VKT_Car_24hr_by_Orig	Sum of CO2e_Car_24hr_by_Orig	Sum of VKT_HCV_24hr_by_Orig	Sum of CO2e_HCV_24hr_by_Orig	Sum of VKT_Car_24hr_by_Dest	Sum of CO2e_Car_24hr_by_Dest	Sum of VKT_HCV_24hr_by_Dest	Sum of CO2e_HCV_24hr_by_Dest
Kumeu-Huapai, Riverhead	5	5	4	5	5	6	6	5	5	6	6
Opaheke-Drury, Drury West	1	1	1	9	9	7	8	9	9	7	7
Pukekohe, Paerata	4	4	6	6	6	5	5	6	6	4	4
Red Hills	6	6	8	2	3	2	2	3	3	2	2
Rural and Coastal Settlements	8	8	7	3	2	3	3	2	2	3	3
Silverdale-Dairy Flat, Wainui East	3	3	2	8	8	8	7	8	8	8	8
Takaanini	9	9	9	1	1	1	1	1	1	1	1
Warkworth	7	7	5	4	4	4	4	4	4	5	5
Whenuapai, Scott Point	2	2	3	7	7	9	9	7	7	9	9

Figure 13: FUA at Cluster Level – Raw Data, Proportion of total FUA and Rank (note ascending vs descending depending on Variable)

Normalised Data

FUA Cluster	VKT per Car per HH Origin	CO2 per Car per HH Origin	VKT per Car per HH+Empl *0.5 Origin	CO2 per Car per HH+Empl *0.5 Origin	VKT per HCV per Emp Dest	CO2 per HCV per Emp Dest	VKT per HCV per HH+Empl *0.5 Dest	CO2 per HCV per HH+Empl *0.5 Dest	Car Origin/Dest VKT Ratio	Car OD CO2 Ratio	HCV OD VKT Ratio	HCV OD CO2 Ratio
Kumeu-Huapai, Riverhead	50.02	3.19	39.49	2.51	8.95	5.08	3.77	2.50	1.01	1.01	1.17	1.16
Opaheke-Drury, Drury West	47.07	3.12	35.92	2.38	3.82	2.29	1.81	2.34	1.01	1.02	1.05	1.06
Pukekohe, Paerata	43.07	2.78	36.34	2.35	7.05	4.00	2.20	2.17	1.08	1.08	1.55	1.54
Red Hills	35.52	2.32	32.27	2.10	1.57	0.87	0.29	2.01	1.05	1.05	0.69	0.69
Rural and Coastal Settlements	58.37	3.73	48.02	3.07	7.75	4.48	2.75	2.85	1.08	1.08	1.06	1.04
Silverdale-Dairy Flat, Wainui East	67.89	4.43	46.84	3.06	4.55	2.60	2.82	2.93	1.05	1.04	1.01	1.00
Takaanini	42.25	2.79	31.21	2.06	4.39	2.69	2.29	2.09	0.98	0.99	0.82	0.82
Warkworth	53.46	3.51	39.31	2.58	9.03	5.07	4.78	2.74	0.94	0.94	1.06	1.06
Whenuapai, Scott Point	49.00	3.18	37.13	2.41	7.59	4.30	3.68	2.37	1.02	1.02	0.94	0.94
Grand Total	50.59	3.30	38.98	2.54	5.90	3.38	2.71	2.47	1.03	1.03	1.08	1.07

as a Proportion of total FUA Clusters

FUA Cluster	VKT per Car per HH Origin	CO2 per Car per HH Origin	VKT per Car per HH+Empl *0.5 Origin	CO2 per Car per HH+Empl *0.5 Origin	VKT per HCV per Emp Dest	CO2 per HCV per Emp Dest	VKT per HCV per HH+Empl *0.5 Dest	CO2 per HCV per HH+Empl *0.5 Dest	Car Origin/Dest VKT Ratio	Car OD CO2 Ratio	HCV OD VKT Ratio	HCV OD CO2 Ratio
Kumeu-Huapai, Riverhead	99%	97%	101%	99%	152%	150%	139%	101%	98%	98%	108%	108%
Opaheke-Drury, Drury West	93%	95%	92%	94%	65%	68%	67%	95%	99%	99%	98%	98%
Pukekohe, Paerata	85%	84%	93%	92%	120%	118%	81%	88%	105%	105%	144%	144%
Red Hills	70%	70%	83%	83%	27%	26%	11%	81%	102%	102%	64%	65%
Rural and Coastal Settlements	115%	113%	123%	121%	131%	132%	101%	115%	105%	105%	98%	96%
Silverdale-Dairy Flat, Wainui East	134%	134%	120%	120%	77%	77%	104%	119%	102%	101%	93%	94%
Takaanini	84%	85%	80%	81%	74%	80%	85%	85%	96%	96%	77%	77%
Warkworth	106%	106%	101%	102%	153%	150%	177%	111%	92%	92%	99%	99%
Whenuapai, Scott Point	97%	96%	95%	95%	129%	127%	136%	96%	99%	99%	88%	88%

0 = Decending, 1 = Ascending

Clusters Rank Position	1	1	1	1	1	1	1	1	0	0	0	0

FUA Cluster	**VKT per Car per HH Origin**	**CO2 per Car per HH Origin**	**VKT per Car per HH+Empl *0.5 Origin**	**CO2 per Car per HH+Empl *0.5 Origin**	**VKT per HCV per Emp Dest**	**CO2 per HCV per Emp Dest**	**VKT per HCV per HH+Empl *0.5 Dest**	**CO2 per HCV per HH+Empl *0.5 Dest**	Car Origin/Dest VKT Ratio	Car OD CO2 Ratio	HCV OD VKT Ratio	HCV OD CO2 Ratio
Kumeu-Huapai, Riverhead	**6**	**6**	**7**	**6**	**8**	**9**	**8**	**6**	7	7	2	2
Opaheke-Drury, Drury West	**4**	**4**	**3**	**4**	**2**	**2**	**2**	**4**	6	5	5	4
Pukekohe, Paerata	**3**	**2**	**4**	**3**	**5**	**5**	**3**	**3**	2	1	1	1
Red Hills	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**1**	3	3	9	9
Rural and Coastal Settlements	**8**	**8**	**9**	**9**	**7**	**7**	**5**	**8**	1	2	4	5
Silverdale-Dairy Flat, Wainui East	**9**	**9**	**8**	**8**	**4**	**3**	**6**	**9**	4	4	6	6
Takaanini	**2**	**3**	**1**	**1**	**3**	**4**	**4**	**2**	8	8	8	8
Warkworth	**7**	**7**	**6**	**7**	**9**	**8**	**9**	**7**	9	9	3	3
Whenuapai, Scott Point	**5**	**5**	**5**	**5**	**6**	**6**	**7**	**5**	5	6	7	7

*Figure 14: FUA at Cluster Level – **Normalised** and other derived values, proportion and derived Rank (note ascending vs descending rank order depending on variable).*

Overall Rank at Group Level

Figure 15 shows an overall normalised rank for each FUA (2nd column) based on summing the ranks of the normalised variables (shown in Figure 14 above). A rank showing the result with all variables from the model is also shown (1st column) and this is graphically presented in Figure 16. As can be seen, the inclusion of all variables versus only considering normalised variables does affect the ranking order slightly, but does not appear to create significant inversions (i.e. making worst performers best).

The FUAs ranked 1 to 4 perform the best in terms of VKT and CO_2e overall, it is notable that they are all in the south apart from Red Hills which is in the northwest. The FUAs ranked 5 to 9 perform worse than the other FUAs as they are estimated to have higher VKT and CO_2e overall and are those

located in the northwest, north and the rural and coastal settlements. This largely reflects their distance from both existing and planned PT, their generally greater distance from the CBD, as well as the presence of fewer employment opportunities and/or services and amenities, hence needing to travel longer distances, which is especially true for the rural and coastal settlements, including many that are not explicitly included in this assessment.

Rank Position		
FUA Cluster	Overall ALL Variables Rank	Overall Normalised Variables Only Rank
Opaheke-Drury, Drury West	4	1
Red Hills	1	2
Pukekohe, Paerata	3	3
Takaanini	2	4
Whenuapai, Scott Point	8	5
Silverdale-Dairy Flat, Wainui East	9	6
Kumeu-Huapai, Riverhead	6	7
Warkworth	7	8
Rural and Coastal Settlements	5	9

Figure 15: Overall Rank position of FUA Groups

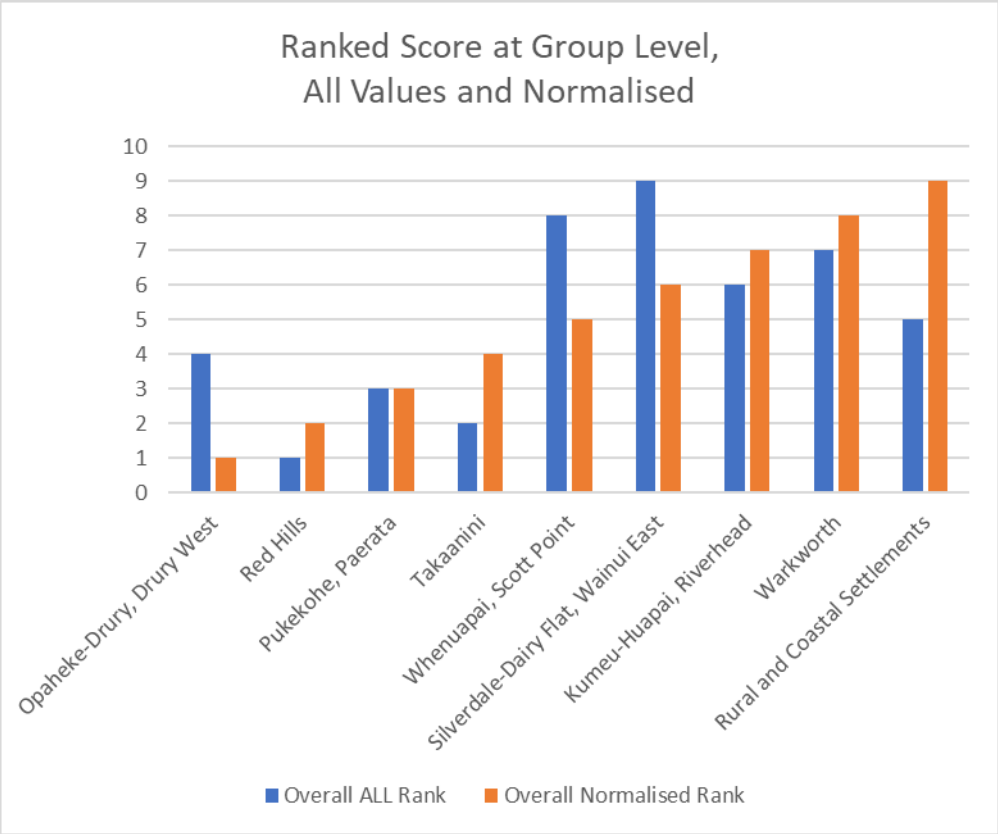


Figure 16: Graphical representation of Figure 15 above.

Appendix 1: Future Urban Area Classified MSM Zones

Zone	MSM_Local_Board	MSM_Category	MSM_Town/MetroCentre1	MSM_RTN / FTN	MSM_Area Classification	MSM_Business Area	MSM_Area notes	_buffer_label	_buffer_id	FUA_Area	FUA_Area_Ha	FUA_Regional_A	FUA_FULSSgroup	FUA_FUZone2022	_FUA_intersectcount	SP_PlanTitle	SP_YearAdopte	_SP_intersectcount	CO2e_Car_Orig_perHH	CO2e_Car_Dest_perHH	CO2e_Car_Orig_perHHplusEmpldiv2	CO2e_Car_Dest_perHHplusEmpldiv2	CO2e_Car_24hr_by_Dest	CO2e_Car_24hr_by_Orig	CO2e_HCV_24hr_by_Dest	CO2e_HCV_24hr_by_Orig	Emp	HH	Pop	VKT_Car_24hr_by_Dest	VKT_Car_24hr_by_Orig	VKT_HCV_24hr_by_Dest	VKT_HCV_24hr_by_Orig
3	Rodney	FUA	Rural Settlement		Rural settlement		Wellsford	67km to 68km	67	Wellsford	15.64264	North	Rural and Coastal Settlements	FUZ	3			0	2.729242	2.855596	2.4192	2.5312	791	756	1028	1218	71	277	622	12349	11896	1841	2204
4	Rodney	FUA	Wellsford Town Centre		Rural settlement		Wellsford	62km to 63km	62	Wellsford	6.234634	North	Rural and Coastal Settlements	FUZ	3			0	12.54808	13.65385	4.788991	5.211009	1420	1305	1686	1754	337	104	245	22172	20429	3039	3166
9	Rodney	FUA			Rural node		Warkworth North East	51km to 52km	51	Warkworth North	95.93764	North	Warkworth	Live Zone	3	Warkworth Structure Plan	0	1	2.345521	2.394881	2.103279	2.147541	1310	1283	1938	2510	126	547	1031	20429	20068	3488	4524
10	Rodney	FUA			Rural node		Warkworth North- PC 25	51km to 52km	51	Warkworth North	10.99918	North	Warkworth	FUZ	4	Warkworth Structure Plan	0	1	2.641047	2.734797	2.22404	2.302987	3238	3127	3308	3974	444	1184	2649	48771	47005	5779	6952
11	Rodney	FUA			Rural node		Warkworth North	53km to 54km	53	Warkworth North	7.260304	North	Warkworth	FUZ	7	Warkworth Structure Plan	0	1	13.8459	15.12459	3.581849	3.912638	4613	4223	9460	11270	1748	305	650	71645	65668	17147	20345
12	Rodney	FUA			Future Urban Area		Warkworth North	50km to 51km	50	Warkworth North	93.27102	North	Warkworth	Live Zone	9	Warkworth Structure Plan	0	1	4.129288	4.712401	2.713481	3.096662	3572	3130	4804	5052	791	758	1589	53621	46948	8443	8894
13	Rodney	FUA			Rural node		Warkworth North East	50km to 51km	50	Warkworth North	4.492315	North	Warkworth	FUZ	4	Warkworth Structure Plan	0	1	3.057692	3.125	2.668531	2.727273	975	954	193	277	91	312	659	14973	14735	335	490
14	Rodney	FUA			Rural node		Warkworth South	47km to 48km	47	Warkworth South	420.2119	North	Warkworth	FUZ	3	Warkworth Structure Plan	0	1	2.686798	2.752809	2.398746	2.45768	3920	3826	1118	617	342	1424	3204	60326	58805	1996	1113
15	Rodney	FUA			Rural node		Warkworth South	48km to 49km	48	Warkworth South	420.2119	North	Warkworth	FUZ	4	Warkworth Structure Plan	0	1	3.207059	3.389176	2.478632	2.619385	7202	6815	3458	2038	1249	2125	4785	108095	102538	6092	3613
18	Rodney	FUA			Future Urban Area		Hatfields Beach	33km to 34km	33	Hatfields Beach	0.874228	North	Rural and Coastal Settlements	Live Zone	2			0	2.893601	2.742483	2.549592	2.41644	3557	3753	2205	2799	350	1297	2947	54968	58366	3876	5065
31	Rodney	FUA			Future Urban Area		Upper Orewa	31km to 32km	31	Wainui East	221.7928	North	Silverdale-Dairy Flat, Wainui East	FUZ	2			0	3.612588	3.334238	3.272549	3.020398	6145	6658	2380	1975	383	1843	4843	94942	103214	4240	3557
32	Rodney	FUA			Future Urban Area		Wainui East	31km to 32km	31	Wainui East	221.7928	North	Silverdale-Dairy Flat, Wainui East	FUZ	1			0	3.678926	3.409543	3.297105	3.055679	3430	3701	1705	1451	233	1006	2634	53158	57652	3032	2616
33	Rodney	FUA			Future Urban Area		Wainui East Live Zone	28km to 29km	28	Wainui East	221.7928	North	Silverdale-Dairy Flat, Wainui East	FUZ	5	Silverdale West Dairy Flat Structure Plan	0	1	3.173604	3.002134	2.590302	2.450348	8439	8921	504	160	1266	2811	7275	127385	135224	863	246
34	Rodney	FUA		Dairy Flat Rapid Transit	RTN Catchment		Wainui East	25km to 26km	25	Silverdale West	240.0243	North	Silverdale-Dairy Flat, Wainui East	FUZ	3	Silverdale West Dairy Flat Structure Plan	0	1	376.5	391.7083	4.266289	4.438621	9401	9036	1179	373	4188	24	55	143158	137630	2045	628
36	Hibiscus and Bays	FUA		Dairy Flat Rapid Transit	RTN Catchment		Dairy Flat East	21km to 22km	21	Dairy Flat East	279.1377	North	Silverdale-Dairy Flat, Wainui East	FUZ	1			0	3.850985	3.491995	3.44763	3.12624	5671	6254	3093	2328	380	1624	4163	86123	95187	5547	4184

Zone	MSM_Local_Board	MSM_Category	MSM_Town/MetroCentre1	MSM_RTN / FTN	MSM_Area Classification	MSM_Business Area	MSM_Area notes	_buffer_label	_buffer_id	FUA_Area	FUA_Area_Ha	FUA_Regional_A	FUA_FULSSgroup	FUA_FUZorLive2022	_FUA_intersectcount	SP_PlanTitle	SP_YearAdopte	_SP_intersectcount	CO2e_Car_Orig_perHH	CO2e_Car_Dest_perHH	CO2e_Car_Orig_perHplusEmpldiv2	CO2e_Car_Dest_perHplusEmpldiv2	CO2e_Car_24hr_by_Dest	CO2e_Car_24hr_by_Orig	CO2e_HCV_24hr_by_Dest	CO2e_HCV_24hr_by_Orig	Emp	HH	Pop	VKT_Car_24hr_by_Dest	VKT_Car_24hr_by_Orig	VKT_HCV_24hr_by_Dest	VKT_HCV_24hr_by_Orig
39	Rodney	FUA			Future Urban Area		Wainui East	26km to 27km	26	Wainui East	331.6205	North	Silverdale-Dairy Flat, Wainui East	FUZ	1	Silverdale West Dairy Flat Structure Plan	0	1	3.365495	3.235487	2.564486	2.465421	3957	4116	2625	3034	764	1223	3047	59621	62290	4568	5340
40	Rodney	FUA		Dairy Flat Rapid Transit	RTN Catchment		Silverdale	22km to 23km	22	Silverdale West	240.0243	North	Silverdale-Dairy Flat, Wainui East	FUZ	3	Silverdale West Dairy Flat Structure Plan	0	1	9.957746	9.850704	3.517413	3.479602	3497	3535	13526	12522	1300	355	985	52502	53135	23843	21684
41	Rodney	FUA			Future Urban Area		Dairy Flat	22km to 23km	22	Dairy Flat	881.6946	North	Silverdale-Dairy Flat, Wainui East	FUZ	2	Silverdale West Dairy Flat Structure Plan	0	1	2.997021	2.713009	2.691039	2.436023	2732	3018	568	422	229	1007	2767	41400	45895	998	747
42	Rodney	FUA			Future Urban Area		Silverdale Dairy Flat	23km to 24km	23	Dairy Flat	2.390766	North	Silverdale-Dairy Flat, Wainui East	FUZ	4	Silverdale West Dairy Flat Structure Plan	0	1	18.76687	19.11861	3.706381	3.775848	9349	9177	7613	9889	3974	489	1371	142464	140225	13215	17557
43	Rodney	FUA			Future Urban Area		Dairy Flat	23km to 24km	23	Dairy Flat	609.5139	North	Silverdale-Dairy Flat, Wainui East	FUZ	1			0	3.865169	3.565543	3.356098	3.095935	952	1032	217	288	81	267	731	14820	16118	374	503
44	Rodney	FUA			Future Urban Area		Dairy Flat	22km to 23km	22	Dairy Flat	881.6946	North	Silverdale-Dairy Flat, Wainui East	FUZ	4			0	3.425373	3.152452	3.058544	2.81485	2957	3213	725	988	225	938	2581	46126	50280	1249	1708
45	Rodney	FUA			Future Urban Area		Dairy Flat	20km to 21km	20	Dairy Flat	881.6946	North	Silverdale-Dairy Flat, Wainui East	FUZ	2			0	2.407452	2.283654	2.142819	2.032629	3800	4006	768	1078	411	1664	4629	58178	61695	1262	1821
46	Rodney	FUA			Future Urban Area		Dairy Flat	20km to 21km	20	Dairy Flat	881.6946	North	Silverdale-Dairy Flat, Wainui East	FUZ	3			0	2.825092	2.626073	2.48401	2.309019	6426	6913	1755	2315	672	2447	6717	99276	107148	2990	3978
69	Rodney	FUA	Rural Settlement		Rural settlement		Albany Village FUA	17km to 18km	17	Albany Village	4.748653	North	Rural and Coastal Settlements	Live Zone	4			0	4.087894	3.963516	2.960961	2.870871	2390	2465	1833	1990	459	603	1547	35341	36532	2790	3189
142	Rodney	FUA			Future Urban Area		Kumeu	23km to 24km	23	Kumeu	567.3581	North-West	Kumeu-Huapai, Riverhead	FUZ	1			0	2.648	2.593778	2.343824	2.29583	2918	2979	243	172	292	1125	2579	45431	46478	442	288
143	Rodney	FUA			Future Urban Area		Huapai	24km to 25km	24	Kumeu	83.36499	North-West	Kumeu-Huapai, Riverhead	FUZ	2			0	2.755474	2.685219	2.478457	2.415265	2943	3020	171	133	245	1096	2598	46918	48222	309	231
144	Rodney	FUA	Kumeu-Huapai Town Centre		Metro and town centre		Huapai	22km to 23km	22	Huapai	43.86921	North-West	Kumeu-Huapai, Riverhead	FUZ	4			0	2.205882	2.179245	2.011131	1.986845	3927	3975	6266	6391	349	1802	4005	61662	62494	11290	11434
145	Rodney	FUA	Kumeu-Huapai Town Centre	Kumeu Town Centre Station	Metro and town centre		Huapai	20km to 21km	20	Huapai	43.86921	North-West	Kumeu-Huapai, Riverhead	FUZ	7			0	2.579323	2.572787	2.159164	2.153693	4330	4341	3329	3686	655	1683	3992	67080	67301	5873	6576
147	Rodney	FUA	Rural Settlement		Rural settlement		Riverhead	18km to 19km	18	Riverhead	8.144364	North-West	Kumeu-Huapai, Riverhead	FUZ	2			0	2.946873	2.876591	2.518921	2.458846	5198	5325	3028	1887	614	1807	4737	81684	83901	5325	3408
151	Rodney	FUA			Future Urban Area		Kumeu	22km to 23km	22	Kumeu	567.3581	North-West	Kumeu-Huapai, Riverhead	FUZ	1			0	3.152648	3.077882	2.808511	2.741906	2964	3036	1481	2349	236	963	2188	47046	48236	2706	4302
152	Rodney	FUA	Kumeu-Huapai Town Centre	Kumeu Town Centre Station	Metro and town centre		Kumeu	21km to 22km	21	Kumeu	69.31368	North-West	Kumeu-Huapai, Riverhead	Live Zone	2			0	9.393678	9.645115	3.360576	3.450527	6713	6538	10312	14141	2499	696	1553	104941	102139	17838	24824
158	Henderson-Massey	FUA			Future Urban Area		Red Hills live zone	16km to 17km	16	Red Hills	590.4786	North-West	Red Hills	Live Zone	1			0	2.576181	2.426712	2.354263	2.217669	5033	5343	54	46	391	2074	4873	78578	83593	98	82
159	Henderson-Massey	FUA			Future Urban Area		Red Hills live zone	15km to 16km	15	Red Hills	590.4786	North-West	Red Hills	Live Zone	1			0	2.314495	2.21609	2.114182	2.024294	6666	6962	67	55	570	3008	7085	100796	105016	118	95
160	Henderson-Massey	FUA			Future Urban Area		Red Hills live zone	15km to 16km	15	Red Hills	590.4786	North-West	Red Hills	Live Zone	1			0	2.101167	2.062257	1.856734	1.82235	1590	1620	712	459	203	771	1812	24263	24726	1277	821
161	Henderson-Massey	FUA			Future Urban Area		Red Hills live zone	15km to 16km	15	Red Hills	590.4786	North-West	Red Hills	Live Zone	1			0	2.07444	1.982213	1.875521	1.792138	3009	3149	466	342	322	1518	3685	46253	48465	838	612
163	Henderson-Massey	FUA		Westgate North RT Station	RTN Catchment		Red Hills North	16km to 17km	16	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	3	Whenuapai Structure Plan	2016	1	9.168196	9.559633	2.873023	2.995688	3126	2998	25951	21123	1433	327	813	48428	46525	45679	37447
165	Upper Harbour	FUA		Westgate North RT Station / Westgate RT Station / Trig Road RT Station	RTN Catchment		Whenuapai Stage 2 - incl business area	14km to 15km	14	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	2	Whenuapai Structure Plan	2016	1	7.481405	7.775826	2.693695	2.799702	7527	7242	6052	4724	3441	968	2400	115063	110630	10493	8271
166	Upper Harbour	FUA		Trig Road RT Station / Hobsonville RT Station	RTN Catchment		Whenuapai Stage 1 - incl business area	13km to 14km	13	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1	Whenuapai Structure Plan	2016	1	16.59751	17.48548	2.953119	3.111111	4214	4000	786	687	2227	241	575	64068	60705	1338	1167
168	Upper Harbour	FUA		Westgate North RT Station	RTN Catchment		Whenuapai Stage 2	16km to 17km	16	Whenuapai	31.42703	North-West	Whenuapai, Scott Point	Live Zone	3	Whenuapai Structure Plan	2016	1	2.298632	2.233283	2.088367	2.028996	5878	6050	2489	1820	530	2632	6573	91141	94061	4526	3243
169	Upper Harbour	FUA			Future Urban Area		Whenuapai Stage 2	15km to 16km	15	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1	Whenuapai Structure Plan	2016	1	2.542183	2.423841	2.291164	2.184508	8418	8829	3399	2221	761	3473	8609	130318	136322	6085	3843
170	Upper Harbour	FUA			Future Urban Area		Whenuapai Stage 2	14km to 15km	14	Whenuapai	55.37415	North-West	Whenuapai, Scott Point	Live Zone	2	Whenuapai Structure Plan	2016	1	2.631175	2.52385	2.391792	2.294232	2963	3089	644	475	235	1174	2916	46222	48115	1151	826

Zone	MSM_Local_Board	MSM_Category	MSM_Town/MetroCentre1	MSM_RTN / FTN	MSM_Area Classification	MSM_Business Area	MSM_Area notes	_buffer_label	_buffer_id	FUA_Area	FUA_Area_Ha	FUA_Regional_A	FUA_FULSSgroup	FUA_FUZorLive2022	_FUA_intersectcount	SP_PlanTitle	SP_YearAdopte	_SP_intersectcount	CO2e_Car_Orig_perHH	CO2e_Car_Dest_perHH	CO2e_Car_Orig_perHplusEmpldiv2	CO2e_Car_Dest_perHplusEmpldiv2	CO2e_Car_24hr_by_Dest	CO2e_Car_24hr_by_Orig	CO2e_HCV_24hr_by_Dest	CO2e_HCV_24hr_by_Orig	Emp	HH	Pop	VKT_Car_24hr_by_Dest	VKT_Car_24hr_by_Orig	VKT_HCV_24hr_by_Dest	VKT_HCV_24hr_by_Orig
171	Upper Harbour	FUA			Future Urban Area		Whenuapai Stage 2	13km to 14km	13	Whenuapai	55.37415	North-West	Whenuapai, Scott Point	Live Zone	5	Whenuapai Structure Plan	2016	1	2.668823	2.543338	2.418523	2.304807	3932	4126	2836	2118	320	1546	3832	61195	64195	5093	3694
172	Upper Harbour	FUA			Future Urban Area		Whenuapai Live Zone / SHA	14km to 15km	14	Whenuapai	16.81433	North-West	Whenuapai, Scott Point	Live Zone	3	Whenuapai Structure Plan	2016	1	2.671736	2.624842	2.291304	2.251087	2071	2108	1315	5207	262	789	2006	32127	32588	2363	9275
174	Upper Harbour	FUA		Westgate RT Station / Trig Road RT Station	RTN Catchment		Whenuapai Stage 2	13km to 14km	13	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1	Whenuapai Structure Plan	2016	1	2.202163	2.119887	1.979713	1.905748	4509	4684	1792	3173	478	2127	5505	68355	71263	3195	5680
176	Upper Harbour	FUA		Hobsonville RT Station	RTN Catchment		Whenuapai Stage 1	13km to 14km	13	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1	Whenuapai Structure Plan	2016	1	5	4.980769	2.903001	2.891835	2072	2080	21	92	601	416	1119	32007	32080	37	159
177	Upper Harbour	FUA		Hobsonville RT Station / Hobsonville Pt RT Station	RTN Catchment		Whenuapai Stage 1	12km to 13km	12	Whenuapai	3.608257	North-West	Whenuapai, Scott Point	FUZ	2	Whenuapai Structure Plan	2016	1	2.779476	2.640466	2.504262	2.379016	3628	3819	19	73	302	1374	3692	55688	58992	34	126
180	Upper Harbour	FUA		Hobsonville Pt RT Station	RTN Catchment		Hobsonville /scotts point	10km to 11km	10	Whenuapai-Scotts Point	151.9242	North-West	Whenuapai, Scott Point	Live Zone	1			0	2.714583	2.59875	2.423735	2.320313	6237	6515	2670	3502	576	2400	6436	95969	100435	4722	6284
534	Franklin	FUA			Future Urban Area		Takaanini	24km to 25km	24	Takanini	463.1856	South	Takaanini	FUZ	1			0	3.507813	3.679688	2.169082	2.275362	471	449	289	223	158	128	329	7145	6797	464	360
535	Franklin	FUA			Future Urban Area		Takaanini	25km to 26km	25	Takanini	463.1856	South	Takaanini	FUZ	1			0	2.420408	2.387755	1.989933	1.963087	585	593	422	362	106	245	646	8914	8963	694	594
548	Papakura	FUA			Future Urban Area	Hingaia Road	Hingaia	28km to 29km	28	Hingaia	78.72145	South	Opaheke-Drury, Drury West	Live Zone	1			0	2.961097	2.874768	2.59102	2.515481	7759	7992	3802	2382	771	2699	7018	116776	117918	6394	3755
549	Papakura	FUA			Future Urban Area	Hingaia Road	Hingaia	29km to 30km	29	Hingaia	78.72145	South	Opaheke-Drury, Drury West	Live Zone	2			0	2.672269	2.537169	2.426412	2.303742	7850	8268	1535	1765	627	3094	8258	116115	120646	2533	2832
550	Papakura	FUA		Drury Train Station	RTN Catchment	Drury Industrial	Drury Opaheke + existing town centre	31km to 32km	31	Opaheke/Drury	4.628708	South	Opaheke-Drury, Drury West	Live Zone	6	Drury Structure Plan		0	3.385409	3.417756	2.256422	2.277982	4966	4919	7858	7540	1454	1453	3620	74327	73278	13106	12416
551	Franklin	FUA			Future Urban Area	Boundary Road Papakura expansion	Drury Opaheke - includes expansion of Boundary road business area under expansive	32km to 33km	32	Opaheke/Drury	1104.048	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan		0	3.634639	3.591187	2.467899	2.438396	5868	5939	195	167	1545	1634	4422	88531	89271	306	260
554	Franklin	FUA		Drury Train Station	RTN Catchment		Drury Opaheke South	34km to 35km	34	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	3	Drury Structure Plan		0	2.680851	2.656535	2.08326	2.064364	6992	7056	10144	11075	1510	2632	6614	106119	106759	16898	18453
555	Franklin	FUA		Drury Train Station	RTN Catchment		Drury Opaheke	33km to 34km	33	Opaheke/Drury	1104.048	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan		0	2.223949	2.148995	1.985717	1.918792	4702	4866	2330	2609	525	2188	5524	70776	72601	3860	4257
556	Franklin	FUA			Future Urban Area	Drury South	Drury South Live Zoned	36km to 37km	36	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	4	Drury Structure Plan		0	15.51963	16.39267	3.449309	3.643345	12524	11857	6034	8779	5347	764	1992	192022	181374	9979	14946
557	Franklin	FUA		Drury West Train Station	RTN Catchment		Drury West Stage 2	35km to 36km	35	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan		0	2.54608	2.396149	2.117849	1.993135	1742	1851	424	556	294	727	1739	27249	28768	735	964
558	Franklin	FUA			Future Urban Area		Drury West Stage 2	35km to 36km	35	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan		0	20.86667	21.58667	3.762019	3.891827	1619	1565	521	697	682	75	114	25363	24489	917	1233
559	Franklin	FUA		Drury West Train Station	RTN Catchment		Drury West Stage 2	34km to 35km	34	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	3	Drury Structure Plan		0	2.376193	2.209433	1.97942	1.840505	3935	4232	287	273	714	1781	4577	61009	65098	485	458
560	Franklin	FUA		Drury West Train Station	RTN Catchment		Drury West Stage 2	33km to 34km	33	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan		0	2.384661	2.188201	2.102471	1.929259	3709	4042	247	214	455	1695	4460	57569	62291	422	363
561	Franklin	FUA		Drury West Train Station	RTN Catchment		Drury - Auranga	32km to 33km	32	Drury West	34.77269	South	Opaheke-Drury, Drury West	Live Zone	3	Drury Structure Plan		0	2.455145	2.362138	2.205592	2.122039	6451	6705	727	412	618	2731	6752	99321	102190	1294	759
562	Franklin	FUA		Drury West Train Station	RTN Catchment		Drury West Stage 1	32km to 33km	32	Drury West	56.02289	South	Opaheke-Drury, Drury West	Live Zone	3	Drury Structure Plan		0	2.397411	2.31877	2.150675	2.080128	7165	7408	755	407	709	3090	7641	108943	111468	1303	719
567	Franklin	FUA		Paerata Train Station	RTN Catchment		Paerata 1st half decade 1	35km to 36km	35	Paerata	100.5876	South	Pukekohe, Paerata	FUZ	3	Pukekohe - Paerata Structure Plan		0	2.370924	2.157609	2.131949	1.940134	1588	1745	87	169	165	736	1960	25177	27494	146	301
568	Franklin	FUA		Paerata Train Station	RTN Catchment		Paerata live zoned	35km to 36km	35	Paerata	22.41477	South	Pukekohe, Paerata	Live Zone	5	Pukekohe - Paerata Structure Plan		0	2.415185	2.210328	2.156665	1.973736	6463	7062	98	169	701	2924	7717	102488	111304	166	302
571	Franklin	FUA		Paerata Train Station	RTN Catchment		Paerata 1st half decade 1	37km to 38km	37	Pukekohe	367.0225	South	Pukekohe, Paerata	FUZ	2	Pukekohe - Paerata Structure Plan		0	2.682449	2.47601	2.335899	2.15613	3922	4249	4117	6809	470	1584	4388	62181	66964	7374	12207

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574	Franklin	FUA			Future Urban Area		Pukekohe North	39km to 40km	39	Pukekohe	55.22371	South	Pukekohe, Paerata	FUZ	4	Pukekohe - Paerata Structure Plan	0	1	2.392801	2.145853	2.166336	1.94276	6856	7645	8569	11840	668	3195	8269	103702	115039	14877	20455
578	Franklin	FUA		Pukekohe Train Station	RTN Catchment		Pukekohe	41km to 42km	41	Pukekohe	340.7867	South	Pukekohe, Paerata	FUZ	1	Pukekohe - Paerata Structure Plan	0	1	2.747646	2.51177	2.365147	2.162107	5335	5836	2457	4528	687	2124	5255	83820	91057	4451	8233
579	Franklin	FUA			Future Urban Area		Pukekohe South	44km to 45km	44	Pukekohe	340.7867	South	Pukekohe, Paerata	FUZ	3	Pukekohe - Paerata Structure Plan	0	1	5.508368	5.460251	3.035159	3.008646	2610	2633	1705	2932	779	478	1228	40485	40667	3050	5259
580	Franklin	FUA		Pukekohe Train Station	RTN Catchment		Pukekohe South	43km to 44km	43	Pukekohe	340.7867	South	Pukekohe, Paerata	FUZ	2	Pukekohe - Paerata Structure Plan	0	1	3.747788	3.568584	2.773639	2.641015	3226	3388	1097	1789	635	904	2248	48774	51151	1884	3125
583	Franklin	FUA			Future Urban Area		Pukekohe North	39km to 40km	39	Pukekohe	367.0225	South	Pukekohe, Paerata	FUZ	1	Pukekohe - Paerata Structure Plan	0	1	4.063584	3.963391	2.717784	2.650773	2057	2109	345	284	514	519	1321	32461	33184	614	501
587	Franklin	FUA	Rural Settlement		Rural settlement		Kingseat	30km to 31km	30	Kingseat	116.1511	South	Rural and Coastal Settlements	Live Zone	3			0	3.824684	3.340602	3.284644	2.868914	7660	8770	2069	1380	754	2293	6143	123124	139755	3733	2555

Appendix 2: MSM zones NOT identified as future urban areas, that intersect identified future urban areas

Zone	MSM_Local_Board	MSM_Category_REVISED	MSM_Town/MetroCentre1	MSM_RTN / FTN	MSM_Area Classification	MSM_Business Area	MSM_Area notes	_buffer_label	_buffer_id	FUA_Area	FUA_Area_Ha	FUA_Regional_A	FUA_FULSSgroup	FUA_FUZorLive2022	_FUA_intersectcount	SP_PlanTitle	SP_YearAdopte	_SP_intersectcount	CO2e_Car_Orig_perHH	CO2e_Car_Dest_perHH	CO2e_Car_Orig_perHHplusEmpldiv2	CO2e_Car_Dest_perHHplusEmpldiv2	CO2e_Car_24hr_by_Dest	CO2e_Car_24hr_by_Orig	CO2e_HCV_24hr_by_Dest	CO2e_HCV_24hr_by_Orig	Emp	HH	Pop	VKT_Car_24hr_by_Dest	VKT_Car_24hr_by_Orig	VKT_HCV_24hr_by_Dest	VKT_HCV_24hr_by_Orig
2	Rodney	Urban	Wellsford Town Centre		Rural settlement		Wellsford	65km to 66km	65	Wellsford	2.661834	North	Rural and Coastal Settlements	FUZ	4			0	4.726708	5.372671	3.083052	3.504389	2595	2283	3858	4080	515	483	1021	40355	35656	6873	7296
5	Rodney	Rural			Remaining rural			57km to 58km	57	Wellsford	2.661834	North	Rural and Coastal Settlements	FUZ	4	Warkworth Structure Plan	0	1	4.632226	4.774908	3.517982	3.626343	7764	7532	8682	10078	1030	1626	3732	117750	113962	13729	16067
7	Rodney	Rural	Rural Settlement		Rural settlement		Algies Bay / Snells Beach	44km to 45km	44	Algies Bay	38.83146	North	Rural and Coastal Settlements	FUZ	1			0	2.747334	2.843296	2.345332	2.427251	8800	8503	3546	5978	1061	3095	6446	139174	134910	6265	10887
8	Rodney	Urban			Rural node		Warkworth	49km to 50km	49	Warkworth South	420.2119	North	Warkworth	FUZ	2	Warkworth Structure Plan	0	1	3.361365	3.565113	2.32895	2.470118	7419	6995	17595	20892	1845	2081	4515	113220	106713	31204	37069
17	Rodney	Rural	Rural Settlement		Rural settlement		Kaukapakapa	33km to 34km	33	Helensville	35.03783	North-West	Rural and Coastal Settlements	FUZ	3			0	4.567682	4.373096	3.897726	3.731681	15507	16197	4989	5657	1219	3546	8824	231158	240784	7659	8981
24	Hibiscus and Bays	Urban			Remaining urban		Hibiscus Coast	27km to 28km	27	Hibiscus Coast	42.89702	North	Rural and Coastal Settlements	Live Zone	1			0	2.044577	1.970282	1.775102	1.7106	3978	4128	513	1073	613	2019	4312	60654	63088	844	1848
30	Hibiscus and Bays	Urban	Silverdale Town Centre	Hibiscus Coast Bus Station	Metro and town centre		Hibiscus Coast and Silverdale Industrial Area	26km to 27km	26	Hibiscus Coast	58.75387	North	Rural and Coastal Settlements	Live Zone	1			0	16.60448	17.0653	3.62895	3.729664	9147	8900	11121	9291	3833	536	1246	139044	135097	19017	16289
35	Hibiscus and Bays	Urban		Hibiscus Coast Bus Station / Dairy Flat Rapid Transit	RTN Catchment		Hibiscus Coast FUA / Silverdale	25km to 26km	25	Silverdale West	28.37371	North	Silverdale-Dairy Flat, Wainui East	FUZ	2			0	5.024263	5.103986	2.732328	2.775683	2945	2899	701	1664	968	577	1527	45600	44902	1225	3017
37	Hibiscus and Bays	Rural			Remaining rural			25km to 26km	25	Hibiscus Coast	58.75387	North	Rural and Coastal Settlements	Live Zone	1			0	5.320127	5.217116	3.821286	3.747297	3292	3357	4886	3524	495	631	1552	51137	52267	8945	6460
38	Rodney	Rural			Remaining rural			26km to 27km	26	Wainui East	221.7928	North	Silverdale-Dairy Flat, Wainui East	FUZ	4			0	5.354244	5.254613	3.42217	3.358491	1424	1451	6218	5066	306	271	676	21850	22353	10867	8960
68	Upper Harbour	Urban			Urban node		Albany Village FUA	15km to 16km	15	Albany Village	4.748653	North	Rural and Coastal Settlements	Live Zone	1			0	3.48265	3.476341	2.548182	2.543566	2204	2208	8897	7607	465	634	1767	33428	33603	15496	13010
139	Rodney	Rural	Rural Settlement		Rural settlement		Waimauku FUA	27km to 28km	27	Waimauku	19.27573	North-West	Rural and Coastal Settlements	Live Zone	2			0	5.418447	5.34914	4.273736	4.219071	10265	10398	7013	7799	1028	1919	4674	164543	166907	13088	14865
140	Rodney	Rural	Rural Settlement		Rural settlement			26km to 27km	26	Waimauku	19.27573	North-West	Rural and Coastal Settlements	Live Zone	2			0	8.457976	8.564322	4.589111	4.646812	4993	4931	6986	10218	983	583	1571	78109	77251	12347	18585
146	Rodney	Rural			Remaining rural			19km to 20km	19	Riverhead	73.63943	North-West	Kumeu-Huapai, Riverhead	FUZ	1			0	4.063545	3.976589	2.8125	2.752315	1189	1215	6306	3580	266	299	720	18726	19190	11520	6318
157	Henderson-Massey	Urban			Urban node			14km to 15km	14	Red Hills	590.4786	North-West	Red Hills	Live Zone	1			0	10.58824	11.11765	2.647059	2.779412	189	180	150	110	102	17	42	2880	2740	270	198
162	Rodney	Rural			Remaining rural			17km to 18km	17	Red Hills	590.4786	North-West	Red Hills	Live Zone	1			0	7.649351	7.753247	3.245179	3.289256	597	589	375	112	209	77	196	9380	9275	673	199
164	Henderson-Massey	Urban	Massey North Metropolitan Centre	Westgate RT Station	Metro and town centre		Redhills FUA & existing urban #	15km to 16km	15	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	3			0	7.528016	7.642536	2.427272	2.464196	18686	18406	2972	4849	10276	2445	7158	281313	277292	5204	8348
167	Upper Harbour	Urban			Urban Development Areas			12km to 13km	12	Whenuapai	55.37415	North-West	Whenuapai, Scott Point	Live Zone	1	Whenuapai Structure Plan	2016	1	3.026616	2.790875	2.563607	2.363929	734	796	979	671	95	263	652	11448	12413	1768	1180
173	Upper Harbour	Rural			Remaining rural		Whenuapai Airbase	13km to 14km	13	Whenuapai	55.37415	North-West	Whenuapai, Scott Point	Live Zone	3	Whenuapai Structure Plan	2016	1	24.41096	26.65753	3.53221	3.857284	1946	1782	3279	11596	863	73	183	30232	27554	5880	20735
175	Upper Harbour	Urban		Trig Road RT Station / Hobsonville RT Station	Urban node		Whenuapai	12km to 13km	12	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1	Whenuapai Structure Plan	2016	1	7.560656	7.996721	2.728994	2.886391	2439	2306	4647	6364	1080	305	787	37714	35652	8262	11250
178	Upper Harbour	Urban		Hobsonville Point Ferry / Hobsonville Pt RT Station	RTN Catchment		Hobsonville /Scotts point	11km to 12km	11	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1			0	2.651601	2.517891	2.332091	2.214493	2674	2816	1397	1271	291	1062	2669	40916	42992	2450	2207
182	Upper Harbour	Urban		West Harbour Ferry	Urban node			12km to 13km	12	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1			0	2.322208	2.272353	2.024425	1.980963	5515	5636	1298	1105	714	2427	6797	83003	84664	2116	1898
183	Henderson-Massey	Urban			Urban node			13km to 14km	13	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1			0	2.255492	2.199349	1.931707	1.883624	2703	2772	529	239	412	1229	3920	40674	41558	889	407
186	Henderson-Massey	Urban	Westgate Metropolitan Centre	Westgate RT Station / Royal Road RT Station	Metro and town centre			14km to 15km	14	Whenuapai	1058.957	North-West	Whenuapai, Scott Point	FUZ	1			0	5.3968	5.113067	3.328071	3.1531	9587	10119	15340	10645	2331	1875	5056	143991	151386	26990	18225
191	Waitakere Ranges	Rural	Rural Settlement	Swanson Train Station	RTN Catchment		Swanson	16km to 17km	16	Swanson	26.80009	North-West	Rural and Coastal Settlements	Live Zone	1			0	3.382407	3.293519	2.779003	2.705972	3557	3653	1146	455	469	1080	2882	51989	53528	1702	665
450	Franklin	Rural	Rural Settlement		Rural settlement		Maraetai	24km to 25km	24	Maraetai	17.13592	South	Rural and Coastal Settlements	Live Zone	3			0	4.501784	4.54459	3.769039	3.804878	3822	3786	2022	2514	327	841	2026	60671	60199	3451	4366
451	Franklin	Rural	Rural Settlement		Rural settlement		Clevedon and Clevedon Waterways	34km to 35km	34	Clevedon	110.4674	South	Rural and Coastal Settlements	Live Zone	4			0	7.415365	7.290365	5.029438	4.944657	16797	17085	17729	22263	2186	2304	5255	237292	241617	26218	33532

Zone	MSM_Local_Board	MSM_Category_REVISED	MSM_Town/MetroCentre1	MSM_RTN / FTN	MSM_Area Classification	MSM_Business Area	MSM_Area notes	_buffer_label	_buffer_id	FUA_Area	FUA_Area_Ha	FUA_Regional_A	FUA_FULSSgroup	FUA_FUZorLive2022	_FUA_intersectcount	SP_PlanTitle	SP_YearAdopte	_SP_intersectcount	CO2e_Car_Orig_perHH	CO2e_Car_Dest_perHH	CO2e_Car_Orig_perHHplusEmpldiv2	CO2e_Car_Dest_perHHplusEmpldiv2	CO2e_Car_24hr_by_Dest	CO2e_Car_24hr_by_Orig	CO2e_HCV_24hr_by_Dest	CO2e_HCV_24hr_by_Orig	Emp	HH	Pop	VKT_Car_24hr_by_Dest	VKT_Car_24hr_by_Orig	VKT_HCV_24hr_by_Dest	VKT_HCV_24hr_by_Orig
477	Mangere-Otahuhu	Urban		Airport Oaks LR Station	RTN Catchment	Mangere	Includes Oruarangi 1 and part Oruarangi 2 (FULSS) and Ihumatao	15km to 16km	15	Oruarangi	0.5672	South	Rural and Coastal Settlements	Live Zone	10			0	20.43486	26.89541	2.629752	3.461157	14658	11137	4565	6955	7380	545	1742	220025	165211	7446	11352
478	Mangere-Otahuhu	Urban			Urban node	Airport	Airport. Includes part Oruarangi 2	17km to 18km	17	Oruarangi	0.5672	South	Rural and Coastal Settlements	Live Zone	5			0	552.0323	739.9032	2.126763	2.850556	22937	17113	38218	31716	16031	31	85	338026	248656	61011	49074
479	Mangere-Otahuhu	Urban		Airport Oaks LR Station	RTN Catchment			15km to 16km	15	Puhinui	23.68965	South	Puhinui	Live Zone	1			0	1.863727	2.066132	1.591784	1.764656	4124	3720	7611	5704	682	1996	7006	61662	55240	13676	9916
480	Mangere-Otahuhu	Urban			Remaining urban	Tidal Road Manukau		15km to 16km	15	Puhinui	23.68965	South	Puhinui	Live Zone	2			0	3.070258	3.632319	1.656349	1.95957	1551	1311	4057	4339	729	427	1624	22802	19374	6108	6872
509	Otara-Papatoetoe	Urban			Urban node		Manukau - Wiri - Puhinui	18km to 19km	18	Puhinui	370.4366	South	Puhinui	Live Zone	4			0	42.89806	48.67961	3.116558	3.53659	20056	17674	93781	131698	10518	412	1075	292079	254916	146720	202670
510	Manurewa	Urban			Remaining urban			22km to 23km	22	Takanini	2.921257	South	Takaanini	FUZ	3			0	2.931605	2.859611	2.272321	2.216518	3972	4072	1560	1401	806	1389	4221	59678	61166	2493	2257
511	Manurewa	Urban			Remaining urban			22km to 23km	22	Takanini	125.6984	South	Takaanini	FUZ	1			0	3.727413	3.854054	2.889554	2.987728	4991	4827	673	603	751	1295	4045	75497	72362	1081	982
531	Papakura	Urban	Takanini Town Centre	Takaanini Train Station	Metro and town centre		Takanini - existing only	26km to 27km	26	Takanini	19.61052	South	Takaanini	Live Zone	2			0	4.164579	4.091686	2.495479	2.4518	7185	7313	1781	1522	2349	1756	4867	107107	108308	2908	2379
536	Franklin	Urban			Remaining urban		Cosgrave Road	28km to 29km	28	Takanini	56.1737	South	Takaanini	FUZ	1			0	3.30916	3.267176	2.553756	2.521355	856	867	686	481	155	262	756	13145	13284	1145	837
541	Papakura	Urban			Remaining urban			28km to 29km	28	Takanini	56.1737	South	Takaanini	FUZ	1			0	2.251825	2.152555	1.945145	1.859395	2949	3085	719	559	432	1370	3794	44775	46862	1159	983
544	Papakura	Urban			Urban Development Areas	Boundary Road Papakura	Papakura	30km to 31km	30	Opaheke/Drury	1104.048	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan	0	1	5.256566	5.573737	1.884142	1.997828	2759	2602	17144	16867	1772	495	1426	42356	39580	28358	27656
545	Papakura	Urban			Remaining urban			29km to 30km	29	Opaheke/Drury	27.82951	South	Opaheke-Drury, Drury West	Live Zone	2	Drury Structure Plan	0	1	2.120643	2.025916	1.890084	1.805655	2267	2373	660	392	273	1119	2930	34002	35329	1138	665
552	Franklin	Rural			Remaining rural			31km to 32km	31	Opaheke/Drury	1104.048	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan	0	1	5.357414	5.231939	4.040143	3.94552	2752	2818	1482	1676	343	526	1322	41297	42178	2372	2685
553	Franklin	Rural			Remaining rural			34km to 35km	34	Drury South	242.9697	South	Opaheke-Drury, Drury West	Live Zone	2			0	4.78777	4.773381	2.819915	2.811441	1327	1331	166	242	388	278	706	20780	20704	283	445
563	Franklin	Rural			Remaining rural			31km to 32km	31	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan	0	1	4.061728	4	3.074766	3.028037	324	329	140	63	52	81	202	5079	5128	247	105
564	Franklin	Rural	Rural Settlement		Rural settlement		Karaka	31km to 32km	31	Karaka	54.92115	South	Rural and Coastal Settlements	Live Zone	2			0	4.34471	4.006826	3.226869	2.975919	1174	1273	702	1118	203	293	760	18145	19449	1181	1829
565	Franklin	Rural	Rural Settlement		Rural settlement		Karaka North FUA	27km to 28km	27	Karaka	54.92115	South	Rural and Coastal Settlements	Live Zone	2			0	7	6.706767	4.065502	3.895197	892	931	1342	1697	192	133	348	14192	14685	2390	3080
569	Franklin	Rural		Paerata Train Station	RTN Catchment		Paerata	34km to 35km	34	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	4	Drury Structure Plan	0	1	3.063197	2.799257	2.642437	2.414751	2259	2472	106	215	257	807	2123	35759	38782	181	349
570	Franklin	Rural		Paerata Train Station	RTN Catchment		Paerata + expansive scenario only	36km to 37km	36	Drury West	737.1265	South	Opaheke-Drury, Drury West	FUZ	1	Drury Structure Plan	0	1	4.626506	4.506024	2.833948	2.760148	374	384	224	332	105	83	221	5866	5984	388	576
572	Franklin	Rural			Remaining rural			37km to 38km	37	Pukekohe	55.22371	South	Pukekohe, Paerata	FUZ	2	Drury Structure Plan	0	2	3.693878	3.370262	2.936269	2.679027	1156	1267	102	46	177	343	826	17462	18947	161	76
575	Franklin	Urban			Urban Development Areas		Pukekohe North	39km to 40km	39	Pukekohe	367.0225	South	Pukekohe, Paerata	FUZ	1	Pukekohe - Paerata Structure Plan	0	1	3.319833	3.263252	2.088031	2.052444	5479	5574	6806	5527	1981	1679	4261	84869	85848	12002	9639
576	Franklin	Urban			Urban Development Areas		Pukekohe (Belmont) - live zone	40km to 41km	40	Pukekohe	1.002381	South	Pukekohe, Paerata	FUZ	8	Pukekohe - Paerata Structure Plan	0	1	1.86853	1.753623	1.708067	1.603028	3388	3610	2873	2486	363	1932	5113	53860	57235	5186	4458
581	Franklin	Urban		Pukekohe Train Station	RTN Catchment		Pukekohe	42km to 43km	42	Pukekohe South	98.92794	South	Pukekohe, Paerata	FUZ	1	Pukekohe - Paerata Structure Plan	0	1	4.064131	4.129381	2.262819	2.299149	11075	10900	10455	10816	4270	2682	7403	175132	172416	18731	19434
584	Franklin	Rural			Remaining rural		Patumahoe + Pukekohe North FUA	36km to 37km	36	Pukekohe	367.0225	South	Pukekohe, Paerata	FUZ	1	Pukekohe - Paerata Structure Plan	0	1	4.362052	4.042594	3.494378	3.238465	4176	4506	1501	2598	513	1033	2742	66672	71588	2712	4625
589	Franklin	Rural	Rural Settlement		Rural settlement		Clarks Beach	32km to 33km	32	Clarks Beach	0.498078	South	Rural and Coastal Settlements	FUZ	5			0	4.896641	4.465116	4.075269	3.716129	3456	3790	1677	1012	312	774	1805	55997	61079	3076	1910
590	Franklin	Rural			Remaining rural		Glenbrook Beach and Patumahoe	39km to 40km	39	Glenbrook Beach	69.66386	South	Rural and Coastal Settlements	Live Zone	5	Pukekohe - Paerata Structure Plan	0	1	4.135512	3.716122	3.433755	3.085531	10119	11261	4305	4908	1113	2723	6835	156451	173565	7385	8292
593	Franklin	Rural			Remaining rural			40km to 41km	40	Drury South	242.9697	South	Opaheke-Drury, Drury West	Live Zone	1			0	6.159444	5.712146	4.479377	4.154086	10676	11512	4978	5259	1402	1869	4676	158046	169959	7997	8385
595	Tuakau-Pokeno	Out of region			Out of region		Out of region	46km to 47km	46	Pukekohe	340.78665	South	Pukekohe, Paerata	FUZ	2	Pukekohe - Paerata Structure Plan	0	1	3.136715997	2.856001879	2.625700521	2.39071871	12158	13353	12181	14448	1657	4257	9776	189407	207021	22393	26463

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