

Sustainability Opportunities and Constraints Drury- Opaheke Structure Plan

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Foreword

A structure plan guides future development by coordinating and defining land use patterns and the location, distribution and integration of infrastructure. When considering sustainability opportunities and constraints in the context of structure planning it is necessary to focus on issues that are relevant and can be influenced by decision making at this early stage and high level.

The Auckland Plan sets out targets to reduce greenhouse gas emissions by 40% by 2040 and 50% by 2050 (relative to 1990 levels). In order to achieve these targets, and against the backdrop of a growing population and urban growth, a significant reduction in net emissions per capita is required.

The urbanisation of Future Urban Zones, including the Drury-Opaheke structure plan area, will play an important role in determining Auckland's future carbon emissions trajectory. It is therefore imperative to ensure that structure planning enables the urbanisation of Future Urban Zones to follow a low carbon development pathway whilst maximising the opportunity to deliver other sustainability benefits.

Executive summary

The Drury-Opaheke Structure Plan (Drury structure plan) presents a significant opportunity to influence sustainability outcomes and support a low carbon development model for the area. The scale and predominantly undeveloped nature of the Drury structure plan area also provides opportunities to plan for broader sustainability outcomes from the outset.

The opportunities and constraints outlined in this report are focussed on influencing early stage decisions that have the potential to deliver most significant sustainability impact. Sustainability opportunities and constraints relevant to the development of the Drury structure plan are summarised in the table below.

OPPORTUNITIES	CONSTRAINTS
Site context	
<ul style="list-style-type: none"> Plan for sustainability outcomes from the outset. Sufficient scale to deliver a mix of land uses to promote a self-sustaining community. Promote mixed use zones to reduce the need to travel within the structure plan area. Plan for more efficient and resilient community/district scale utilities and infrastructure. Aim to reduce earthworks and balance cut and fill volumes to minimise environmental impacts. 	<ul style="list-style-type: none"> Potential to generate a large increase in private vehicle trips and traffic congestion due to the location of the structure plan area and its distance from existing employment and commercial centres.
Urban form	
<ul style="list-style-type: none"> Plan for a quality compact urban form that supports a low carbon development model. Plan for transit-oriented development (TOD) increase the accessibility and appeal of Rapid Transit to a greater number of people. Enable an efficient use of land to reduce the need for further urbanisation in the region, allowing land to be retained for other functions. 	<ul style="list-style-type: none"> Resistance to higher density residential developments based on market conditions and perceptions of market demand.
Sustainable transport and accessibility	
<ul style="list-style-type: none"> Promote low carbon and active transportation modes within the structure plan area and to and from the area. Enable efficient multi-modal transport when planning the transport network. 	
Energy use and generation	
<ul style="list-style-type: none"> Promote diversified energy sources to increase energy resilience and a greater use of renewable energy resources. Enable smart grid infrastructure and community energy generation that can respond to future developments in energy technology. Respond to passive design principles in terms of the location and orientation of individual sites and land use 	<ul style="list-style-type: none"> Inclination to adopt a business as usual approach to energy use, generation and infrastructure provision.

zones.	
Climate change adaptation	
<ul style="list-style-type: none"> • A structure plan informed by Auckland specific climate change projections. • Integrate green infrastructure that supports climate change adaptation. 	
Forestry and natural carbon assets	
<ul style="list-style-type: none"> • Integrate forestry planning into the development of the structure plan to support an increase in urban forest canopy cover. 	
Stormwater management	
Delivering co-benefits through stormwater management as a result of integrating stormwater management with other land uses to deliver multiple functions.	
Ecology	
<ul style="list-style-type: none"> • Increase ecological values and maximise opportunities for co-benefits including carbon sequestration, recreation, climate change adaption and stormwater management. 	
Health and wellbeing	
<ul style="list-style-type: none"> • Promote healthy lifestyles through active design principles; a land use mix and street layout that encourages walking, cycling, and other forms of active transportation and recreation. • Recreational land uses at sufficient scale and located within walking distances of residential areas to support a healthy, active community. • Connecting people with nature to improve physical and mental health and wellbeing. 	

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1. Scope of report

This report sets out the sustainability opportunities and constraints relating to the development of the Drury-Opaheke Structure Plan (Drury structure plan). The opportunities and constraints outlined are focussed on influencing early stage decisions that have the potential to deliver most significant sustainability impact. Sustainability opportunities and constraints have been identified under the following topic headings:

- Site context
- Urban form
- Sustainable transport and accessibility
- Energy use and generation
- Climate change adaptation
- Forestry and natural carbon assets
- Stormwater management
- Ecology
- Health and wellbeing

It is recognised that some of the above themes will overlap with other technical disciplines that are inputting into the development of the structure plan. For example, technical reports are being prepared for ecology, stormwater management and transport. Where this is the case, this report aims to complement these disciplines by identifying wider sustainability opportunities and constraints associated with these topics, for example through the identification of co-benefits and relevance to greenhouse gas emissions reduction.

In addition, this report outlines existing council policies and strategies that are relevant to embedding sustainability considerations in the urbanisation of the Drury structure plan area. These policies and strategies should inform and guide the development of the Drury structure plan.

2. Site description

The Drury structure plan area consists of approximately 1907 hectares of future urban zoned land. It includes Opaheke in the north east, Drury in the south east, and part of Karaka referred to as Drury West. The current land use is predominantly for arable horticultural, pastoral and rural lifestyle activities. The structure plan area adjoins Drury Creek - Pahurehure Inlet and Manukau Harbour. It is bisected by State Highway 1, the North Island Main Trunk Line railway, and Transpower's transmission lines. The existing Drury township is located near the centre of the area but is not part of the Drury structure planning area.

3. Opportunities and constraints

3.1 Site context

Opportunities:

- **Plan for sustainability outcomes from the outset**

The structure plan will provide for the urbanisation of about 1907 hectares of future urban zoned land. The predominantly undeveloped nature of the Drury structure plan area provides opportunities to plan for sustainability outcomes from the outset.

- **Sufficient scale to deliver a mix of land uses to promote a self-sustaining community**

The Drury structure plan area is of a sufficient scale to create a new urban area with a mix of land uses that promote a functioning, self-sustaining community. Allocating land use to schools, local centres, neighbourhood centres, mixed used, business and open space and recreation can ensure that many of the everyday needs of residents are met within the development reducing the need to travel longer distances.

- **Promote mixed use zones to reduce the need to travel**

Promoting areas of mixed use within the structure plan area through land use allocation can deliver a range of benefits including reducing the distance that residents need to travel within the structure plan area, supporting a walking and cycling friendly environment and helping to establish a vibrant community with a sense of place.

Benefits include:

- Promoting low carbon development
- Reducing transport related greenhouse gas emissions
- Reducing negative impacts on air quality
- Encouraging greater social and cultural vitality
- Promoting health and wellbeing

- **Plan for community/district scale utilities and infrastructure**

The proposed level of development and lack of existing utilities infrastructure presents an opportunity to plan for community/district scale utilities and infrastructure that support more sustainable and resilient outcomes. For example communal rainwater harvesting infrastructure, district/sub-district scale energy generation, community smart grids and organic waste management.

The potential to exploit economies of scale may increase the viability of technologies and infrastructure that can support sustainability outcomes.

Benefits include:

- Increasing efficiency and resilience of infrastructure
- Reducing peak energy demand and the need to invest in energy infrastructure and generation
- Reducing the need to source energy, water from regional and intra-regional resources
- Promoting low carbon development

- **Aim to reduce earthworks and balance cut and fill volumes**

Understanding the current landscape and topography along with the impact of the structure plan on the requirement for future earthworks presents an opportunity to support a reduction in earthwork cut (excavation) and fill (embankment) volumes. Aiming to reduce earthworks and balance cut and fill volumes on site can reduce environmental impacts. This includes reducing the need to transport earth materials, therefore reducing the environmental, social and financial impacts associated with vehicle movements.

Benefits include:

- Reduction in sediment discharge to watercourses

- Reduction in transport related greenhouse gas emissions
- Reducing negative impacts on air quality

Constraints:

- **Potential to generate a large increase in private vehicle trips and traffic congestion**

A significant constraint to delivering sustainability outcomes is the potential for the urbanisation of the structure plan area to generate a large increase in private vehicle trips and traffic congestion in the surrounding area. The location of the structure plan area in terms of its distance from existing employment and commercial centres could create a significant need to travel by private car. Main highways, including the Southern Motorway, run through the structure plan area and this may further encourage private vehicle travel. This could be mitigated by reducing the need to travel through land use allocation and mixed use development and the provision of public transport alternatives that are accessible and attractive to residents and visitors.

3.2 Urban form

Opportunities:

- **Plan for a quality compact urban form that supports a low carbon development model**

The structure plan will coordinate and define land use patterns and the location, distribution and integration of infrastructure as well as the layout of public infrastructure such as roads and rail through the structure plan. This presents an opportunity to enable a quality compact urban form that supports a low carbon development model, therefore contributing towards a reduction in net emissions per capita.

Assigning higher residential density zones within convenient walking/cycling distances of amenities such as local centres, neighbourhood centres and open space and recreation areas can support lower carbon lifestyles through a reduction in transport related carbon emissions, in addition to delivering a range of other benefits.

Benefits include:

- Promoting low carbon development
- Reducing transport related greenhouse gas emissions
- Encouraging greater social and cultural vitality
- Encouraging healthy, active lifestyles

- **Plan for transit-oriented development (TOD)**

Planning for transit-oriented development (TOD) through assigning higher density residential and mixed-use zones within convenient walking distances of Rapid Transit Network stations and stops can increase the accessibility and appeal of Rapid Transit to a greater number of people.

Increasing access to Rapid Transit can reduce private vehicle use and associated traffic congestion and greenhouse gas emissions whilst increasing productivity.

Benefits include:

- Promoting low carbon development
- Reducing transport related greenhouse gas emissions
- Increasing accessibility to Rapid Transit
- Fostering improvements in productivity

- **Enable an efficient use of land**

Enabling a quality compact urban form allows for a more efficient use of land and reduces urban sprawl. Using land efficiently can reduce the need for further urbanisation of land in the region. As a result land can be retained for other productive functions such as recreation, biodiversity enhancement, agriculture and stormwater management.

Benefits include:

- Promoting the efficient use and development of natural and physical resources

Constraints:

- **Resistance to higher density residential developments**

There may be resistance and challenges from the development sector towards delivering higher density residential developments based on market conditions and perceptions of market demand for higher density housing in Auckland. This may be reinforced by traditional values associated with housing and residential subdivision in Auckland. In order to change perceptions and market demand, the structure plan must ensure that higher density housing benefits from convenient access to quality amenities and Rapid Transit Networks.

3.3 Sustainable transport and accessibility

Opportunities:

- **Promote low carbon and active transportation modes**

The structure plan presents an opportunity to establish a transport network that promotes low carbon and active transportation modes within the structure plan area and to and from the area. This can support a wide range of environmental and social gains.

The structure plan can promote and facilitate walking and cycling within the development through a network of high quality walking and cycling routes that provide convenient linkages.

Establishing a Rapid Transit Network¹ that serves the structure plan area and connects to key locations beyond the structure plan area, including Auckland CBD, is central to delivering sustainability outcomes through the structure plan. The successful delivery of the new train stations planned for Drury and Drury West is therefore critical.

Locating Rapid Transit Network stations and stops within convenient distances from residential areas for walking/cycling can promote the use of sustainable transport and reduce traffic congestion.

Assigning land for neighbourhood centres, local centres and mixed used development in areas that are within convenient distances from residential areas for walking/cycling will encourage active travel and reduce the need to travel longer distances by private car, therefore supporting a low carbon development model.

- **Enable efficient multi-modal transport**

Providing and encouraging opportunities for efficient multi-modal transport, such as bus-train and cycle-train, when planning the transport network can further promote sustainable transport outcomes.

Benefits include:

- Promoting low carbon development
- Reducing transport related greenhouse gas emissions
- Reducing negative impacts on air quality
- Encouraging healthy, active lifestyles
- Increasing accessibility to Rapid Transit
- Fostering improvements in productivity

¹ AT defines a rapid transit network, or RTN, as the highest level public transport service that gives fast and consistent regional access, to provide a reliable and superior alternative to driving, in order to allow people to travel efficiently, and reduce traffic and emissions.

3.4 Energy use and generation

Opportunities:

- **Promote diversified energy sources to increase energy resilience**

When considering infrastructure as part of the development of the structure plan, there is potential to identify opportunities to increase energy resilience by diversifying the type and scale of energy sources and fostering greater use of renewable energy resources in line with Directive 8.4 of the Auckland Plan. It should be noted that the development of the structure plan area will be staged and delivered within an evolving regulatory and technical energy market.

- **Enable smart grid infrastructure and community energy generation**

There is an opportunity to consider the potential and benefits of enabling smart grid infrastructure and community energy generation when planning for infrastructure provision. This may include the opportunity to provide flexible, future proof, smart grid infrastructure that can respond to future developments in energy technology. For example, storing or aggregating locally generated renewable electricity for the benefit of the community.

- **Respond to passive design principles**

The layout of the structure plan, in terms of the location and orientation of individual sites and land use zones, presents an opportunity to respond to passive design principles. For example, site orientation that allows future buildings to be located and orientated in order to benefit from passive heating and cooling from solar gains and prevailing winds. If optimal orientation can be achieved, it has the potential to reduce heating/cooling requirements, household energy costs and greenhouse gas emissions.

Benefits include:

- Promoting low carbon development
- Reducing peak energy demand and the need to invest in energy infrastructure and generation
- Increasing the potential benefit from future developments in energy technology
- Improving energy resilience

Constraints:

- **Inclination to adopt a business as usual approach**

If a business as usual approach to energy use, generation and infrastructure provision results from the urbanisation of the structure plan area, the opportunity to deliver benefits associated with smart grid infrastructure and technologies that support sustainability outcomes may be reduced or lost.

Changing from a business as usual approach may be challenging and could present both technological (generation and infrastructure technology) and non-technological barriers (planning and cultural challenges and the ability and willingness for industry to deliver etc.).

3.5 Climate change adaptation

Opportunities:

- **A Structure Plan informed by Auckland specific climate change projections**

Using Auckland specific climate change projections to inform the development of the Structure Plan presents an opportunity to arrange land uses and infrastructure in a way that is resilient to the projected impacts of climate change and therefore exposed to a reduced level of climate related risk.

Auckland Council, CCOs and DHBs have co-commissioned NIWA to provide an Auckland-specific report on the climate change projections developed through the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. This work has been commissioned to provide us with the best, most detailed information on future projected changes for the region, both for decision-making and to enable us to increase our understanding of risks, vulnerabilities and opportunities. The report

will incorporate information on a range of climate variables for 2040, 2090 and 2110, including changes to temperature and precipitation; changes to evaporation, soil moisture and drought; changes to pressure, wind and storms; oceanic changes and sea level rise amongst others. It will complement work already in place across council, particularly in relation to sea level rise and coastal inundation modelling. This information is expected to be available to council at the end of October 2017.

- **Integrate green infrastructure that supports climate change adaptation**

Climate change adaptation is one of a host of multi-functional benefits that can be delivered through green infrastructure. Defining land uses during the development of the Structure Plan presents an opportunity to consider the integration of green infrastructure in a way that supports climate change adaptation.

Benefits include:

- Reduced vulnerability to future climate change impacts and associated costs and damages

3.6 Forestry and natural carbon assets

Opportunities:

- **Integrate forestry planning into the development of the Structure Plan**

Auckland Council's Environment and Community Committee approved a strategic framework for Auckland's urban ngahere (forest) on 12th September 2017. This strategic framework is particularly relevant to the structure planning of the Drury structure plan area where the urban forest canopy cover is very low (10%) compared with other areas in the Auckland region (the Auckland wide average is around 18-19%). There is an opportunity to integrate forestry planning in the development of the Structure Plan to deliver an increase in urban forest canopy cover in the Drury structure plan area in line with the approved strategic framework.

An increase in canopy cover will deliver a wide range of evidence-based benefits including community health and wellbeing benefits, environmental benefits, cultural benefits and economic benefits. Examples include enhanced opportunities for biodiversity, climate change adaptation, stormwater management, carbon sequestration and increased amenity value.

An increase in canopy cover would contribute to the implementation of national and regional policies and strategies such as Auckland's commitment to green growth in the Auckland Plan and Auckland Growing Greener and goals identified in the National Policy Statement for Freshwater Management, Auckland's Indigenous Biodiversity Strategy and Low Carbon Auckland.

Benefits include:

- Enhancing opportunities for biodiversity, climate change adaption and stormwater management
- Promoting community wellbeing through opportunities to connect with nature
- Reducing net greenhouse gas emissions through carbon sequestration

3.7 Stormwater management

Opportunities:

- **Delivering co-benefits through stormwater management**

A detailed stormwater technical report has been produced identifying opportunities and constraints relating to the Drury structure plan area. The approach taken to stormwater management is fundamental to the sustainable development of the structure plan area. It will also influence environmental outcomes outside of the structure plan area, such as pollution levels in the Manukau Harbour.

Stormwater management presents opportunities to deliver a range of other functions and co-benefits that can enhance sustainability outcomes. The opportunity to integrate stormwater management with other land uses such as recreation, biodiversity enhancement, ecological corridors, urban forest cover and active transport networks should be identified during the development of the Structure Plan. This would allow the value of land to be better understood in terms of its potential to deliver multiple functions and services.

Benefits include:

- Integrating stormwater management with other land uses to deliver multiple functions
- **Stormwater management informed by Auckland specific climate change projections**

Stormwater management decisions should be informed by guidance and data relating to future projected climate change impacts. A NIWA Auckland-specific report on climate change projections is expected to be available to council at the end of October 2017 (see 3.5 Climate change adaptation).

3.8 Ecology

Opportunities:

- **Increase ecological values and maximise opportunities for co-benefits**

A detailed Ecology Assessment² has been produced identifying opportunities, constraints and outcomes sought relating to the Drury structure plan area. The report identifies that, "Formulation of the structure plan provides an opportunity to maintain and improve ecological values, set objectives for ecological enhancement, guide the placement of reserves and align community recreation corridors with these."

The Ecology Assessment reports that the current state of native vegetation is notably sparse and poorly connected, providing a major barrier at the landscape scale for flora, fauna and ecological function. Increasing the amount of native vegetation in the Drury structure plan area presents an opportunity to increase ecological values both within the structure plan area and across the wider region through bridging a spatial gap in native vegetation. It also presents opportunities to increase Auckland's urban forest cover and deliver a host of ecosystem services including carbon sequestration, recreation, climate change adaptation and stormwater management (see 3.6 Forestry and natural carbon assets).

Benefits include:

- Enhancing the ecosystem services provided by the Drury structure plan area and the wider region

3.9 Health and wellbeing

Opportunities:

- **Promote healthy lifestyles through active design principles**

The structure plan can promote healthy lifestyles through considering active design principles and identifying a land use mix and street layout that encourages walking, cycling, and other forms of active transportation and recreation.

- **Recreational land uses that support a healthy, active community**

Recreational land uses provided at sufficient scale to cater for the needs of the community and located within convenient walking distances of residential areas can support a healthy, active community and provide formal and informal opportunities for play.

² Ecology Assessment Drury-Opaheke Structure Plan; Eru Nathan, Ecologist, Auckland Council

- **Connecting people with nature**

Assigning land uses for stormwater management, urban forestry and recreation can provide opportunities to connect residents, workers and visitors with nature to improve physical and mental health and wellbeing.

Benefits include:

- Encouraging healthy, active lifestyles
- Promoting community wellbeing through opportunities to connect with nature

4. Baseline policies and strategies

This section outlines excerpts from relevant key policy documents and strategies relating to sustainability that should inform and guide the development of the structure plan. In addition to guiding the approach to sustainability, this will ensure that Auckland Council delivers on existing mandates through the structure planning process. Where bold text occurs this has been added for the purposes of this document to emphasise particularly important points or concepts.

National policy documents

4.1 Resource Management Act 1991

Part 2 - Purpose and principles

Part 2 of the Resource Management Act outlines the purpose of the Act; to promote the sustainable management of natural and physical resources. Further explanation is provided and 'other matters' that relate to achieving the purposes of the Act are outlined. Many of these are relevant to the development of the Drury structure plan.

Purpose

1. *The purpose of this Act is to promote the sustainable management of natural and physical resources.*
2. *In this Act, **sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—***
 - a) *sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
 - b) *(safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
 - c) *avoiding, remedying, or mitigating any adverse effects of activities on the environment*

...

Other matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—

- (a) **kaitiakitanga:**
 - (aa) *the ethic of stewardship:*
- (b) **the efficient use and development of natural and physical resources:**
- (ba) **the efficiency of the end use of energy:**
- (c) **the maintenance and enhancement of amenity values:**
- (d) **intrinsic values of ecosystems:**
- (e) *[Repealed]*
- (f) **maintenance and enhancement of the quality of the environment:**
- (g) *any finite characteristics of natural and physical resources:*
- (h) *the protection of the habitat of trout and salmon:*
- (i) **the effects of climate change:**
- (j) **the benefits to be derived from the use and development of renewable energy.**

Auckland Council policies and strategies

4.2 The Auckland Plan

C.2: Outcomes: What the Vision Means in 2040

A Green Auckland

63_ *Our waterways and coastlines are clean and full of life. **Our air is healthy and we have sustainable rates of water consumption, greenhouse gas emissions, and waste production. Many Aucklanders prefer to use public transport, and our energy supply is resilient and sustainably sourced.** Biodiversity is abundant on private land, in our network of parks, and in protected areas of native bush and wetlands. We have developed new industries in leading-edge, green technology.*

C3: Transformational shifts to achieve the vision

2. Strongly Commit To Environmental Action and Green Growth

71_ *Our stunning natural environment and our ability to access it relatively easily, is one of the reasons Auckland ranks so highly on international quality of life surveys. But the health of that environment, and its biodiversity, is deteriorating. Air pollution, soil degradation, the poor state of many of our waterways, and declining fish stocks are some of the pressing environmental problems we face. **A fundamentally different approach to the way Auckland will grow and develop is required.** We will protect and restore our environment, and respect its values. **This Plan sets an aspirational target to make a 40% reduction in greenhouse gas emissions (relative to 1990 levels) by 2040.** Joining the global shift towards green growth is essential to achieving our environmental and economic goals.*

3. Move to Outstanding Public Transport within One Network

72_ *The congestion on Auckland's transport network will increase as the population grows. Unchecked, this will have a negative impact on our economic performance and our quality of life. **Addressing this congestion requires a transformational shift towards far greater use of public transport and a stronger focus on planning, developing, and operating the entire transport network as an integrated system.***

C.4: Principles We Will Work by to Achieve the Outcomes

69_ *Our vision will not be achieved by incremental change. **Transformational change is needed, and this requires a commitment to a better future from all Aucklanders.***

Be Sustainable

79_ *Ensure that our short-term decisions enhance our long-term prospects, and build our resilience to changing local and global conditions that may impact on the economic, environmental, social and cultural well-being of Auckland.*

Strategic Direction 8 – Contribute to Tackling Climate Change and Increasing Energy Resilience

Priority 1: Mitigate Climate Change

DIRECTIVE 8.1: Progress towards the Auckland Plan's emissions reduction target and take a coordinated approach to transitioning, through green growth, to a sustainable Auckland.

DIRECTIVE 8.2: Protect, enhance and increase Auckland's green infrastructure networks.

Priority 2: Improve Energy Efficiency, Security and Resilience

DIRECTIVE 8.3: Improve energy efficiency and conservation (in both supply and use) through:

- **a quality compact city form that is well integrated with a multi-modal transport system**
- **a transport system that reduces reliance on non-renewable resources and improves energy efficiency**
- **energy-efficient development and design**, by (i) ensuring development is assessed using an appropriate ratings tool along with provision in Auckland's Unitary Plan and (ii) supporting the retrofitting and redevelopment of residential, commercial and industrial buildings.

DIRECTIVE 8.4: Increase energy resilience by diversifying the location, type and scale of energy sources and fostering greater use of renewable energy resources available in the region.

Priority 3: Adapt to a Changing Climate

DIRECTIVE 8.5: Identify the opportunities and risks associated with climate change. Increase the resilience of Auckland's communities, natural resources and built environments and their ability to adapt to the impacts of climate change. Take a cautious, risk-based approach where there is uncertainty on the effects of climate change, and monitor and adapt to environmental change over time.

DIRECTIVE 8.6: Recognise, promote and strengthen the value and contribution of local urban and rural food systems to improve resilience, resource use efficiency and community food security.

Strategic Direction 10 – Create a Stunning City Centre, with Well-Connected Quality Towns, Villages and Neighbourhoods

DIRECTIVE 10.4: Locate and develop greenfield areas as sustainable liveable neighbourhoods in a way that:

- **demonstrates the most efficient use of land**
- **protects and enhances biodiversity, air quality, water quality, and heritage values**
- **provides community facilities, open space, infrastructure (including transport, communications, power and water utilities) in a timely and efficient manner**
- **provides opportunities for walking and cycling, and public transport, and a well-connected street network**
- **provides a broad range of housing choice to cater for the diversity of housing needs in Auckland**
- **provides or supports local employment opportunities avoids risks from natural hazards**
- **demonstrates high-quality design with high environmental performance.**

DIRECTIVE 10.7: All urban development should take into account the environmental design principles outlined in Box 10.2.

4.3 Low Carbon Auckland, 2014

Low Carbon Auckland - Auckland's Energy Resilience and Low Carbon Action Plan is intended to deliver on the target of reducing greenhouse gas (GHG) emissions by 40 per cent by 2040 as set out in the Auckland Plan. It is structured around five areas of transformation:

- Transforming the way we travel.
- Transforming the way we use and generate energy.
- Transforming our built environment and green infrastructure.
- Transforming to Zero Waste.
- Transforming forestry, agriculture and natural assets.

- **Transforming the way we travel**

Auckland 2040: 30% reduction in vehicle kilometres travelled per person. Auckland's urban form means fewer and shorter trips are required per person.

Element 1: Reducing the demand for travel

- **Action 1: Investigate and ensure alignment between transport investment and the outcomes sought by this action plan**

Element 2: Increasing the use of public transport, walking and cycling

- **Action 6: Ensure street design standards support walkability.**
- **Action 7: Implement new frequent bus network and electric trains that are supported by integrated ticketing and fares.**
- **Action 8: Ensure significant improvements to cycling infrastructure, particularly focusing on improving actual and perceived safety, including separated routes and traffic calmed streets.**
- **Action 9: Achieve extensive improvements to bus priority measures, e.g. bus lanes, priority at traffic signals.**

- **Transforming the way we use and generate energy**

Element 1: Managing the energy demand

Element 2: Developing Auckland's low carbon energy options

- **Action 5: Investigate and promote the most appropriate, GHG efficient energy options for heating water, heating and cooling living spaces and for cooking in Auckland.**
- **Action 6: Promote and support the move to generating 90 per cent of electricity from renewable sources by 2025, providing this does not affect security of supply.**
- **Action 7: Identify appropriate measures to ensure networks are adapted and flexible to enable efficient and effective uptake of local renewable energy technologies.**
- **Action 8: Investigate the feasibility of district energy schemes that utilise (i) waste heat and chilled water systems, and (ii) forest residues.**
- **Action 14: Extend and reinforce the distribution network to meet growth through greenfield and infill development.**

- **Transforming our built environment and green infrastructure**

Element 1: Demonstrating leadership and creating quality exemplars of sustainable development to inspire

- **Action 4: Ensure principles of sustainable design, including energy and water efficiency are embedded and prioritised in:**
 - **all of the council's planning, strategic and placemaking programmes, and major projects**

- Transforming forestry, agriculture and natural carbon assets

Auckland 2040: 50% increase in carbon sequestration (compared with 2014 levels) by planting ecological corridors.

Element 1: Growing the extent of urban and regional forests

- **Action 1: Integrate and consider native forestry planning when undertaking local area plans and structure planning to expand Auckland's ecological corridors.** For example:
 - Engage recreation groups to enable integrated design of forest resources and recreational opportunities.
 - **Establish tree-based ecological corridors and plans based on existing available land, e.g. transport routes, forest remnants, streamways, coastal zones and land acquisitions.**
 - Initiate public engagement programmes to promote and develop understanding of the 'corridors' concept and the benefits derived from Auckland's natural assets.
 - **Apply low-impact design to establish ecological corridors through urban and newly developed areas.**
 - Develop a planting programme that implements the biodiversity strategy and delivers healthy green corridors.
- **Action 3: Identify significant ecological areas and protect or restore these areas through planning processes.**
-

Local Board Plans

4.4 Franklin Local Board Plan, Draft 2017

Outcome 1: A well-cared for natural environment

Enhance, protect and maintain our diverse natural environment and make sure it's able to be enjoyed.

Outcome 2: A thriving local economy

Franklin has a strong economy and attracts people to live, work locally and visit its attractions

Outcome 3: An improved transport system

Continue to work towards better public transport and safer roads in Franklin.

4.5 Papakura Local Board Plan, Draft 2017

Outcome 2: People in Papakura lead active, healthy and connected lives

We have great parks and places to play and do the things that we enjoy.

Outcome 3: A strong local economy

Papakura businesses prosper, creating employment opportunities for local people.

Outcome 4: Papakura is well-connected and easy to move around

Our roads should be free from congestion, public transport convenient and reliable, walkways and cycleways safe and connected.

Outcome 5: Treasured for its environment and heritage

We value our natural environment and heritage, protecting and nourishing it for future generations.