Table of contents

4 Sustainability ................................................................................................. 4.2
  4.1 Introduction .................................................................................................. 4.2
  4.2 How is public transport sustainable? ............................................................. 4.3
    4.2.1 A sustainable transport mode ................................................................. 4.3
    4.2.2 Sustainable infrastructure ....................................................................... 4.3
  4.3 Sustainability framework for transport infrastructure .............................. 4.3
    4.3.1 Queensland Government ......................................................................... 4.3
    4.3.2 Cairns Regional Council ......................................................................... 4.4
  4.4 Assessment of sustainability within the Concept Design Report ............... 4.4
    4.4.1 Promote a more sustainable transport network ....................................... 4.5
    4.4.2 Promote resource efficiencies across the whole of project and infrastructure life 4.5
    4.4.3 Protect and enhance natural, physical and human environments ............ 4.6
    4.4.4 Promote community capacity, equity and social well being .................... 4.6
    4.4.5 Promote sustainable forms of local and regional economic growth ......... 4.6
  4.5 Future investigations .................................................................................... 4.7

List of figures

Figure 4.1: The three pillars of sustainability ..................................................... 4.2
Figure 4.2: Public transport makes much more efficient use of road space .......... 4.5
4 Sustainability

4.1 Introduction

Sustainability is a concept that aims to integrate the principles of environmental conservation, social equity and economic development in any human activity. Sustainability is a central theme influencing the delivery of all major public and private sector projects. This is shown in Figure 4.1.

![Figure 4.1: The three pillars of sustainability](http://cmsdata.iucn.org/downloads/iucn_future_of_sustainability.pdf)

The concept of sustainability is particularly important when it comes to large scale, major transport infrastructure projects such as the Cairns Transit Network which contain both opportunities and risks for sustainability. While such projects provide an opportunity to achieve sustainable outcomes into the future, due to their scale they are also likely to be associated with greater impacts if the sustainability principles are not duly considered.

The concept of sustainability has been central to the Cairns Transit Network and has been addressed by various technical disciplines involved in the project to date. Sustainability principles are incorporated into the concept design by integrating the alignment and station locations within the existing urban environment in a way that minimises ecological impacts while maximising economic and community benefits. A well integrated outcome will encourage patronage on the Cairns Transit Network, thereby contributing to the more efficient movement of people within the Cairns region.

This chapter aims to:

- provide an assessment of the Cairns Transit Network to date against key sustainability principles for transport infrastructure
- provide recommendations on how to optimise sustainable outcomes in the future phases of the project.
4.2 How is public transport sustainable?

4.2.1 A sustainable transport mode

In broad terms, the planning of transport infrastructure is critical for the sustainable development of towns and cities. Efficient transport systems contribute to the sustainability of a region. Public transport infrastructure in particular is a form of sustainable development as it encourages the efficient movement of people, providing greater access for all and can help promote more self contained land use patterns. By removing buses from traffic congestion, dedicated bus only infrastructure helps improve bus engine efficiency, and thereby reduce emissions.

For example, a typical highway lane has a people carrying capacity of about 2,000 people per hour. In contrast, a busway lane can carry nine times as many people than a highway lane. By carrying more people more efficiently, vehicle emissions are significantly reduced.

4.2.2 Sustainable infrastructure

The design, materials and procedures used in the construction, operation and maintenance of a bus transit network can also enhance sustainable outcomes. Adopting a whole of life approach to the sustainability of products and materials promotes value for money through minimised resource consumption and cost savings on consumables, maintenance and disposal.

4.3 Sustainability framework for transport infrastructure

The following identifies recent government directions and initiatives on how sustainability should be addressed and on how the concept of sustainability has been applied to the Cairns Transit Network project.

4.3.1 Queensland Government

Sustainability is a central theme for the Queensland Government’s approach to planning for the future of the state. The Queensland Government’s Toward Q2 strategy specifically identifies the goal of reducing the carbon footprint of the state. The Cairns Transit Network project, by virtue of providing an alternative to private car travel, is an important step toward achieving this goal.

The Far North Queensland Regional Plan 2009-2031 builds on the elements of the Toward Q2 plan and provides an overarching framework for ensuring sustainability of the region. The regional vision for Far North Queensland seeks to achieve a stronger, more liveable and sustainable community where:

“Cairns forms the heart of an efficient and sustainable settlement pattern that protects natural, cultural and agricultural values, addresses the need to reduce greenhouse gas emissions and is supported by high level infrastructure, facilities and services.” (p9 Far North Queensland Regional Plan 2009-2031).

The Far North Queensland Regional Plan 2009-2031 identifies climate change and oil vulnerability (“peak oil”) as two critical issues in determining the future ecological sustainability of Far North Queensland. The Cairns Transit Network will support reduction in
greenhouse gases (as a contributor to climate change) and provide an attractive alternative to the private motor vehicle and more efficient use of valuable oil.

The *Far North Queensland Regional Plan 2009-2031* also identifies a preferred pattern of development within an urban footprint that addresses urban sprawl which can have adverse impacts upon the sustainability of Cairns. By containing growth within the urban footprint this ensures that:

- land is used efficiently
- transport demand is minimised
- infrastructure is provided in a cost effective way.

Most growth is planned to occur in transit oriented communities that will be supported by the Cairns Transit Network. Transit oriented communities are communities that will be specifically built around public transport. They will consist of diverse housing types, a range of employment opportunities, quality features and easy access to pedestrian and cycle paths which are linked to public transport. In Cairns, potential transit oriented communities sites are Edmonton, Mount Peter, Palm Cove, Redlynch, Smithfield, Cairns city centre, Earlville and Gordonvale.

### 4.3.2 Cairns Regional Council

*CairnsPlan* is the local government's planning document that demonstrates how development must be undertaken in an ecological, sustainable manner that meets the intent of the *Far North Queensland Regional Plan 2009-2031*.

The pattern of urban development identified in *CairnsPlan* provides opportunities for growth and consolidation, achieving the efficient use of existing and planned infrastructure. Transport is recognised as critical to the functioning of the city and the region. This is supported by implementation of a long term public transport network as a means to achieve sustainability for the region.

The concept of sustainability and the means to achieve this for the region through delivery of a highly efficient public transport system is supported in other policy documents including the Cairns Regional Council's *Corporate Plan 2009-2014* and *Cairns Integrated Public Transport Plan* (April 2005).

### 4.4 Assessment of sustainability within the Concept Design Report

Assessment of the Cairns Transit Network has been made on the following sustainability principles:

- promote a more sustainable transport network
- promote resource efficiencies across the whole of project and infrastructure life
- protect and enhance natural, physical and human environments
- promote community capacity, equity and social well being
- promote sustainable forms of local and regional economic growth.
4.4.1 Promote a more sustainable transport network

Increasing the proportion of trips made on public transport helps to manage the impacts of travel demand growth by using road space and fuel resources more efficiently than can be achieved with low occupancy private vehicles. See Figure 4.2.

Figure 4.2: Public transport makes much more efficient use of road space

The public transport network integration strategy (see chapter 14) presents information that promotes this sustainability principle. The focus of the network integration strategy is to ensure that the transit network is well integrated with the surrounding transport network. This approach aims to improve the connectivity, efficiency, accessibility and capacity of the transportation system and thereby deliver travel time savings, bypassing congestion to make public transport an attractive alternative to the private motor vehicle. This will lead to an increased proportion of trips by public transport. The strategy also guides provision for cycling, pedestrian and local bus access which will facilitate less reliance on the private car and greater use of more active and sustainable modes of travel when accessing the bus transit network.

4.4.2 Promote resource efficiencies across the whole of project and infrastructure life

Construction of the Cairns Transit Network will involve significant use of resources and energy. Achieving resource efficiencies means promoting the use of renewable, long lasting and/or fully recyclable resources and minimising the consumption of disposable, non recyclable and non renewable resources. Adoption of this approach to resource sustainability will help minimise the production of waste and emissions, maintain asset value and its component materials, and potentially reduce capital and recurrent costs.

As the detailed design phase of the project has not yet commenced, opportunity exists to incorporate specific objectives for resource efficiency and whole of life cost minimisation into the project. This may include features such as rainwater and solar energy collection and use, water sensitive urban design, climate sensitive design, energy and waste minimisation, sourcing local materials, recycling facilities and whole of life considerations.
Cairns' location presents specific sustainability issues for the construction phase. While there will be a preference to use local materials where possible, the scale of the project and the lack of local materials means there would likely be a need to transport significant amounts of construction materials from other regions. This has energy and resource implications and future strategies to minimise potential impacts will be developed as part of future detailed design phases.

Given the expected project timeframe for delivery of the different stages of the Cairns Transit Network varies significantly from short to longer term, a review of sustainability initiatives (e.g. resource efficiency, transportation of materials, and waste minimisation strategies) should be conducted at each stage of project delivery.

4.4.3 Protect and enhance natural, physical and human environments

Protecting natural, physical and human environments ensures biodiversity and environmental quality are maintained or enhanced. Encouraging particular types of urban development and infrastructure will help to promote self-sufficient and connected communities.

Most of the Cairns Transit Network is within the road reserve resulting in less disturbance and impacts to natural environments. However, there are some locations where the network crosses ecological and marine environments. The Ecology chapter (see chapter 11) identifies existing ecological values and outlines the types of strategies that can be employed to maintain or enhance the integrity of flora and fauna habitats adjoining the corridor. Particular strategies include avoiding unnecessary clearing of vegetation and landscaping with local native plant species.

Impacts on the human environment, such as access across local streets, have been addressed in the concept design through provision of pedestrian crossings and cycle/pedestrian overpasses where warranted. The urban design and architectural elements of the stations also seek to integrate with the built and natural environment. These matters will be investigated in further detail in future detailed design and impact management phases.

4.4.4 Promote community capacity, equity and social well being

The project's social benefits are significant and extend to the wider community. They include providing more reliable public transport options and increasing the convenience and connectivity of public transport to major employment and recreation centres. The Social environment chapter (see chapter 6) identifies that the Cairns Transit Network is expected to make an overall positive contribution to equity, quality of life and community values in the study corridor.

4.4.5 Promote sustainable forms of local and regional economic growth

Growth in the regional and local economies will ensure the availability of employment and a mix of local services and recreational opportunities. As Infrastructure Australia noted in its report to the Council of Australian Governments in December 2008, public transport systems play an important role in supporting the productive capacity of the economy, with large
numbers of people use public transport for their journeys to work and education. Without these networks and services, levels of congestion on our roads will be much higher and the business areas of our cities and towns will struggle to function.

Coordinating local economic development with land use planning is important in realising sustainable transit oriented development. The Land use planning and urban design chapter (see chapter 5) recognises the importance of incorporating stations at major attractions and activity centres to facilitate transit orientated communities. The Department of Transport and Main Roads is working closely with key stakeholders responsible for land use planning such as Cairns Regional Council and the Department of Infrastructure and Planning to coordinate integrated land use/transport outcomes as part of master planning processes for areas such as Mount Peter and Edmonton.

This sustainability principle is also addressed within the Economic chapter (see chapter 8). This chapter recognises the importance of local and regional economic viability and the importance of the tourism market to the regional economy. The Cairns Transit Network will increase the mobility of residents and visitors/tourists to various destinations/attractions within the region, supporting the regional economy.

### 4.5 Future investigations

This chapter has provided an overview of sustainability considerations within the Cairns Transit Network Concept Design Report. As this project progresses, the following will need to be addressed:

- legislation, policy, standards or relevant public transport planning manuals
- changing government priorities and programs, which may provide funding and support to sustainability initiatives, or which change sustainability targets or aspirations
- development of improved technology and practices that improve the availability of more sustainable products, practices and materials
- designing for whole of life sustainability through construction, maintenance and decommissioning.

Sustainability considerations within the concept design will be carried forward to the detailed design phase. Future impact management planning will also contribute to the sustainability of the project by ensuring opportunities are captured and impacts are mitigated effectively during the construction and operational phases of the project.