Part D

Sustainability

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D.1
Meaning and Achievement of Sustainability

Over the last 30 years sustainability, particularly environmental sustainability, has become a global concern reflected in such key international conferences as the Stockholm United Nations Conference on Environment and Development in 1972, the Earth Summit Conference in Rio de Janeiro in 1992 and the United Nations Framework Convention on Climate Change in Kyoto in 1997. New Zealand too has responded strongly to the concern for sustainability through reviews of environmental and planning legislation. In particular, the Resource Management Act passed by Parliament in August 1991, signalled a new emphasis on sustainable development in New Zealand.

There are many definitions of *sustainability* and what it means to be *sustainable*. The following definition focuses on long-term city survival or durability:

> *"Sustainability requires a city to function in a way that ensures its long-term survival as well as its integrity, normal functioning and self-reliance. It requires that environmental, social and economic parameters conform to the productive and assimilative capacity of the biosphere. Key principles that give substance to this theme are: efficiency, interdependence, connectivity, stewardship, durability and appropriateness".*[1] *Sheltair Group (2003).*

A further definition, contained in Section 5 of the RMA, builds on the concept of durability by stressing the need to deal with adverse effects:

> *" '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 wellbeing 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 ecosystems; and*
> *c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."*

[1] The Sheltair Group. 2003 Cities Plus. A Sustainable Urban System – The Long Term Plan for Greater Vancouver. Available on http://www.citiesplus.ca/images/DevelopingThePlan_a.pdf

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D.2
Requirements to Deliver Sustainable Transport

A range of statutes require the North Shore City Council to influence the growth and activities of the City in a sustainable way. This includes the need for transport infrastructure and activities to be sustainable, and for transport to support the achievement of sustainability for other activities.

Statutory requirements affecting transport sustainability are contained in the following legislation:

- Resource Management Act 1991(RMA);
- Land Transport Management Act 2003 (LTMA);
- Local Government Act 2002 (LGA);
- Energy Efficiency and Conservation Act 2000; and
- New Zealand Transport Strategy 2002.

At the regional level the Regional Land Transport Strategy (RLTS) identifies seven key objectives – five of which are a requirement of the LTMA. The following are those that relate to sustainable transport:

- Assist economic development;
- Improving access and mobility;
- Protect and promote public health; and
- Ensure environmental sustainability.

Within the RLTS these objectives (the last in particular) give rise to a broad group of policies to contribute to an integrated, safe, responsive and sustainable transport system.

The LGA requires Councils to produce a long term Council community plan (the City Plan) that includes community outcomes derived from community consultation.

The draft 2006-2016 North Shore City Plan identifies a number of community outcomes that provide for sustainability in the natural and built environment:

- The natural environment is protected, enhanced and promoted;
- The built environment is of a high quality;
- Our economic environment is visionary, vibrant and sustainable; and
- The city services and facilities meet the needs of the community.

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The North Shore City Plan is supported by other Council plans and strategies in protecting and enhancing the environment. These documents include the City Blueprint, Water Management Strategy and the Stormwater Strategy.

The District Plan also contains objectives and policies that relate to sustainability and transport. The following are raised as major issues facing the council in regard to its resource management function:

- Protecting our high quality natural environment;
- Securing a high quality built environment;
- Enhancing our ease of movement;
- Fostering and strengthening our community wellbeing; and
- Optimising employment and economic growth within the city.

D.3 Sustainability Strategy

All of the transport objectives listed in Part B of the Strategy relate, in various respects, to achieving city sustainability at personal, local community and citywide levels.

The key strategy to achieve these objectives is to:

> **KS-10** *Adopt and implement transport actions and policies that support the achievement of city durability, promote sustainable resource use and which reduce the adverse environmental, social and health effects of transport.*

The durability of a city such as North Shore City relies on all components of the city efficiently interacting together to ensure its social, economic, cultural and environmental health and success. How transport contributes to this aspect of sustainability is covered in other sections of the Strategy – notably Part C, *Meeting Transport Needs*, and in Part F, *Role of Transport in City Growth and Land Use*.

Complementing transport's role in contributing to overall city success and durability, this part of the Strategy focuses on two other main aspects of sustainability i.e. :

- Use of non-renewable resources; and
- Dealing with adverse effects.

The remainder of this section summarises current resource use and adverse effects, and describes what is being done now, or is being planned or investigated, to minimise the use of non-renewable resources and to reduce, avoid or minimise adverse effects.

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D.4
Minimising the Use of Finite Resources

Resources Used or Influenced by Transport

The use of non-renewable or finite resources is a major sustainability concern. The main finite resources consumed by transport are land, fuel and building/construction materials. Indirectly transport infrastructure and operations also influence resources used by other activities, particularly land.

Walking, cycling and public transport are all modes of transport that use less finite resources, and are therefore more sustainable, than the private motor vehicle. Providing for and using private motor vehicles consumes the bulk of finite resources consumed by transport.

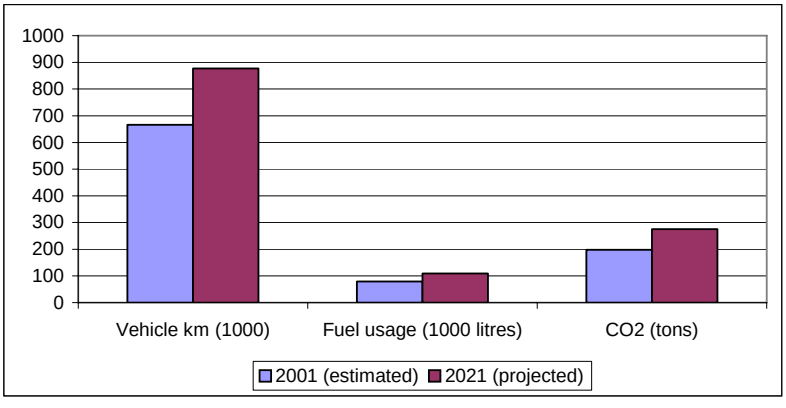
Principal Current and Projected Use of Transport Resources

Fuel Usage

Traffic on the North Shore has increased at a rate of about 3% per annum over the last 10 years. In the Auckland region, 35 new vehicles are added to the fleet every day. This, coupled with the recent trend towards larger vehicles and sport utility vehicles (SUVs), has increased trip numbers and fuel usage in the North Shore and across New Zealand.

The figure below (Figure D1) shows the projected changes in the relevant indicators (vehicle km's, petrol usage and CO_2) based on current driving behaviour. Planned improvements such as the Northern Busway, increased public transport services and road upgrading are taken into account. However, actual fossil fuel usage in the future will depend on such factors as growth in transport demand, mode choice, engine efficiency, fuel type, fuel costs, fuel availability and fleet vehicle size.

Figure D1: Traffic Growth, Fuel Consumption and Emissions for Morning Peak Period



(North Shore City Council strategic model, 2004)

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Land Occupied by Transport

Transport infrastructure, principally roads, occupy about 10% of North Shore urban land. Of this area, the carriageway itself takes up approximately 50%. The road network in North Shore City is largely complete and the total area occupied by transport is only expected to increase marginally, largely to service remaining subdivision potential. However, expected expansion of the road corridor space in congested areas (such as for bus or transit lanes) will impact on existing land uses. The prospect of a further harbour crossing may also have a localised requirement for additional land or harbour reclamation.

Consumption of Resources for Construction and Maintenance

The construction and upkeep of transport infrastructure in the North Shore uses a significant amount of construction material. Over 40km of road around the city is resealed annually, using asphalt or chip seal. The Council also upgrades footpaths annually, using around 5.5km of concrete for the paths, with an additional 8.7km of kerb and channel replacement.

During resealing, around 80% of the material is removed from the road, with the new seal being laid over the remaining 20%. Around 90% of the material removed is discarded, with approximately 10% recycled and reused.

Current and Ongoing Actions and Initiatives to Reduce Use of Finite Resources

Reduction in Private Car Use

The following actions or initiatives aimed at reducing private car usage are currently planned or are ongoing:

- Support and adoption of land use strategies and policies influencing nodal growth and mixed-use developments (Regional Growth Strategy, NSCC City Blueprint);
- Implementation of and support for TDM programs and measures (NSCC supported by ARTA);
- Improvement of walking and cycling facilities and promotion of walking and cycling (NSCC supported by ARTA); and
- Improvement of public transport services and facilities and promotion of public transport use (ARTA, Transit, NSCC).

These actions or initiatives are described elsewhere in the Transport Strategy.

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Creating Efficiencies

Creating more efficient transport systems and technology reduces the demand on resources. Current methods for achieving this are:

- Implementing traffic efficiency improvements through better traffic management and infrastructure upgrading (NSCC); and
- Encouraging and supporting the use of more fuel-efficient vehicles (Government).

Road Maintenance and Rehabilitation

In conjunction with Transit, Council is involved in ongoing trials for the use of second hand materials from demolition sites for pavement and road surfacing. This includes the use of old tyres in bitumen.

Council also undertakes regular surveys of the state of transport infrastructure in order to optimise maintenance activities and minimise the resources required in the maintenance programme.

Further Actions and Initiatives to Reduce Use of Finite Resources

Government Actions

In addition to current initiatives, various government departments are investigating or taking action to reduce resources used by transport. Examples of this are:

- Recent completion of Ministry for Economic Development sustainable transport energy workshops aimed at developing policies for cleaner more efficient transport; and
- Ministry of Transport investigation of road pricing as a tool to manage and reduce transport demand.

Regional Actions

The Regional Land Transport Strategy 2006-2016 identifies a range of policies for the reduction of finite resources. The key policy is to:

> *'Develop the transport system in a way that minimises the use of non-renewable resources'.*

The policies identified to implement this key policy relate to reductions in the use of fossil fuels, interventions focused on the use of fuel efficient vehicles, a long term perspective on the reduction of fuel consumption by transport, the reliance of infrastructure construction on non-renewable resources and policies aimed at making more efficient use of existing transport infrastructure to minimise consumption of land for transport purposes.

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Projects identified under the draft 2006/07 Land Transport Programme anticipate reductions in travel times and vehicle delays, but more work is required to identify effective ways of delivering the objective and policies of the RLTS 2006/16.

Council Actions

Council is currently running a programme investigating roughness and vehicle tolerance on roads. Better suspension in modern vehicles means that they can tolerate different road surfaces, which require less renewal (and less resources) than the surfaces currently used.

In addition to ongoing trials using second hand materials from demolition sites, Council further intends to increase the amount of recycled material used in road construction as a method of reducing resource usage.

D.5 Minimising Adverse Effects on the Environment and the Community

Adverse Effects of Transport

The transport system has widespread and sometimes significant adverse effects on the environment and community. The following table is not exhaustive, but indicates the most obvious adverse transport effects.

TABLE D1: Adverse Transport Effects

Type of Effect	Effect
Environmental	Pollution of streams and harbours from vehicles - heavy metals, oils, rubber and exhaust particulates.
	Changes to landscapes, including vegetation removal.
	Effects on terrestrial ecology – weed and vermin corridors, destruction of habitats.
	Increased water temperatures in streams (heated road run off).
	Silt runoff from road construction and vehicles.
	Airborne emissions from vehicles.
	Increased stormwater runoff and resultant flooding and erosion.
	Land acquisitions for transport infrastructure.
Social	Severance of communities by heavily trafficked roads and motorways.

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TABLE D1: Adverse Transport Effects (cont'd)

Type of Effect	Effect
	Land acquisitions for transport infrastructure.
	Health (air pollution).
	Vibration.
	Loss of amenity.
	Noise.
	Visual intrusion.
	Safety.
Economic	Congestion restricting movement of freight and reducing viability of businesses.
	Transport system creating unattractive city for businesses to locate to.
Cultural	Damage to cultural sites due to road construction.
	Effects on Mauri of water bodies.

Current and Projected Adverse Effects from Transport

Although the adverse effects of transport on the environment and communities are widespread and occur in various ways, many are difficult to identify and/or quantify, and only a few are measured in a systematic way. Primarily these effects are caused by motor vehicle operation and road infrastructure. Regional and district regulations limit some effects, but others are an unavoidable consequence of transport where the ability to directly reduce adverse effects is more restricted and may not be covered by specific regulations.

To date only one adverse effect has been measured in a way that allows wider conclusions to be drawn for the region and indirectly, for the North Shore. Auckland Regional Council undertakes monitoring on air quality. Substances of particular concern for air quality and public health are suspended particulates, mainly from diesel vehicles. Chief emissions are carbon monoxide, carbon dioxide and nitrogen dioxide.

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Regional surveys of air quality are undertaken on a regular basis. Conclusions from assessing levels of regional and city air emissions are:

- An estimated 253 people die prematurely in the Auckland region from the effects of vehicle emissions[2].
- 60-80% of all air contaminants in the Auckland region come from motor vehicles[3].
- Air quality for particulate matter and carbon monoxide is close to maximum levels at a small number of sites tested in North Shore City, (Takapuna, Taharoto-Westlake).
- The Ministry for the Environment's Ambient Air Quality Guideline is 30 mg/m3 - one hour average - and 10 mg/m3 - eight hour average.

Current and Ongoing Initiatives and Actions to Reduce Adverse Effects of Transport

As with reducing the use of finite resources, national and regional government and the council all have roles in reducing the adverse effects of transport.

Central Government Role

The RMA is New Zealand's primary piece of environmental legislation. It requires all persons to avoid, remedy or mitigate adverse effects on the environment and establishes a framework for sustainable management and the reduction of adverse effects on the environment. This legislation requires plans and strategies to be created to give effect to the RMA at a regional and local level.

Central government also sets other legislation or imposes regulations to reduce the adverse effects of transport on the environment. These include:

- Specification of fuel standards;
- Testing of vehicle emissions; and
- Road safety – warrant of fitness standards.

Regional Role

In addition to the RMA required environmental plans, and their policies and methods of implementation, ARC undertakes a number of other initiatives for reducing adverse effects of transport on the environment.

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[2] Source: Ministry of Transport. 2002. *Health Effects due to Motor Vehicle Pollution in New Zealand.* Wellington: Ministry of Transport. Available from: http://www.mot.govt.nz/downloads/niwa_report.pdf

[3] Source: ARC File Ref: A224-08-05

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In 2000, the Auckland Regional Council (ARC) ran the 0800 SMOKEY campaign which encouraged motorists to phone a hotline to "dob in" excessively smoky vehicles. This was hugely successful and was supported by the Ministry of Transports' '10 second rule'. ARC also established a Green Fleet Programme in May 2004 to encourage businesses to reduce air pollution from their vehicle fleets through initiatives such as sustainable travel plans and improved fleet management and procurement practices.

Water quality is also addressed by a stormwater action plan - a multi-disciplined approach to stormwater management in the Auckland region that recognises further work is required in areas such as:

- Improvement of the quality and timeliness of integrated catchment management plans;
- Better understanding and implementation of source control initiatives;
- Regional co-ordination of communication and education initiatives;
- Regional capacity issues; and
- Long-term sustainable funding sources.

District Councils are required to obtain resource consents through the Regional Plan Air, Land and Water, for their stormwater networks which set conditions on stormwater quality and quantity.

Council Roles

Councils can reduce the adverse effects of transport using provisions within the District Plan, adopting and implementing Council policies, adopting and implementing operating and construction standards and procedures (such as drainage standards for road construction), implementing specific remedial works or programs, coordinating planning and advocacy.

The following table summarises the mechanisms Councils have in legislation and regulation to reduce or control adverse effects.

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TABLE D2: Legislative & Regulatory Mechanisms to Reduce/Control Adverse Transport Effects

Legislation/ Regulation	Mechanism	Adverse Effect	Example
RMA	General powers	Noise	Control of excessive noise. Allows for enforcement officers to operate.
	District Plan	Noise	The road hierarchy directs traffic flows away from residential areas. Development controls – controls over where a building is sited and how it is constructed.
	District Plan	Amenity and Severance	Road hierarchy and development controls (see above).
	District Plan: Structure Plans	Severance	Specifies the location of transport links – including location of pedestrian and cycle links.
	Regional Plan: Air Land Water	Water	Contains policies and rules to protect the region's air, water and land resources from the adverse effects of development. North Shore City Council is required to gain consent for its stormwater network – a consent that sets the standards for the quality and quantity of water discharge. Requires an Integrated Catchment Management Plan, which contains a range of methods that will be used to help achieve the outcomes. Examples relating to transport are: swales, rain gardens
Building Act 1991	Building code	Noise Amenity	Contains standards for building dwellings.
Local Government Act Building Act and Resource Management Act	Council Infrastructure Design Standards	Water	Requires water sensitive design such as swales or rain gardens in contaminant and/or flood sensitive areas.
	Council Infrastructure Design Standards	Amenity	Includes design standards for landscaping and street furniture.

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Strategies

Council also has strategies in place that reduce or control adverse effects. These are:

- Stormwater Strategy - Assists the council in meeting two of the primary Strategic Plan objectives of protecting and enhancing the environment and improving living and working environments in North Shore City; and
- Water Management Strategy - Assists the council in ensuring a consistent approach to the wide range of activities that can impact on water bodies and to integrate the council's various management functions and tools.

These strategies contain specific policies and actions for addressing adverse effects. For example, the Water Management Strategy identifies the following actions currently in place:

- Using appropriate site management and timing of works at road works projects to avoid washing of cement and lime into waterways;
- Using a best practicable option approach to reduce pollution associated with transport systems, in co-operation with other local, regional and central government agencies as appropriate. This may include lobbying regional and central government to introduce controls at source for persistent contaminants from transport sources;
- Street sweeping and catchpit emptying;
- Using alternative approaches to road and car park design to reduce contaminants, for example swales;
- Promotion and support of alternatives to car travel or reduced car travel e.g. cycling, walking, public transport; and
- Installing appropriate water quality devices (e.g. catchpit inserts) in priority areas.

Works and Programs

Council is currently retrofitting stormwater quality devices to some roads around the city as part of its overall contaminant management strategy, part of which addresses stormwater quality at the source. Any new roads in contaminant or flood sensitive areas must meet the council design standards and may involve the installation of rain gardens or swales as measures to mitigate down stream effects.

Advocacy

Council supports the regional initiatives outlined in the RLTS and other regional plans with regard to the avoidance, remediation and mitigation of adverse effects of transport on the environment.

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Future Actions and Initiatives to Reduce Adverse Effects

The levels of future adverse effects created by transport depend upon:

- Mode share - proportion of travel by private motor vehicle versus more sustainable modes (walking, cycling and public transport);
- Level of transport demand;
- Technological changes;
- Demand for further transport infrastructure;
- Population growth;
- Ability to research adverse effects comprehensively;
- Ability to mitigate adverse effects; and
- Ability to fund mitigation measures.

A range of issues arise when considering mitigation measures. Where there is not the facility to adequately mitigate the adverse effects that occur (e.g. lack of road reserve) or the activity creating the effect is increasing at a rate that cannot be addressed (e.g. growth in traffic) it may be that the adverse effect occurring can only be managed to a certain level.

Other difficulties arise from the high costs of some forms of control and remediation, and the level of information and research required to ensure the remedial measures are sufficient. There may also be issues with how effective North Shore City policies and actions can be when the ultimate responsibility for a particular effect lies with the Regional Council or Central Government.

Some uncertainties also remain in relation to the benefits that will result from contaminant management. Until this matter becomes clearer, it will be difficult to justify the use of scarce community funds on major mitigation works.

Central Government Actions

As with the sustainable use of resources various government departments are taking action to avoid, remedy or mitigate adverse effects. The primary tool for doing this is the RMA, however, there are a number of upcoming initiatives that are likely to have an impact in the years to come. Examples of this are:

- The Ministry for the Environment is planning to look at standards for land transport noise; and
- Changes to vehicle exhaust emissions testing. Two specific changes to the Vehicle Exhaust Emissions Rule are proposed. The first is an amendment to the implementation date for the emissions standard known as Euro 4 for heavy diesel vehicles. The second is the introduction of emissions performance requirements relating to visible smoke, which would be checked at vehicle inspections.

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Regional Actions

The Regional Land Transport Strategy 2005 identifies a range of policies for avoiding, remedying and mitigating adverse environmental effects of transport.

The high level policy is to:

> *Take all reasonable steps to avoid, remedy or mitigate adverse environmental effects and improve health outcomes of transport.*

The policies identified to implement this high level policy relate to emissions reduction, improvement of water quality, enhancement of amenity, retrofitting solutions and advocacy.

In addition, ARC is also undertaking a programme to reduce emissions from buses in the public transport fleet. Heavy-duty diesel vehicles produce most of the emissions of fine particles (PM10) and these emissions are the ones that are responsible for the majority of adverse health effects due to motor vehicles in the region.

Council Actions

Council's current focus for further reducing the adverse effects of transport is to better manage and improve the quality and quantity of water runoff from road corridors in contaminant sensitive areas. Specific initiatives are:

- Investigation and application of additional methods of reducing waterborne transport contaminants as part of the Council's adoption of Integrated Catchment Management Plans;
- Further investigation and trialling of water sensitive designs (such as trialling of porous pavements);
- Enviropods – Council operates over 300 'enviropods', which are devices that are fitted inside roadside catchpits to remove coarse solids, litter and general debris washed off the road surface; and
- Recognition of the requirement for a high level of water treatment in transport design.

Council is undertaking a streetscape design project that will result in a high level strategy for major corridor streetscape and use of road reserve land with the provision of guidelines and standards.

Council will review sustainability policy and objectives in other council standards and documents such as the District Plan.

In addition to the initiatives above, Council will also be supporting regional and national initiatives to reduce the adverse effects of transport within the city.