"The sustained growth in traffic volumes that will occur over the next decade leads to the requirement for substantial increases in roading capacity and increased traffic management efficiency."

Chapter

4

Roading

- A very large investment to complete the long-planned arterial road network
- Major new roads will be built in a way that caters for passenger transport, cycling and walking, as well as cars and trucks
- Maximise the efficiency of the roading network by using the best travel management techniques and emerging technologies
- Manage each road according to its function in the roading hierarchy.

4.1 Introduction

The very strong growth in travel demand within Manukau city is going to continue throughout the 10 years covered by this strategy, driven by population growth and land development. New urban development will continue in several forms: greenfields subdivision and development at Flat Bush; large-scale business development at East Tamaki-Highbrook and Ascot-Airport; and growth at selected rural settlements including Beachlands-Maraetai and Clevedon. This is in addition to further infilling of existing residential and business areas. This lower-density, suburban style of development where origins and destinations are widely separated is relatively difficult to effectively service by modes other than private vehicles. In spite of the implementation of policies in this strategy (together with those of the Regional Land Transport Strategy and the Regional Growth Strategy) which seek to achieve a better balance in trip making between the various transport modes, and to eliminate the need for some car based trips altogether, the overwhelming majority of trips (absolutely and by proportion) will continue to be made by commercial vehicles and private cars on roads.

The city's business areas are already significant in regional and national terms and provide large employment numbers. Commercial vehicle movements will increase with their growth, and also generate demand for additional roading capacity. Increased provision for rural residential population, together with growth in heavy vehicle movements associated with rural extractive industries (e.g. quarrying and forestry) will result in the need for substantial rural arterial upgrading.

"More intensive development will commence at the identified growth centres of Manurewa, Manukau city centre, Mangere, Papatoetoe and Pakuranga."

Later in this planning period it is anticipated that more intensive development will commence at the identified growth centres based on the existing town centres at Manurewa, Manukau city centre, Mangere, Papatoetoe and Pakuranga. Although intensification at these growth centres will more readily facilitate use of non-car modes of transport, the intensification may also stimulate the need for significant road upgrading and also retrofitting of passenger transport, cycling and walking facilities into the existing road network.

With congestion and delay already being significant issues for Manukau this sustained growth in traffic volumes that will occur over the next decade leads to the requirement for substantial increases in roading capacity and increased traffic management efficiency. Accordingly the largest category of proposals and expenditure in this transport strategy involves a large programme of roading construction and efficiency measures to add capacity to the arterial roading network.

The programmes, policies and actions included in this strategy aim to:

- Deliver a roading network that minimises congestion and delay in access to the growing business areas in East Tamaki and Highbrook, Wiri and Airport-Ascot, to the ports of Auckland and Tauranga, and to the Auckland International Airport
- Provide better access and movement across Manukau city and connection with the rest of the Auckland region
- Facilitate the efficient movement of goods and services
- Significantly reduce peak period congestion that imposes unnecessary costs on business, and loss of productive time for commuters as they access places of work and education.

This will be achieved by:

- Completing the arterial road network that has been planned to complement the development of residential and business zoned land
- Upgrading some existing arterial roads to cater for the existing and future traffic demands placed on them
- Maximising the efficiency of the network by carefully managing each road according to its function in the roading hierarchy, and utilising the best traffic management techniques including emerging technologies
- Maintaining and renewing the existing asset to a level that sustains its ability to maintain the level of service it provides.

4.2 Additional Roading Capacity to Accommodate Growth

An extensive construction programme to provide additional roading capacity will be undertaken over the next decade in order to:

- Alleviate growing traffic congestion
- Cater for the additional traffic volumes that will be generated by further urban development.

As indicated in the previous chapter, there will be large-scale growth and development in the business/employment areas of Highbrook, East Tamaki, Wiri and Airport-Ascot, over the next 10 years. This will be accompanied by residential growth in Botany and Flat Bush, and also intensification at those town centres which have been designated as urban growth centres in the Regional Growth Strategy (see Chapter 3). This growth and development will generate large volumes of home-based trips, and freight movements to and from the business areas of the city.

The arterial roading network for the city has been planned and provided for in the council's District Plan for many years but is not yet fully in place. During the period covered by this transport strategy, that network will be substantially completed by a number of projects. Some will be individual links and others will be construction and/or upgrading of area wide road networks to accommodate growth. The council will be the lead agency for many projects, but there will also be large state highway projects undertaken in the city, led by Transit NZ.

Completion of the Arterial Roading Network to Accommodate Growth

The council is committed to the completion of an extensive programme of roading construction, in terms of both scope and expenditure, in order to complete the planned arterial network and provide the capacity to deliver the key transport objectives. In particular, the programme committed to this strategy targets two of these objectives:

"Improve Access and Mobility" and "Assist Economic Development".

The existing network of urban arterial roads portrayed in Figure 4.1 with the future network that will be completed over the next decade shown in Figure 4.2. Figure 4.3 shows the rural part of the network.

Commitment to this programme of road works represents a very large undertaking for the council. The full programme is documented in the Long Term Council Community Plan and has been reproduced as Appendix A to this strategy. That programme has three broad components:

i. New or substantially upgraded roads to provide additional capacity to accommodate existing traffic growth and also for the future traffic generated by new growth and development in the city. Travel demand management techniques (Chapter 8) will be applied to offset the tendency that new capacity has to result in a higher level of trip making by existing businesses and households. The programme of new roading involves a total expenditure of $258 million over the next 10 years comprising a range of projects including: construction of totally new arterials; major upgrading and widening of some existing urban arterials and many rural arterials; installation of new traffic signals and kerbing and channelling.

ii. Upgrading of existing roads and the installation of new or replacement infrastructure to restore the level of service afforded by them. These works include a wide range: safety improvements; footpath and lighting improvements; addition of cycleways and footpaths; and stormwater improvements. This category of work involves $66 million expenditure over 10 years.

iii. Renewal of the depreciating roading asset so it can continue performing the function it was designed for. This involves extensive work totalling $366 million over the next 10 years and is discussed (together with maintenance) later in this chapter.

Figure 4.1: Existing Primary Road Network

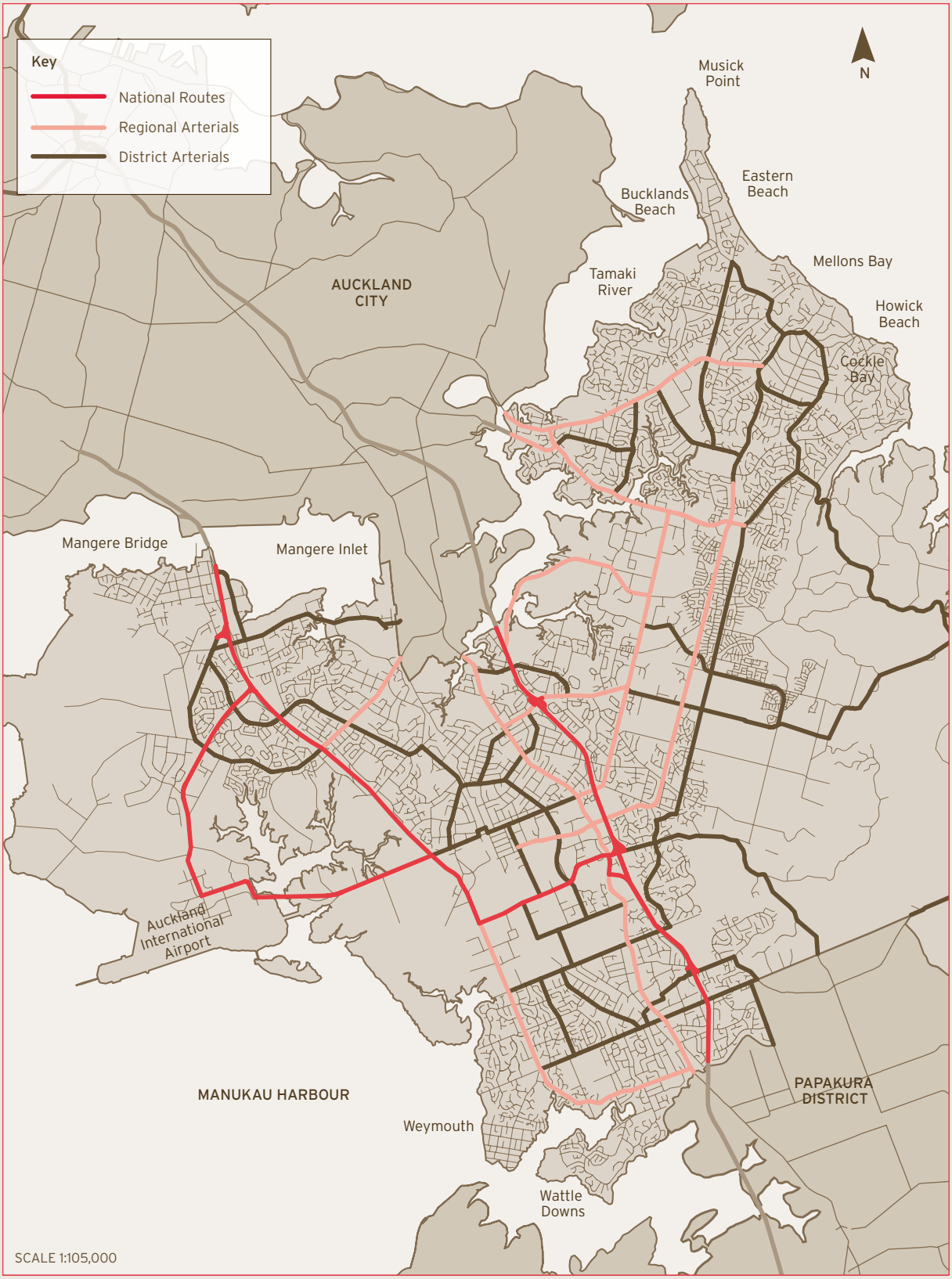
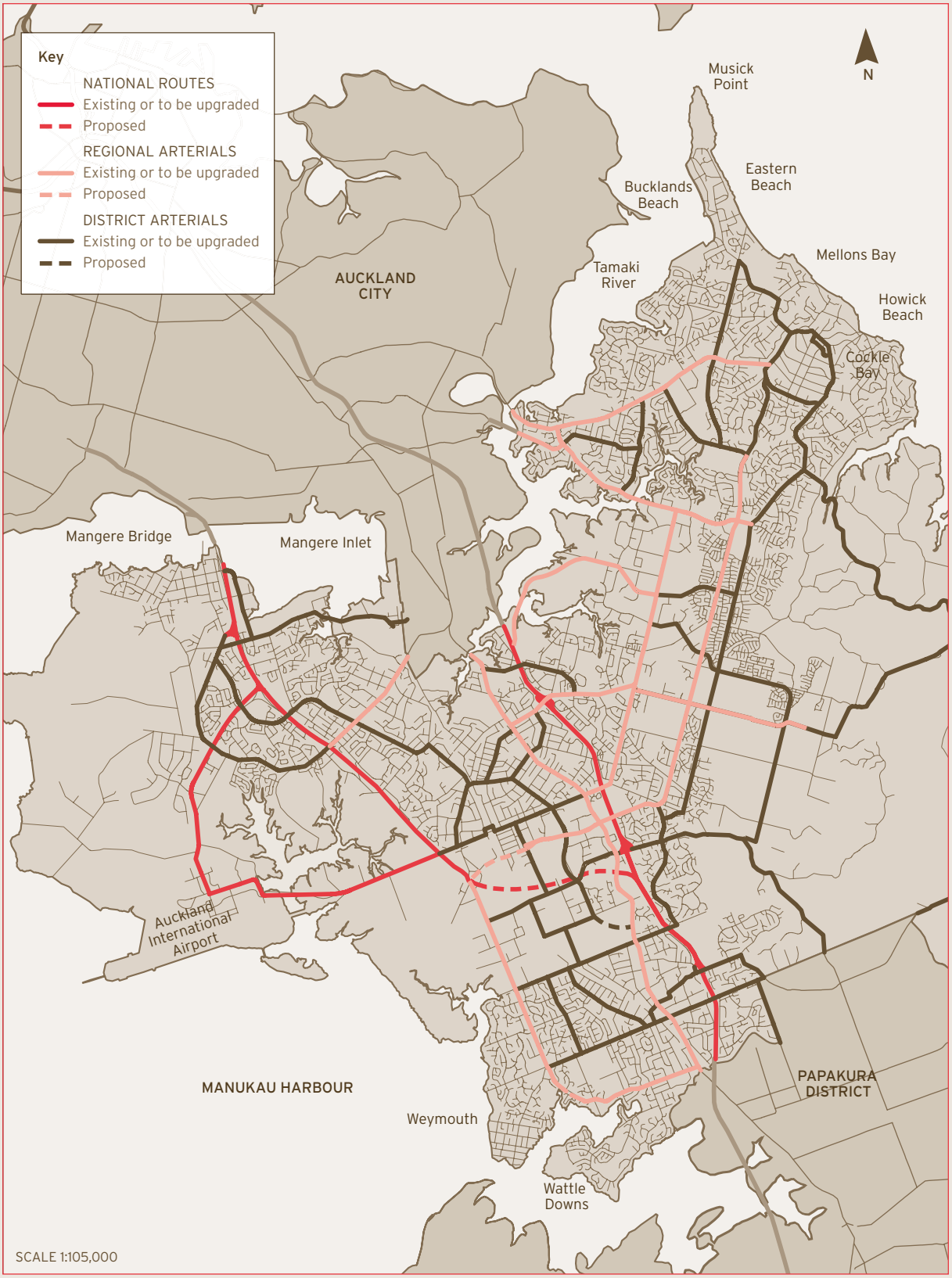
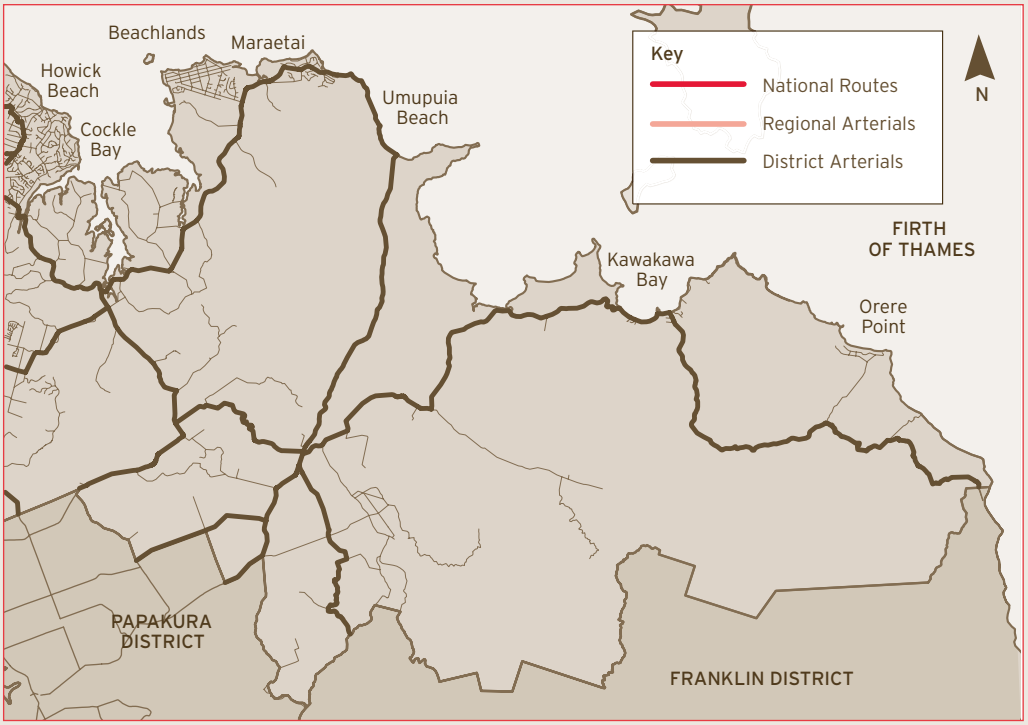


Figure 4.2: Future Primary Road Network



"The roading programme will be funded through a combination of rates, loans and external subsidy funding from Land Transport NZ."

Figure 4.3: Existing Road Network (Rural)



Completion of the Primary Road Network portrayed in Figure 4.2 involves a number of council-led projects. The larger, urban projects are listed below:

- Highbrook/East Tamaki connection to Southern Motorway (MCC/Transit shared role)
  - Highbrook Drive construction
  - Highbrook motorway interchange
  - Allens Road upgrading
- Flat Bush development
  - Chapel Road upgrading and bridge
  - Flat Bush School Road upgrading and bridges
  - Murphys Road upgrading and bridges
  - Ormiston Road upgrading and entry bridge to town centre
  - Smales Road upgrading
- Wiri Station Road and Surrounding Street Improvements (in association with construction of SH1 to SH20 Connection)
- Cavendish-Liverpool-Nesdale connection
- Hollyford Drive duplication
- Druces Road continuance.

The larger groups of projects are portrayed in Appendix.

Funding Provision for this Strategy

The roading programme will be funded through a combination of rates, loans, and external subsidy funding from Land Transport NZ as part of the National Land Transport Programme. Development contributions are also charged to all new building developments citywide to fund capital expenditure required to increase the capacity of arterial roads due to growth. Additionally some funding will be obtained from landowners adjacent to the works on the basis of the benefits that their land obtains from the road construction or upgrading. The estimated total expenditure for each project is provided for in the LTCCP.

In addition to council and Transit NZ roading, another 12km (approximately) of new roads are constructed in the city each year as part of the land subdivision and development process. These roads are constructed in accordance with council standards and regulated through the resource consent process. When completed these roads are vested in council ownership. It is estimated that approximately $74million worth of such sub-divisional roads will be vested over the next 10 years.

Transit New Zealand Projects Within Manukau City

Transit NZ will also be completing strategic projects within the city:

a. Completion of the Western Ring Route (including the Southwestern Motorway). See Appendix.

   The Western Ring Route will be constructed to provide an alternative to the existing Northern-Southern Motorway (SH1) route through the central part of the Auckland metropolitan area. The ring route will connect the Northern Motorway at Albany with the Southern Motorway at Manukau Central via a series of new and existing motorway links on the North Shore, West Auckland, and Manukau. The Manukau component will utilise: an upgraded Manukau Harbour Crossing; the Southwestern Motorway between Mangere and Wiri; and the connection of that motorway to the existing Southern Motorway. This involves two very large projects:

   i. Second Manukau Harbour Crossing. This includes:

   - Duplication of the Mangere Bridge to four traffic lanes plus a bus lane in each direction.
   - Widening the motorway to three lanes each direction between Mangere Bridge and Walmsley Road.

   ii. Connection between State Highways 1 and 20. This includes:

   - A new motorway to motorway connection of four lanes together with a reconfiguration of ramps, through the Manukau Central – Wiri area providing for all directional traffic movements.
   - New full interchanges at Lambie Drive and the Nesdale-Liverpool-Cavendish link.

b. Completion of the Highbrook Drive connection to the Southern Motorway. See Appendix.

   Opened in April 2007 this project was jointly planned and funded by the council and Transit NZ. Manukau City Council contributed $44m of the total $63m cost. In addition to major traffic benefits for motorway access, this project provides direct connection of East Tamaki and Highbrook business areas to the Southern Motorway. The project features:

   - A new interchange providing for all traffic movements and motorway connection to Highbrook Drive
   - A new network of walking and cycling facilities between Highbrook-Otahuhu-Otara localities.

4.3 Investigations into Possible Future Links

The Process of Analysis for New Roads and Transport Corridors

The previous two sections have shown that the future arterial road network that will be required in conjunction with the growth of the city has been well planned and provided for. However as development proceeds other strategic transport demands and problems that need to be addressed become evident. A standard sequence and methodology is followed in the investigation of such issues, and ultimately to specify the transportation project required. That process typically involves the following steps:

Identification of Transport Problem/Need/Demand

↓

Investigation of Issues

↓

Scoping and Formulation of a Transport Study

↓

Development of Options

↓

Testing/Evaluation of Options

↓

Selection of Preferred Option

↓

Scheme Design

↓

Route Protection – District Plan

This is followed by the standard processes for design, funding, tendering and contracting.

This process includes working together with other transport agencies, neighbouring local authorities and the affected communities.

Roading Studies in Progress

There are three current investigations of this nature that are likely to result in the formulation of specific transport projects. The capital expenditure programme of the LTCCP makes provision for the possible future costs of two of these, but these provisions are subject to refinement as the studies proceed. They are portrayed in general terms in Figure 4.4.

1. Auckland Manukau Eastern Transport Initiative (AMETI)

This set of studies is considering means of alleviating existing traffic problems and accommodating future transport requirements on the routes leading to, and across the Tamaki River between Botany-Pakuranga-Panmure town centres. This includes Ti Rakau Drive on the Manukau City Council side of the river, and Mt Wellington Highway on the Auckland City side. The studies are considering existing constraints at the river bridges, and on several intersections and roads leading to them. Options include walking, cycling and passenger transport facilities in addition to vehicles. Freeing up traffic flows in this area may also assist intensification at the growth centres planned for the existing centres at Pakuranga and Panmure.

2. Mill Road – Redoubt Road Corridor Study

The Southern Sector Strategic Transport Study established the need to conduct detailed investigation into provision of a new route between Papakura – Flat Bush – Manukau Central. Considerable development and population increase will take place at both Flat Bush (future population 40,000) and Takanini-Papakura (future population 40,000) ends of this route. This is currently served by Mill Road, a former rural road that is now under increasing pressure to accommodate urban traffic in terms of both capacity and physical condition. Traffic from both of these development areas will also increasingly access the motorway interchange, future rail link, and business activities located at Manukau central. Investigations include the role of passenger transport. This link would also provide an alternative to the Southern Motorway over its length, during occurrence of a significant disruptive event.

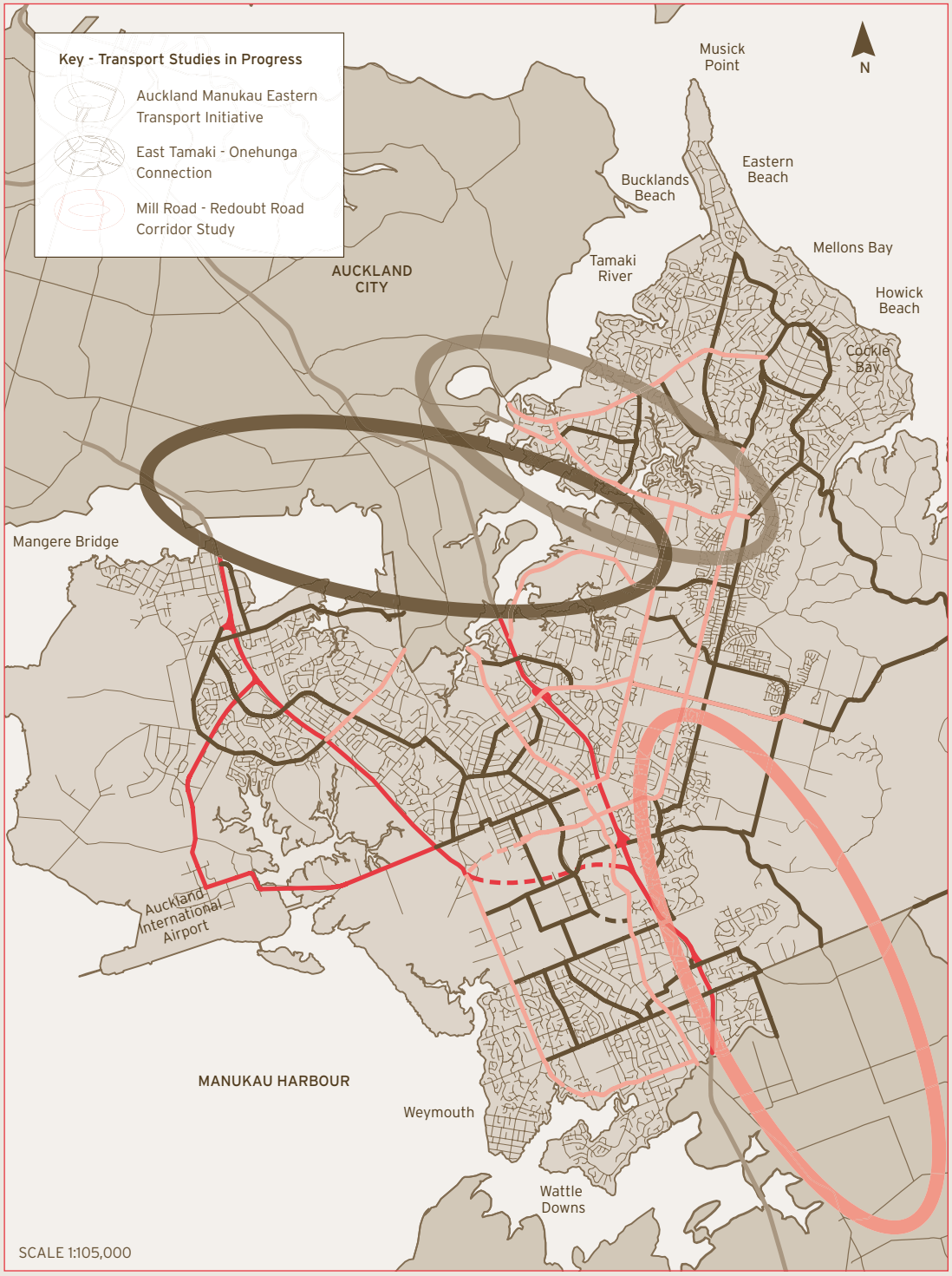
3. East Tamaki – Onehunga Connection

This study is considering a potential route from the East Tamaki business area, through Highbrook across the Tamaki River to the Auckland Industrial Edge business area, and then along the northern edge of the Manukau Harbour to Onehunga.

Such a route would provide a direct connection between significant business areas in East Tamaki and the south-eastern isthmus. It would potentially take considerable business related traffic volumes off the Southern Motorway and the existing, but longer connecting route that comprises the South Eastern Highway and Ti Rakau Drive.

An additional investigation into future airport access needs is also being commenced by Auckland International Airport Ltd in conjunction with Transit NZ and the council.

Figure 4.4: Transport Studies in Progress (2006/07)



"Where appropriate new roading projects will incorporate bus priority measures from the outset."

4.4 Multimodal Roads and Travel Corridors

New Arterial Roads provide for Vehicles, Pedestrians and Cyclists

The new and upgraded arterial and principal roads that will be constructed as part of this transport strategy differ from those of previous generations. Given the much wider scope of the five key transport objectives and Tomorrow's Manukau transport outcomes, most planned future roading projects will produce multimodal roads or travel corridors rather than facilities designed almost exclusively for the movement of only cars and commercial vehicles. New arterial road corridors will provide for the effective and safe movement of private motor vehicles, buses, cycles, pedestrians, and goods.

Where appropriate, new roading projects will incorporate bus priority measures from the outset rather than having to retrofit later on. Examples include the second Manukau Harbour Crossing and AMETI, which will include bus lanes or other priority measures.

The former practice of simply constructing footpaths beside traffic lanes is being superseded by provision of well planned, designed and landscaped walking and cycling paths. Where possible these will be separated from moving traffic lanes to enhance safety. Where roading projects involve a new or upgraded local network of road links, such as the new motorway interchange and connection to Highbrook Business Park, a whole network of cycle and walking links will be provided to connect multiple origins and destinations.

Although this approach significantly increases the cost of what would have formerly been traditional "roading projects" the council is committed to this multimodal approach in order to deliver its mix of transport outcomes. Provision of these facilities at initial construction achieves a more effective design solution and is often more cost effective than subsequent retrofitting.

The following chapters describe the council's commitments to ongoing provision of these facilities in order to increase the relative usage of these modes. Constraints in the width of available road reserve can limit the ability to provide walking and cycling facilities completely separated from other vehicles. On-road cycleways and adjacent footpaths are not perceived to be as attractive or safe to use by more vulnerable cyclists. Retrofitting of existing roads is frequently time consuming and expensive and not always able to be fully achieved due to the impacts on adjoining properties and business, carparking, and relocation of utility services. Notwithstanding this, where possible and where the benefits justify, this strategy provides for ongoing retrofitting in addition to new roads, for example, where the service performance of QTN bus routes can be enhanced through installation of bus priority measures.

Integrated approach used in Greenfields Development

Greenfields development provides the opportunity to develop local road networks in which the movement of vehicles, cycles and pedestrians are co-ordinated with each other and also integrated with the land use pattern. Although relatively few such opportunities remain for large-scale greenfields development, the council plans to use them as a means to deliver a more balanced transport system and contribute to achievement of the transport objectives and outcomes.

Flat Bush (ultimately 40,000 residents) is an example of this approach where local roads, walkways, cycle paths and bus stops are being provided in a complementary manner. Residential development is occurring between 'green fingers' which contain vegetation and surface water channels and ponds. Commonly, local roads will only have residential development fronting one side, so that the other side fronts the green space. Within that green space, connected walkways and cycle paths provide for and encourage greater use of the modes within better-designed and more attractive settings.

Design and Function in Growth Centres

The design approach in Flat Bush contrasts favourably with the approach in the past. Networks of local roads, walking and cycling facilities have historically been developed so houses have frontage to local roads with green space and waterways at the back. Rather than encouraging use, these 'backyard strips' have sometimes become little used and unsafe. Furthermore, walkways between local streets and cul-de-sacs have not always provided safety or good enough connectivity to activity centres or to passenger transport routes, and consequently have not been well used. In such cases it has been more convenient or safer for residents to use the car for local trips.

Intensification of the growth centres within existing developed areas will usually involve retrofitting or comprehensive redevelopment in order to effectively provide for and encourage walking, cycling and access to passenger transport. The built form in these centres will be different to the greenfields facilities but design will still be of paramount importance to ensure: maximum connectedness; crime prevention through environmental design; and that routes are barrier free for use by persons with disabilities.

4.5 Managing Functionality - The Roading Hierarchy

One of the most important concepts used in planning, developing and managing the city's transport system is that of the roading hierarchy that is used to differentiate between road types based on their function. Figure 4.5 explains the five steps from low order local roads, up to the highest order national routes (which include state highways and motorways).

The road network has two principal functions: to provide for the safe and efficient through movement of vehicles; and to provide access to properties and the land use activities located on them. Roads with principal roles of providing for property access and local traffic are at the bottom of the hierarchy. They generally carry low traffic volumes travelling at lower speeds, and are engineered with narrower carriageways and less heavy wearing surface treatments then those further up the hierarchy. Adjacent land uses are typically sensitive to the adverse effects of traffic and include typical suburban housing.

Conversely, the main purpose of roads of the types nearer the top of the hierarchy is to provide for the safe and efficient through movement of vehicles. These typically carry large volumes at higher speeds and are engineered and managed accordingly. Access to and from adjacent land use activities is strictly controlled and in the case of motorways, prohibited.

The two principal functions of roads can conflict with each other. For example, through moving traffic can be delayed or subject to hazards by vehicles entering and leaving the traffic stream from car-parking and adjacent properties. Conversely, traffic use of the road can adversely affect the safety, ability to access, or amenity levels of users of adjacent land.

In order to effectively provide for both of these functions, and mitigate the potential conflicts between them, the city's roading network has been classified into a hierarchy and zoned. The hierarchy (Figure 4.5) distinguishes between primary roads with the main function of providing for the safe and efficient movement of through traffic, and secondary roads whose most important roles are to accommodate locally generated traffic and provide property access.

Zoning of roads in the District Plan is the mechanism used to achieve the purposes provided for by this hierarchical classification of roading function. All roads are zoned and activities within the zoned roads and adjacent land are thereby controlled through policies and rules in the city's District Plan. For example, in order to minimise adverse impacts on roading functions the District Plan controls:

- Access to properties through standardised requirements for the location and size of vehicle crossings
- The conduct of works or any activities within the road zones themselves.

The primary road zone's main purpose is to provide for the safe and efficient through movement of vehicles on a network of national, regional and district arterial roads. Provision for direct property access is a secondary function for roads in this zone. In order to protect the primary road network from the adverse effects of adjacent land use activities, the District Plan requires all land use activities which require access to or egress from the primary road zone to obtain a restricted discretionary activity resource consent approval. This provides the council with a means to control the intensity of traffic generation, location and design of site access, onsite circulation and parking layout, and to minimise or eliminate the way these elements adversely impact on the through traffic function.

The secondary road zone's main purposes are to provide for locally generated traffic movements and provide for direct property access from collector and local roads. These are typically low speed traffic environments that provide for comparatively safe cycle and pedestrian activity in addition to vehicle movements. Local safety and amenity levels can also be enhanced on the secondary network by the use of the traffic calming measures designed to reduce traffic speeds or divert through traffic onto primary roads. This specification of the hierarchy is thereby used to keep unnecessary traffic (and its effects) off the secondary network.

District Plan provisions are also applied in other zones which aim to prevent high traffic generating activities locating within local residential streets (which are part of the secondary network).

Figure 4.5: Manukau Roading Hierarchy

	Category	Description	Routes Included	Road Types	Road Zone
Primary Network	National Routes	Roads which: • Form part of a network of national significance • Are a significant element in the national economy	• Motorways • State Highways • Limited Access Roads	• Motorways	Primary
	Regional Arterials	Roads which are: • Of strategic regional important, and; • A significant element in the regional economy	• Roads providing significant intra-urban links • All other roads of regional or inter-regional importance	• Regional Arterials	Primary
	District Arterials	Roads which are: • Of strategic district importance, and • A significant element in the local economy	• Links between residential, business or recreational land use activities	• District Arterials	Primary
Secondary Network	Collector Routes	Routes where are: • Locally preferred between or within areas of population or activities • Complementary to district arterials	• Links between local roads and arterials	• Through roads • Business roads with a collector road function	Secondary
	Local Roads	Roads whose primary function is property access	All other roads servicing land use activity	• Local roads • Business roads without a collector road function • Cul-de-sacs • Service lanes • Private ways • Access-ways	Secondary

"In order to improve flows on the motorways during peak periods Transit NZ will be deploying ramp signalling."

4.6 Managing the Road Network to Function as Efficiently as Possible

There is ongoing emphasis on managing the road network as efficiently as possible in order to maximise its carrying capacity for all road users including private vehicle occupants, passenger transport users, pedestrians and cyclists. This involves refinement and application of both existing traffic management techniques and the use of emerging technologies. This is in addition to the construction of additional capacity.

Roading corridors also have other important functions in addition to providing for the movement of people and goods, and access to properties. They also provide corridors for utility services (pipes and lines above and below ground level), and corridors of visual amenity through the inclusion of street trees and gardens.

Maximising Efficiency through Traffic Engineering and Co-ordinated Traffic Management

The efficient management of traffic flows at the local level is achieved through application of standard traffic engineering techniques including speed controls, intersection management and lane configuration. Additionally, through traffic on secondary roads in residential areas is eliminated or calmed using Local Area Traffic Management Schemes (LATMS).

Application of relatively simple road management techniques can make appreciable improvements. These include management of well defined and signposted routes to major regional destinations, for example the Ti Irirangi-Cavendish-Liverpool-Nesdale route from the east of the city to the airport.

Traffic engineering at this level mainly involves application of national standards or national best practice solutions. When applying such solutions to local traffic issues care is taken to analyse their effect on the wider transport context, especially to ensure that the function of the primary road network is not adversely affected as a result of remedying a local problem.

To maximise the efficiency of traffic flows and expenditure, traffic management for the region's primary road network is centrally coordinated by the Traffic Management Unit. This is a joint venture between the Auckland local authorities and Transit New Zealand. The council undertakes planning and funding for traffic management within the city but the following operational functions are coordinated on its behalf by the TMU:

- Optimisation of traffic flows
- Incident management
- Operation and asset management of traffic signal, CCTV and Variable Message Signage; on the primary road network. This includes computerised management of the linked traffic signal system.

This successful joint venture approach will continue to be supported by the council. Road users benefit from this coordinated approach that is seamless in terms of jurisdictional boundaries.

In order to improve flows on the motorways during peak periods, Transit New Zealand will be deploying ramp signalling on all motorway on-ramps during the first three years covered by this strategy. Ramp signals stop traffic at the entrance to ramps and then regulate the entry of vehicles so they can easily merge with traffic already on the motorway. Overseas experience indicates that when appropriately implemented this technique can assist motorway traffic when flows are heavy (but still moving). The council will monitor and work with Transit New Zealand to ensure that traffic queues and delays are not simply transferred from motorways and ramps onto the arterial roads that feed them.

The use of temporary traffic signals may also become more widespread. They fulfil a similar function to ramp signals by controlling access from one leg of an intersection in order to let traffic from another leg enter and pass through it. This can be used in situations where an uncontrolled intersection functions well during most of the day but has a much heavier demand from one direction during the peak that restricts movement from other legs.

Advanced Traveller Information Systems

It is anticipated that Advanced Traveller Information Systems (ATIS) will be deployed on the city's primary road network during the ten-year period covered by this strategy. As yet, however, technology is still rapidly evolving and it is only in its early stages of development and deployment. Such deployment is not yet fully provided for in the Long Term Council Community Plan.

ATIS comprises a set of tools which provide road users with real time information about roading and traffic flow conditions which allows them to make travel and route choices. These tools include:

- Variable message signing: These display customised messages to road users regarding traffic conditions, which they can read and act on well ahead of where incidents, delays or road works are affecting traffic flows. Currently, Transit New Zealand has deployed some signs on the Southern Motorway but it is likely that the council will extend deployment over the primary network over the next decade.
- Closed circuit television: Cameras provide information to controllers at the TMU who can then operate ATIS and traffic signals in order to better manage traffic flows in the light of changing conditions. The coverage of a small number of Manukau intersections will be extended.
- Internet information and web camera views: Information on traffic conditions supplied to a general audience who can access and take it into account before commencing trips. Currently, Transit New Zealand deploys information regarding the Southern Motorway. Coverage is likely to be extended.
- Text messaging to mobile phones: Supply of traffic flow information to targeted user groups (for example commercial vehicle drivers) is a possible future tool.

The council will work with other agencies in the deployment of ATIS in order to achieve regional consistency and co-ordination of traffic management.

Operations and Maintenance Associated with Utility Service Corridors

In addition to providing travel corridors, roads also have an important function as corridors for network utilities. Road berms and carriageways contain underground pipes (sewers, stormwater, gas, water) and lines (telecommunications, electricity), and poles bearing overhead lines. This sharing of space is convenient, yet with the increasing traffic pressure on the network it is necessary to minimise conflicts between these two functions, especially the impacts of operations and maintenance works for both roads and utilities, on the efficient flow of traffic.

The council is endeavouring to plan the scheduling and coordination of its own roading works with those of network utility operators in order to minimise disruption to road users. Several techniques are being used including:

- The application of the Code of Practice for Temporary Traffic Management which provides means to control traffic efficiently while road works are undertaken
- Inclusion of conditions in road works contracts that oblige contractors to undertake works in a manner that maintains peak period roading capacity
- Voluntary coordination of utility operators' work programmes, although this relies on full cooperation of utility companies which each have different practices and programmes. Successes in this area can be achieved, for example undergrounding of Vector lines in Howick has been successfully coordinated with Telecom undergrounding and council footpath reinstatement.

Streetscape Amenity

The presence of well landscaped and maintained street trees and gardens enhances the aesthetic quality of the urban environment. Manukau City Council's street trees and gardens policy guides their provision and location by both council operations and land developers/sub-dividers. Although much lesser in impact than utility service operators, the planning and maintenance of street trees and gardens must also be conducted in a manner and at times which minimise adverse impact on traffic efficiency.

On Street Carparking

On street carparking can adversely impact efficient flow due to the manoeuvring of vehicles entering and leaving the traffic stream to park. Accordingly the council's District Plan includes policies and rules which require parking generation to be provided for on site.

Any relaxation of District Plan parking requirements as part of travel demand management measures (Chapter 8) would have to be carefully weighed against the possibility of generating additional demand for on street parking and a corresponding detrimental effect on the efficiency of through roads.

On Road Events

Public participation in on road recreational and sporting events such as those involving running, walking, and cycling are increasing in popularity. Because of their community and health benefits, the council encourages these. The safety and potential impact on roading efficiency are carefully managed through traffic management plans which are required for each event. In rural areas, roads are commonly not of adequate width and consequently it is difficult to minimise traffic disruption from events. This will be a factor in future consideration of rural carriageway widths.

4.7 Maintenance and Renewal of Existing Roads

The Existing Roading Network

Although much of the emphasis is on making provision for the growing demand for vehicle travel by building new roads to complete or increase the capacity of the primary road network, effective maintenance and renewal of the existing very large roading asset is also an important element of this strategy.

Effective and sustainable management of the existing road network is of fundamental importance to the provision of access and mobility for people and goods. The quality of the roading asset declines over time with use, particularly the road surface itself that deteriorates faster with higher volumes of heavy commercial vehicles and general traffic. It is imperative that the network is maintained and renewed at least to the level at which it can continue to provide the same capacity, capability and service performance as it was originally designed to do.

Manukau's existing road network is extensive in size and value, comprising the largest of the council's asset classes with a total replacement value of $1.11 billion. Additionally, the land which roads and associated infrastructure occupy has a value of $1.57 billion. Figure 4.6, illustrates the extent and makeup of the council's roading infrastructure but excludes roading owned by Transit NZ and privately owned roads.

Figure 4.6: Council Roading Infrastructure

Roading Network Infrastructure	Length/No	Value
Road Pavements	1,200 km	$602m
Road Marking	1,260 km	$2m
Street Signs	38,900	$5m
Streetlights	19,000	$36m
Traffic Signals	700 poles	$5m
Traffic Controls	2,000	$1m
Bridges and Structures	150	$63m
Culverts, leads and catchpits	288,000	$210m
Footpaths, Cycleways and Pedestrian Accessways	1700 km	

The council's Roading Asset Management Plan documents the extent, physical state and performance of the roading infrastructure, compared with targeted levels of service, and the type and cost of investment that must be applied to it to sustain its ability to meet existing and future traffic demand. In order to assess the condition of the roading asset a range of measures are calculated annually, including:

i. Surface Condition Index
ii. Ride Quality Performance Indicator (roughness)
iii. Customer satisfaction
iv. Achievement of LTCCP Targets
v. Safety Performance (crash rates and severity).

Together with asset age and lifespan, this data is used to ascertain expenditure requirements. These requirements provide input to the council's annual budgeting process and ultimately the annual funding levels which are applied to roading works in the Long Term Council Community Plan. The final funding levels are determined by the council after it assesses its ability to fund the level indicated by the asset management planning process, together with consideration of other relative priorities for expenditure. As far as it is able, the council aims to fully fund the required annual roading investment given the strategic importance of the network's role in providing access and mobility. Funding is derived from land rates, Land Transport NZ subsidies and borrowings (which effectively spreads the burden over future generations).

"Expenditure on roading renewals will double over the period covered by this strategy."

Operation, Maintenance and Renewal of the Roading Asset

Very large expenditure levels are required to sustain the existing road network in a condition where it can maintain its level of service. Annual expenditure on the existing network will increase by 70 per cent over the next 10 years. Renewing the asset will cost $366m over the same period.

A number of significant issues are involved in the operation, maintenance and renewal programme and budgeting.

Roading Operations and Maintenance

$14.1m 2006/7 **Budget**

↓

$17.8m 2015/16 **Estimate**

This expenditure maintains the road pavement and associated assets at safe and functional service levels (e.g. repairs to potholes); funds ongoing operations (e.g. power for streetlights and traffic signals); and repairs damage and other wear (e.g. streetsigns). The council's operations and maintenance strategy is to move to a proactive maintenance regime, thereby minimising the proportion of reactive work required each year.

This expenditure will increase over the 10 year strategic period due to:

- An annual 2.5 per cent increase in the length of roading arising from ongoing subdivision and development
- Increasing traffic volumes of 2.5 – 3.0 per cent pa
- Some cost elements are inflating at rate higher than the CPI, such as power.

Roading Renewals

$25.2m 2006/7 **Budget**

↓

$49.2m 2015/16 **Estimate**

This expenditure provides upgrading, refurbishment and replacement of the deteriorating and depreciating roading asset. It includes: road resurfacing; reconstruction of roads, footpaths, culverts, streetlights and signs.

Expenditure on roading renewals will double over the period covered by this strategy because:

- Although urban roads in Manukau have performed quite adequately over the last 40 years without major rehabilitation, many are now reaching the end of their design life and require reconstruction as the average roading age increases annually
- The number of situations where asphaltic concrete roads are required rather than the cheaper (but less able to withstand heavy wear) chipseal surfaced roads are increasing due to increasing traffic volumes and the increasing proportion of heavy commercial vehicles
- Some component costs such as bitumen have increased at rates in excess of CPI movements (e.g. the LTNZ roading index increased by 11 per cent along the first six months of 2005).

The 2006 AMP identifies two issues regarding renewals;

- Although approximately 20km of roading requires reconstruction each year, only 8.5km is being funded. Ongoing deferral could result in increased maintenance costs and reduced road life if unaddressed
- Approximately 95km of urban roads require resealing per annum (and is funded in the LTCCP) but a backlog of approximately 90km of previously unfunded work has built up
- Much rural roading is suffering distress and deterioration due to increasing use by heavy commercial vehicles serving forestry and quarrying activities and require reconstruction. Many rural roads have evolved from old country roads that were low strength/low volume gravel roads which have been progressively sealed over the years. Some of this work has been scheduled further into the future in order to arrive at achievable budgets.

Road Network Management and Service Delivery

The council has chosen to outsource the vast bulk of the work associated with roading asset management, operations, maintenance and renewals in order to achieve efficiency through competitive tendering for the provision of works and services, and in order to qualify for maximum external subsidy funding. Council staff undertake roading planning and specification works, with most work being managed by external consultants via the Road Network Management Contract. Physical works are all outsourced. Annual measurement of professional service fees and maintenance rates for the larger Auckland local authorities shows that Manukau City Council achieves a high level of investment efficiency compared with other roading agencies.

Summary

- Roading infrastructure is a very large portion of the council's total assets.
- Sustainably managing this asset to maintain its ability to do the job it was provided for (in the face of constant degradation) is a key strategic transport priority. Operations and maintenance currently accounts for $53m annually.
- Aging of roads, higher proportions of heavy commercial vehicles, and higher traffic volumes are contributing to very large increases in the expenditure levels required to sustain the asset's ability to deliver the levels of service which it was originally designed for.

4.8 The Funding Shortfall and Other Potential Revenue Sources

At the time this strategy was being prepared it appeared that there would be an ongoing shortfall between the transport expenditure programmes of Auckland transport agencies and local authorities and the available funding. Roading expenditure is the largest component of these programmes and is one of the key issues discussed in Chapter 2.

The Transit NZ projects that together comprise the Western Ring Route are affected by the funding shortfall and will have delayed completion dates as a result.

Manukau City Council has been cognisant of its ability to pay its share of the 10-year expenditure programme that is required to implement this transport strategy. However almost every project is also dependent on subsidy funding (via LTNZ and/or ARTA), so if further serious funding shortfalls from central or regional government occur, then affected projects would have to be deferred or delayed unless the other available funding options were to become more acceptable to the council.

Legislation does provide for the use of other procurement and funding mechanisms for roading, including public private partnerships and toll roads under certain circumstances. For example toll roads are permitted where an alternative toll free route is available. However the council has no current plans to utilise these options to implement this strategy and no such provision has been made either in this strategy or in the LTCCP. There appears to be little scope for application of toll roads in Manukau, with the possible exception of AMETI.

Various types and configurations of road pricing schemes have also been floated for consideration by transport agencies, local authorities and the public as a means to generate additional large amounts of money for transport infrastructure and services in the Auckland urban area. Although the council has supported continued investigation into such proposals it remains cautious in consideration of the differential impact such schemes can have on various communities, socio economic groups, and potentially on the future business investment and development patterns of the city. Such impacts can fall differentially depending on features of the road pricing

scheme including: the magnitude of the charges, and the location of tolling points or cordons. Furthermore, the role of road pricing to generate additional revenue must be clearly related to its role as an instrument to change travel behaviour or deter trip making. This is discussed further in Chapter 8 – Travel Demand Management.

Another possible source of funds that has been suggested is a regional petrol tax. Again in the absence of any definite such proposal, this strategy has been developed based on existing funding sources.

Roading – Goals and Objectives

Goal	Manukau's roading network functions efficiently and safely for all road users.
Objectives	i. The arterial roading network provides good mobility and access for passenger transport users, pedestrians and cyclists in addition to business and private vehicles. ii. The Manukau economy is enhanced by the ability of business traffic to freely move between business areas, the airport, and other parts of the Auckland region. iii. The roading network is progressively expanded and enhanced in order to eliminate congestion and delay, and to provide capacity for the additional travel generated by ongoing population increase and large scale development of land and buildings. iv. The substantial roading asset is well maintained and renewed so that it continues to provide the level of service for which it was originally designed.

Roading – Policies and Actions

Policy		Action	
Additional Roading Capacity to Accommodate Growth			
P.4.1	Complete the planned primary road network.	A.4.1	Complete construction of the roading network portrayed in Figure 4.2.
P.4.2	Provide additional roading capacity to address current congestion and delays, together with the increased traffic volumes that will arise from ongoing population growth and development of the city.	A.4.2	Implement the planned roading programme appended to this strategy and provided for in the LTCCP.
Investigations into Possible Future Links			
P.4.3	Investigate strategic issues and travel demand using structured methodology involving other transport agencies, adjoining local authorities and affected communities.	A.4.3	Complete the following strategies and incorporate specific proposals into this strategy and the LTCCP, and protect land via District Plan processes: i. Auckland Manukau Eastern Transport Initiative. ii. Mill Rd – Redoubt Rd Corridor. iii. East Tamaki – Onehunga Link.
Multimodal Roads and Travel Corridors			
P.4.4	Design new and upgraded primary roads to provide effective and safe movement of private vehicles, passenger transport, pedestrians and cyclists.	A.4.5	Include the principles of Crime Prevention Through Environmental Design when designing new and upgraded multimodal roads.
P.4.5	Comprehensively design local roading in greenfields developments and at growth centres to encourage use of walking, cycling and passenger transport in addition to private vehicles.	A.4.6	Develop barrier free walking links and networks in association with local roading.

Roading – Policies and Actions (cont.)

Policy		Action	
Managing Functionality – The Roading Hierarchy			
P.4.6	Maximise effectiveness of the road network by planning, designing and managing roads in accordance with the roading hierarchy.	A.4.7	Categorise and differentiate roads according to their function: - Primary roads emphasise efficient and safe movement of through traffic; and - Secondary roads emphasise property access and local traffic movement.
		A.4.8	Utilise District Plan zoning to achieve the purposes of the roading hierarchy by: - Minimising adverse effects on primary roads due to activities within road reserves and from access to adjacent properties; and - Minimising adverse effects of traffic on land use activities adjoining secondary roads.
		A.4.9	Maintain high visual amenity of the city's urban streetscapes through implementation of the street trees and gardens policy.
Managing the Road Network for Maximum Efficiency			
P.4.7	Maximise the efficiency of the existing road network through application of a range of traffic engineering techniques and co-ordinated management by the Regional Traffic Management Unit.	A.4.10	Manage the roading network in a manner that maximises its person carrying capacity.
		A.4.11	Monitor work with Transit NZ to ensure that ramp signalling does not disadvantage traffic on Manukau city arterials.
		A.4.12	Create well defined, managed and sign-posted access routes to major destinations such as Auckland International Airport.
Advanced Traveller Information Systems			
P.4.8	Provide road users with options to modify their travel routes/timing by providing real time information on road and traffic conditions via ATIS	A.4.13	Work with other roading agencies to finalise, adopt and implement the Draft CCTV and VMS Strategy on the primary road network.
		A.4.14	Keep abreast of evolving technology and utilise it as part of ATIS for the city when it is stable and cost effective.

Roading – Policies and Actions (cont.)

Policy		Action	
Roading Operations and Maintenance			
P.4.9	Minimise reduction in peak period roading capacity through active management and co-ordination of the operation and maintenance of both utility services and roading contractors.	A.4.15	Seek co-operation of utility companies to co-ordinate their operations and maintenance activities with each other and with council roading works to minimise disruption to road users.
		A.4.16	Regulate the conduct of works through use of codes of practice and contract conditions.
Sustaining the Existing Roading Assets			
P.4.10	Manage the existing road assets to sustain their physical condition and capability to deliver the levels of service for which they were originally designed.	A.4.17	Update the Roading Asset Management Plan annually.
		A.4.18	Fund the annual level of investment indicated by the AMP as fully as possible given other competing priorities and the council's ability to fund.
		A.4.19	Maximise the qualification for subsidy funding from LTNZ, for expenditure on roading operations, maintenance and renewals.
P.4.11	Seek the most cost effective delivery of roading services through competitive selection of external providers of roading management, design, and physical works services.	A.4.20	Annually benchmark cost effectiveness of service contractor cost and performance against other large local authorities.