Department of Infrastructure and G21 Alliance

G21 Integrated Public Transport Strategy

Best Practice and Evaluation Criteria Report

Draft Final Report

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Introduction

1.1 Overview

The Department of Infrastructure and the G21 Alliance commissioned GHD to develop an Integrated Public Transport Strategy for the G21 region, which encompasses the City of Greater Geelong, the Borough of Queenscliff, Colac Otway Shire, Golden Plains Shire and Surf Coast Shire. The G21 Integrated Public Transport Strategy considers the range of public transport options available to the G21 community and presents a staged plan for the improvement of the public transport system to better serve the needs of residents and visitors.

This report presents an overview of research into best practice in the field of integrated public transport provision, with a focus upon innovations that have the greatest potential in the G21 region. It also presents a range of evaluation criteria, based on the strategic objectives of the G21 Alliance. These criteria are to be used in the evaluation of short, medium and long-term projects for implementation in the region.

1.2 Structure of Document

This document highlights some of the best national and international practices for public transport initiatives. The structure of the document is:

- Review of best practice for bus services;
- Review of best practice for rail services;
- Review of community transport modes;
- Review of infrastructure standards;
- Review of travel information methods;
- Discussion on other public transport modes; and
- Identification of evaluation criteria for the Strategy’s actions determined in the next phase of the project.
2. Best Practice for Bus Services

Bus services, and in particular their routes, have more flexibility than light or heavy rail in that they only require a road or busway to travel along rather than fixed track for the full length of the service.

This section outlines four key case studies of best practices for bus services within Australia and New Zealand, namely:

- The Perth and Fremantle Central Area Transit (CAT) service;
- The Adelaide O-Bahn busway;
- The Victorian SmartBus service; and
- The Christchurch Bus Exchange.

It also discusses other practices that focus on different components of bus service provision.

2.1 Perth and Fremantle Central Area Transit Services

Transperth operate Central Area Transit (CAT) services in the central area of Perth and Fremantle. CAT services are high frequency shuttle bus services that operate on three distinct Perth routes connecting Perth Railway Station, the Central Business District (CBD), tourist attractions, peripheral car parks and other bus and train interchanges. A service also operates in the City of Fremantle connecting the Fremantle CBD and tourist precinct. The services were introduced in response to the adoption of a travel demand management approach to city centre access and moving towards a more balanced transport system.

The daily Perth services operate on three routes that interconnect at the Perth Railway Station. The Yellow, Blue and Red routes are free services with an operating frequency of 5 to 10 minutes on the weekday and 15 to 35 mins on the weekend, depending on the route. The Red and Yellow CATS operate from 6:50 am to 6:20 pm Monday to Friday and 10:00 am to 6:15 pm on weekends. The Blue CAT has similar operating hours, except it operates until 1:00 am on Friday and Saturday nights.

The daily Fremantle service has been operating since August 2000, and while initially it operated with extended hours during the weekend evenings, it was determined that there was inadequate patronage to support these hours. However, there appeared to be demand for extending the service to South Fremantle, which was funded by reducing the operating hours on the weekend and extending the coverage of the service. The operating hours are now 7:30 am to 6:30 pm Monday to Friday and 10:00 am to 6:30 pm on Saturday and Sunday.

The CAT buses are conspicuous with a distinctive livery and a silhouette of a cat as the logo. The bus stops are an extension of the colourful marketing with distinctive
stops that include a map of the bus route and surrounding area. A real time update of the Perth bus routes is available on the Internet, showing the location of the buses and the expected arrival time at each stop. Figure 1 shows the Fremantle bus livery and bus stops.

Figure 1 Fremantle CAT

The CAT service has shown steady increase in patronage with the Fremantle CAT carrying an average of 16,000 passengers per week and passenger satisfaction has increased from 68% in 2001 to 93% in 2003\(^1\) because of service extensions. The increased bus patronage is credited with helping meet City Plan objectives by reducing the volume of traffic entering the Fremantle City centre.

2.2 Adelaide O-Bahn

The Adelaide O-Bahn is a 12-kilometre guided busway facility serving the north-eastern suburbs of Adelaide. It has been operating since a two-staged opening in 1986 and 1989. The original project, to construct a light rail transit (LRT) line, was changed to the construction of a guided busway using O-Bahn technology. The technology consists of a concrete busway with raised kerbs approximately 200mm high, separated by only slightly more than the bus width. Small “jockey” wheels (approximately 150mm dia) are attached at right-angles to the steering wheels of normal buses. The jockey wheels engage with the kerbs to keep the bus centred on the track.

The system allows the bus to be driven onto the entry to the track at approximately 40 km/h and once engaged with the track, the driver is not required to steer the vehicle.

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\(^1\) Nicholson David, Improving Access to and Circulation Within Town Centres by Public Transport – the Fremantle Central Area Transit Service
until exiting from the track. Normal buses, including articulated ones, are used and they operate normally when not on the track. Figure 2 illustrates a bus operating on the Adelaide O-Bahn.

Figure 2 Adelaide O-Bahn

Adelaide has chosen to operate the system in the true sense of an expressway with only two intermediate stops (called “stations”) at major cross-town arterial roads along the 12 kilometre route. However, one of these stops is also a secondary entry point to the busway approximately 9 kilometres from the city. Figure 2² is a map of the busway route and the catchment areas it services.

² Source: www.Adelaidemetro.com.au
Figure 2 Adelaide O-Bahn Route Map

Buses accessing the O-Bahn to travel to the City usually begin their journey in the suburbs providing a collection facility, travel express on the O-Bahn to the City edge and then distribute passengers in the City. Buses using the busway have a travel time of approximately 10 minutes less than if the bus was required to travel along the arterial road system with considerable bus priority. Patronage on the O-Bahn rose by 10.6% per annum between 1985 and 1991. While part of this rise can be attributed to population growth, similar population growth in other outer suburbs only led to a 1.4% growth in public transport patronage in those suburbs. Therefore, part of the large growth in public transport patronage can be attributed to the O-Bahn.

The facility has been designed to allow vehicles to travel safely at up to 100 km/h with a headway of 20 seconds resulting in a capacity of up to 18,000 passengers per hour using articulated vehicles. The capacity is currently limited by the availability of kerb space at City bus stops.

Another benefit of the system is that the O-Bahn has narrower tracks than a busway (7.0 m vs 9.8 m) that enabled it to be constructed in a very narrow and environmentally sensitive corridor.

2.3 Victorian SmartBus

The SmartBus project commenced with a trial service along Springvale and Blackburn Roads, Melbourne. The system, with minor differences, has also been installed in Adelaide and is similar to systems in Queensland and overseas.

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3 D.Bray and Prof. D Scrafton, the Adelaide O-Bahn: Ten Years On
Following the success of the trial the SmartBus system has been updated (eg buses are tracked using GPS rather than by dated transponder technology) and is being progressively rolled out on major routes throughout the Melbourne metropolitan area.

Key features of SmartBus include:
- It is offered as a high quality service on major routes;
- It provides passengers with real-time information as to when their bus will arrive;
- Bus drivers are continuously advised whether they are ahead or behind schedule (and by how much);
- Late running buses can be given more priority at traffic signals;
- It provides quality information to bus operators, planners and regulators to enable better, more-cost effective services; and
- It can integrate traveller information for trains, trams and buses and is intended to be compatible with the new smartcard ticketing system being introduced into Victoria.

2.4 Christchurch Bus Exchange

In order to assist inner-city revitalisation and promote public transport as an attractive option, Christchurch City Council developed the Christchurch Bus Exchange. This central city terminal provides a comfortable waiting area for passengers, real-time bus service information, a ticket office and facilities such as phones, toilets and retail shops. However, the principle design feature that was unique to the Christchurch Bus Exchange was the single flow bus lane, where buses enter the exchange on a first come first served basis and pick-up passengers through a universal set of glass exit doors with information on the next bus service provided by real-time signs. A 200-space car park was included in the new facility to provide multi-modal connectivity between cars and buses within the same exchange. Figure 3 shows the passenger waiting area for the Christchurch Bus Exchange.
The Christchurch Bus Exchange was well received by commuters and as a result is expected to reach passenger capacity in 2008. Some of the other lessons learnt from the Bus Exchange project included:

- Segregation of buses and pedestrians decreased the congestion, noise and pollution levels passengers experienced when all of the services were located on the main street;
- The main street became a more cyclist and pedestrian friendly environment;
- Bus patronage levels rose and the Exchange is operating near capacity; and
- Caters for approximately 1,050 buses per day or 15,000 passengers per day.

2.5 Application to G21

The CAT service has features that could be applied to a high frequency bus system servicing the Geelong Central Activity Area (CAA). A long-term application of this service is the provision of a conspicuous and high frequency bus that services the major activity areas within the Geelong CAA. These activity areas could include the Waterfront, Geelong and South Geelong Rail Stations, Geelong Shopping Precinct, Deakin University, Gordon Institute of TAFE, Shell Stadium and Geelong Hospital. Consideration could also be given to the investigation of a “Park and Ride” on the outskirts of the CAA and serviced by a Geelong CAT. The success of this car to bus mode transfer has reduced car travel within Fremantle. A nominal charge for parking

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Source:
at the “Park and Ride” and/or on-street parking within Geelong could potentially fund the CAT service.

Features of both the Adelaide O-Bahn and Victorian SmartBus would be applicable to the long-term public transport activity within the G21 region. The practice of providing a bus expressway between the Coastal areas and Geelong could be investigated as a long-term strategy as an alternative to providing rail or light rail infrastructure. Further investigation and planning would be required for this to occur.

The SmartBus service was developed to overcome the radial network of public transport. Transport within the G21 region also operates with this radial network and a SmartBus service could provide more cross regional movements via public transport. Other features of the system, such as providing high frequency travel and bus priority, is applicable to both the urban and regional services.

The principles of the Christchurch Bus Exchange are applicable to the Geelong CAA. These towns are similar in size and the success of the Christchurch Bus Exchange indicates that a bus interchange utilising the first-in first-out principle, rather than each service having a defined bus bay, could be applied to an interchange within the Geelong CAA. The Christchurch Exchange includes real time information to enhance the operation of the interchange.

2.6 Bus Fleet Options

2.6.1 Vehicle Size

Bus operators are now looking beyond the traditional heavy rigid diesel powered bus. A multitude of options now exist that can better meet the needs of passengers and operators including the use of different sized vehicles ranging from minibuses to articulated buses, as shown in Figure 4.

![Figure 4 Wigglybus, UK and Sydney Articulated Buses](image)

Smaller buses are often suited to lower patronage routes in regional areas. The fuel savings for the operator can be significant, leading to great financial viability and lower environmental impacts. Alternatively, where demand warrants, articulated buses can provide greater capacity along trunk routes.
2.6.2 Fuel
Alternate fuel sources include fuel cells, electricity (via batteries or overhead catenary), compressed natural gas, and more efficient and less polluting diesel engines. These may have an application in the G21 region to improve environmental performance and contribute to positive public perceptions of public transport.

2.6.3 Other options
Other potential improvements in vehicles and services include:

- “kneeling” or low floored buses with ramps to enable better wheelchair access;
- Bicycle racks at major stops and on buses (eg Brisbane) to facilitate linked bike-bus trips; and
- Enhanced amenity and security at major stops.

2.7 Application To G21
There may be a role for alternative bus designs over the medium to long term, as existing vehicles are due to be replaced. In particular, smaller vehicles with low operating costs and better manoeuvrability may bring significant benefits in rural areas to mobility-impaired passengers. The use of alternative fuels would be dependent upon community, government and operators priorities for public transport in the region. The consideration of amenity and security at bus stops has been included in the G21 Integrated Public Transport Strategy Baseline Issues Report.
3. Best Practice for Rail Services

While bus operations have the benefit of route flexibility, rail can provide high-speed travel with a large capacity over long distances. Rail has a further travel time advantage in that it has right of way over all other modes. It has high passenger attraction and can impact land use and future growth areas by focusing communities along rail corridors.

Rail services consist of either heavy (eg “train”) or light (eg “tram”) rail. This section describes the best practices for both heavy and light rail and discusses the applicability of these services to the G21 region.

3.1 Heavy Rail

3.1.1 High Speed Rail Services - Overseas

France’s Train a Grand Vitesse (TGV) and Japan’s Shinkansen (Bullet Train) are world famous, high-speed rail services that use technology combined with improvements to existing railway alignments to provide considerable savings in travel time to regional centres by travelling at speeds of over 300 km/hour. The TGV is one of the few high-speed train services to operate at a profit, paying off its construction costs within ten years.

3.1.2 Victoria’s Regional Fast Rail

Geelong is currently serviced by frequent V/Line rail services to Melbourne and a regional service that extends through Colac to Warrnambool. An upgrade of 75 kilometres of track is currently being undertaken between Werribee and Geelong to allow new state-of-the-art trains (Regional Fast Rail) to operate at speeds of up to 160 km/h. These upgrade works, combined with a new automated signalling system that will reduce delays experienced in the metropolitan system, will have the capacity to deliver a 45-minute express service between Geelong and Spencer Street Station.

Regional Fast Rail service is considered to be more applicable to the Geelong region than a higher speed service (eg TGV or Bullet) because of the mixture of suburban and rural systems and the relatively small distances compared with those in France or Japan.

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3.2 Light Rail

Light rail can bring the benefits of rail at a lower capital and operating cost than heavy rail. Its more flexible geometry and operating regime (ie it can share road-space) enable it to provide a more localised service. It is seen as a viable option for many smaller towns where a heavy rail system would be difficult to justify.

Light rail systems can vary from slower street-based trams to high speed, high acceleration vehicles operating on their own right of way. Light rail can also share the use of heavy rail tracks with freight and regional passenger services, as has been done in Karlsruhe, Germany.

Despite these benefits, light rail requires a significant investment in infrastructure and often relies on a dense population corridor to support frequent services. It is therefore not usually recommended for regional areas.

3.3 Application To G21

In the short to medium term, light and heavy rail networks would be difficult to justify due to relatively low patronage and high investment costs. If strong urban corridors are formed within Geelong, there may be potential to develop a rail network in the longer term.

In anticipation of this possible future need for rail networks, appropriate corridors should be considered in planning and land development.
4. Best Practice for Community Transport

Community Transport is often overlooked when determining the transport needs and availability of a community. Local community groups or councils typically operate these services to meet a particular group’s special transport needs and usually use volunteers to drive buses or cars to collect residents who wish to travel to a location.

This section reviews the benefits of community transport, including demand responsive transport systems, community service transport and car sharing and their places within an integrated public transport system.

4.1 Demand Responsive Transport

Demand responsive transport is a term that covers a variety of transport services that fit between the standard definitions of “taxis” and “buses”. They typically include an element of flexibility in that they can deviate from their usual route to pick up and drop off passengers at their home or destination. This makes the service more attractive to many users, including the elderly and those with a mobility constraint.

The section highlights two case studies in Adelaide and Dubbo where community service transport has met the needs of the community where normal services could not.

4.1.1 Roam Zone, Adelaide

In Adelaide a demand responsive bus service operates services in the areas of Hallett Cove, Shadow Park and Trott Park. The system has been given the nickname the Adelaide ‘Roam Zone’ and is different from many late night services in that it operates seven days a week rather than just on weekends. The service has fixed routes during the day and then after 7pm, the service drops off passengers at their home, providing increased safety for those travelling home at night. The service connects with rail stations within the area and can be accessed at bus stops throughout the area or picked up from their place of origin. Figure 5 is a route map of the area serviced by the Adelaide ‘Roam Zone’.

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6 Source: www.Adelaidemetro.com.au
This type of late night service counteracts perceived safety concerns that often relates to late night public transport use and increases the potential market of public transport users. This type of service is particularly attractive to youth, in that they can use safer public transport to travel late at night rather than rely on family members and friends to drive them or provide a vehicle. Within an area that has a university and a large youth population attached to it, this type of service can be applicable to the G21 region.

An extension of this principal could be applied to pick up and drop offs throughout the day, particularly in smaller communities where the diversion will not significantly delay other passengers. This then provides a service to elderly or people with special needs who have difficulties accessing bus stops and rail stations and currently rely on others or taxis for their transport needs.

4.1.2 Dubbo, NSW

Following a review of the existing Dubbo town bus service it was determined there was an opportunity to provide an alternative service that better meets the needs of the community. As part of this review a demand responsive service was proposed that was a hybrid ‘hail or dial-and-ride’ service. This type of service involved operating four fixed hail-and-ride routes on a half-hourly timetable in four dial-and-ride zones to the North, East, South and West of Dubbo. These services interchange on the hour in the CAA with the East and South routes interchanging half-hourly and the North and West interchanging half-hourly. The timetable has a 10 to 15-minute time lag to allow for diversions to pick up or drop off dial-and-ride passengers.
The zones have been developed so that most passengers can reach major patronage generators within one bus. This includes the CAA, Orana Mall, Dubbo Hospital, TAFE College and University.

Dubbo have considered implementing this service using school buses in the off peak periods meaning reduced start up costs due to the availability of fleet. In Dubbo, community transport services are currently under demand to provide this type of door-to-door service.

4.2 Community Transport Services

Community transport is a similar concept to demand responsive transport, but is often more tailored to the needs of individuals or groups with special needs. Community transport may include an unscheduled bus route, which only picks up passengers who have pre-booked their trip. Another example would be the availability of a community car for private short-term use. Both of these examples would usually operate at a financial loss in recognition of the benefits of greater mobility for disadvantaged individuals and communities. Some form of subsidy or financial support would be required.

This type of service requires a centralised call centre and/or web site to enable bookings. As some of these services are run by local community groups such as the bowls club, local hospitals or church groups they are often reliant on volunteers to either co-ordinate the service or drive the bus or car. This volunteer service is what makes community transport service different to the commercially run demand responsive services. The benefits of community transport over commercial fixed route services are that passengers with special needs get the attention they require and they operate both door to door and at a time that suits the passenger.

4.3 Application To G21

Demand responsive services have strong potential for the G21 region. The actual solution chosen will depend upon the passenger demand, distribution of destinations and the rate of take up of the service. It may also be a hybrid service in that it may vary throughout the day, with regular peak services but demand responsive routes during the off-peak and night.

Community transport options will be more dependent upon the need for such services and available funding. They will primarily be of benefit where there is a lack of alternate transport options for certain sections of the community, such as the elderly or special needs groups. Currently many groups within the G21 region run volunteer transport services and there is an opportunity to co-ordinate these groups and make more efficient use of the volunteers and vehicles available.
4.4 Car Sharing

Car sharing is a concept that allows people to utilise a vehicle for short periods to fulfil travel needs that are best met with a car. It is typically used by people who do not have access to a car, and who satisfy most of their travel needs by walking, cycling or public transport.

Car sharing organisations purchase vehicles which are parked throughout an urban area. Members of the organisation book their usage of the car through a call centre or web site. They pay a usage charge, typically made up of per km and/or per hour charges, and also sometimes a regular membership fee.

Car sharing is best for people who require a car infrequently, and drive perhaps less than 10,000 km per year. It is also of benefit to those who cannot afford to buy a vehicle themselves.

Car sharing has recently been operating in Sydney and Melbourne through Newtown Car Share and GoGet Car Share.

4.4.1 Application to G21

This sort of program typically works best in areas with established public transport networks where there is little need to own a car. As such, it is not an immediately attractive option for the G21 area. However, a car sharing scheme may be an option for smaller communities where there is a demonstrated social need for a shared vehicle.
5. Best Practice for Infrastructure Provision

For an integrated public transport system to be successful the whole door-to-door trip must be considered and not just the type and standard of service available to passengers. The location of stations and stops must be accessible to passengers and the stop itself must be safe, attractive and usable by all passengers and not just able bodied passengers.

This section highlights the areas that bus and rail infrastructure can be improved to coincide with some of the best practices occurring nationally and internationally.

5.1 Integrated Ticketing Systems

Integrated ticketing has been a welcome advance for public transport users in Melbourne and environs through the Metlink ticket. This has allowed easy transfer between services and reduced in-built financial penalties where a transfer is required. However, integrated ticketing has not been widely introduced throughout the G21 region due to multiple operators and a lack of coordination.

Ticket integration could include modes of transport not typically associated with such programs; such as fixed fee taxi rides or demand responsive bus services that connect with regional transport such as V/Line coaches. This would allow for better connectivity with areas currently outside of the catchment of trunk regional services and give certainty to public transport users.

An example of successful multi-modal ticket integration is Hong Kong’s contactless stored value smart card known as the Octopus Card. Launched in 1997, the Octopus Card System collects fares from Hong Kong’s Mass Rapid Transit (MRT) system that includes railways, buses and ferries. Not only used for public transport purposes, the Octopus electronic cash system has also expanded to enable payments at convenience stores, supermarkets, fast-food restaurants, on-street parking meters, car parks and many other point-of-sale applications. Octopus is one of the worlds most successful electronic cash systems with other 12 million cards in circulation throughout Hong Kong, which is nearly twice their population. Singapore’s EZ-link card for its MRT and bus systems, the EasyCard in Taipei as well as the Oyster Card for the London Underground also use the same technology used by the Octopus system. Some future developments in the use of the Octopus card include:

- Payments for taxis;
- Control access to offices, schools and apartments; and
- Use at service stations and vending machines.
5.1.1 Application to G21

This initiative would bring immediate and significant benefits for public transport users across the G21 region. Its introduction will involve the cooperation and transfer of funding across multiple agencies and companies.

5.2 Station Access Upgrades

Passengers must be able to quickly and safely access the public transport stop in order for the public transport trip to be an attractive option. In addition, disabled access is increasingly important in recognition of community values and Disability Discrimination Act (DDA) compliance requirements. These aspects have led many governments and transport operators to reconsider the quality of access to their stop or interchange.

For example, consultants Nelson/Nygaard recently produced a guideline for the Bay Area Rapid Transit system (BART) in San Francisco, USA. This report highlighted the importance of the ‘last mile’ of the trip to the passenger, referring to the trip between the transport stop and the intended destination. Whether the passenger is going to walk, cycle, catch a bus or taxi, or drive their own vehicle, their experience in accessing this transport mode is as important as the actual trip itself.

The BART Access Guidelines outlined a number of key principles in the provision of efficient and attractive station precincts for each access mode. They highlight the need to view the public transport stop from the passenger’s perspective and provide them with the information and environment that they require. It also describes an approach of prioritisation of station access modes, being (from highest priority) pedestrians,

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7 Source: http://en.wikipedia.org/wiki/Octopus_card
8 Available at http://www.nelsonnygaard.com/articles/article_bartaccess.htm
buses, cyclists, drop off / taxi and private vehicle parking. For instance, if pedestrian access is the highest priority then treatments such as lighting and proper walking routes with crossings should be considered foremost when making funding and land space decisions.

In a related area, GHD has completed a number of pedestrian and bicycle audits for station precincts. These studies ensure that public transport users can efficiently and safely access the station without undue interference from traffic, obstacles or poor quality footpaths / cycle routes. This kind of investigation can bring about changes to reduce the time and difficulty in accessing a station and thus increase the potential patronage of the service.

5.2.1 Application To G21

While this approach can yield greater benefits at larger interchanges, such as at Geelong, it can be applied across the G21 area wherever public transport stops are located.

As a first step, larger stations can be investigated to ensure that all access modes are catered for in a coherent manner and that there are no obvious safety issues or access barriers in the station proximity. At smaller bus stops, investigations can determine whether there is a need for pedestrian links to nearby car parks or the town centre and whether there is a need for dedicated drop off or taxi areas.

5.3 Public Transport Stop and Interchange Improvements

The quality of the passenger interchange and waiting area is critical in providing an attractive transport service. Many authorities and transport operators have no records of what infrastructure is provided at each stop, what condition it is in and what needs to be done in the future.

Many public transport operators are now linking their stop infrastructure records to a GIS database. These can be accessed internally or potentially placed on the Internet to provide passengers with a better indication of the location and quality of stops. This is particularly important for users with special needs (e.g. mobility impaired passengers or parents with young children).

This is a basic first step in the improvement of stops. From here, a hierarchy of interchanges and stops can be developed and linked to a list of recommended facilities for each type of stop. Infrastructure needs can then be identified and programmed for future upgrades. For example, an important rail station may require a staff ticket booth, disabled access, sheltered waiting areas, toilets, a public telephone, nearby bus/tram/ferry interchange, bike racks or lockers, and a commuter car park. However, a local bus stop may only require a shelter with lighting and timetable information.
Transport for London\(^9\) has identified a number of features that are common to successful intermodal passenger transport throughout London’s public transport network. These features include:

- Access within the interchange zone (e.g., escalators, ticket offices);
- Access for mobility impaired passengers including ramps for disability access;
- Signs identifying routes;
- Other wayfinding information (e.g., lighting, arrows); and
- Tactile ground surface indicators for sensory impaired passengers.

Another key element for intermodal interchanges is passenger access to and from the interchange zone. For example, Figure 7\(^{10}\) shows the close proximity of the cycle parking facilities to the bus service enables commuters to link their local network with the public transport system.

**Figure 7 A Park-and-Ride Interchange in Oxford**

Other methods of intermodal interchanges includes the kiss-and-ride and park-and-ride where train stations allocate specific areas for cars to either discharge their passengers or park for the day. These systems together with bus-and-rail interchanges connect the train network with the roads and highways.

\(^9\) Intermodal transport interchange for London: Best Practice Guidelines (January 2001 Issue 1)

\(^{10}\) Source: http://en.wikipedia.org/wiki/Park_and_ride
5.3.1 Application To G21

This is an important component of the G21 Integrated Public Transport Strategy. The Baseline Conditions report includes information on the existing condition of public transport stops throughout the region, which can be assessed and recommendations can be made as to what improvements are required.

5.4 Funding Sources

In 1998, the UK Government launched the Rural Bus Subsidy Grant and the Rural Bus Challenge. This program aimed to decentralise rural transport service provision and allow local communities and governments to develop their own transport system.

A funding scheme was developed to enable organisations with an interest in the success of a particular service to contribute to the design and funding. Some of these organisations included the Countryside Agency: a statutory agency working to conserve and enhance the English countryside, local private companies and groups representing potential users of the service. The funding scheme resulted in both improvements to existing services and entirely new services. Of these, many included innovative approaches such as real-time information or demand responsive services.

The program has been seen as very successful, with many isolated communities benefiting from the program, bringing about an increased quality of life for residents.

As part of the funding for the Fremantle CAT, there was joint funding between state and local government with the part of the local government funding coming from increasing parking fees across the board and introducing on-street parking charges on Sundays. For the Perth CAT, the service is fully funded by the City of Perth who operate a parking licensing scheme to pay for the CAT services and a Free Transit Zone in the Perth CBD and adjacent areas.

5.4.1 Application to G21

Both funding schemes appear to have potential for the G21 region and regional Victoria in general. The involvement of local communities and local companies in the funding process would provide community ownership of the public transport system. There is a body of experience available in the operation of the programs that could potentially be available to G21 if the programs were to be adopted.
6. Traveller Information

Promoting information on services to passengers and non-passengers has shown to improve patronage in the short term. One of the reasons many services are not used by car owners as an alternative form of transport for a trip is that they are unaware of the service or the savings in travel time, if any, that may be available to them. This was highlighted in the community forums undertaken for this project as an area that could potentially be improved. Many people either did not know about a service, or did not know where they could find information about a service.

This section reviews some of the methods used to inform the community of routes, timetables and connection points for public transport.

6.1 Better Service Information

Information about public transport services, and the links between the services, has historically been very poor. However, in recent years, improvements have been made such as:

- Real-time timetables at stops;
- Journey planners and timetables on the internet;
- Call centres for trip planning information; and
- SMS timetable information.

While this style of information provision is being implemented in the G21 area through the Metlink Melbourne and VicLink services, the level of information available in regional areas does not yet reach best practice. Within Victoria, the timetables and route information are available on the VicLink website. Figure 8\(^\text{11}\) is the cover page of the Internet site which is able to search for public transport options for travellers based on their start and end points.

In conjunction with the internet service is a dial up service with a TTY facility. For information on regional services, fares, timetables and bookings, passengers can dial 136 196 for connection to a call centre. This service is able to provide up to date information on V/Line services however for private bus companies while the timetable is provided they advise that passengers may wish to contact the company directly (and provide the number) in case of any changes.

\(^{11}\) Source: www.VicLink.com.au
In a similar fashion to the MetLink website service, journey planners for vehicle trips are also widely available online. Figure 9 shows the outcome of a travel planner available for Victoria that provides a map, step-by-step directions and any other related points of interest such as accommodation or attractions for any given origin and destination throughout Victoria.

Advantages of marketing this approach for the G21 region would include better origin to destination travel information and wider availability of timetable and route information. However, it must coincide with a dial up service for passengers who do

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12 Source: www.visitvictoria.com.au
not have the internet available to them. The service should be a more rounded service in that up to date information should be available from the one service rather than required to contact various companies.

6.1.1 Application To G21
Better service information is considered to be highly applicable to the G21 area. This type of information can be distributed in the short term and as new services become available. This will be of increasing benefit as service frequencies increase and there is better coordination between connecting services.

6.2 Integration of Timetables
Timetables are ideally coordinated so that lower order transport services (for example, local buses) feed regional services (such as V/Line trains). Such a system would ensure that passengers have adequate time to comfortably transfer between services without undue delay. Integration of timetables would also allow for bus-bus transfer at transport interchanges. This is sometimes referred to as ‘pulse’ timetabling, where all services converge and diverge from a node at a similar time to allow for interchange.

The public transport network in Switzerland has a top quality public transport reputation owing to schemes such as ‘pulse’ timetabling and as a result is the most heavily used in Europe today. The Swiss Rail 2000\textsuperscript{13} project goals of shorter travel times, better connections in the hubs and a day-long half hour cadence of train services in long-distance traffic were achieved through a series of measures and improvements. Some of these improvements included:

\begin{itemize}
\item Infrastructure upgrades and additional tracks;
\item Retrofitting trains with advanced signalling control systems that allowed trains to travel at speeds of over 160 km/h;
\item Upgrading old trains and using tilting trains on lines with many kerbs; and
\item Altering timetables to have a standard half-hour interval between trains.
\end{itemize}

The key to the Swiss Rail 2000 project was to achieve a system of trains serving the stations always at the same minute every half hour. This forms the basis for better passenger accessibility by taking the uncertainty out of travelling. Additionally, this enabled the trains and buses to arrive shortly before the full hour or half hour, or at the minutes 15 and 45, and leave shortly afterwards. This resulted in ideal connectivity for passengers and shorter travel times.

6.2.1 Application to G21
This is a fundamental requirement for operation of an integrated public transport network and thus must be addressed by this study.

\textsuperscript{13} Available at: http://mct.sbb.ch/mct/en/bahn2000-summary.pdf
6.3 Timetable Distribution

An essential part of marketing for public transport services is ensuring that potential passengers know when the service operates and where it goes. However, many people are unaware of the range of services available in their local area and how they may be able to use them.

For this reason, transport operators have included timetable distribution as part of the recent SmartBus project in Melbourne. The SmartBus project involves long distance cross-suburb bus services that link rail stations, activity centres and other bus and light rail routes. The project is focussed on providing a high level of public transport service to outer suburbs. Improvements included real-time information at bus stops, route and timetable information at bus stops, accessible buses and stops that met DDA requirements and on-road reliability improvements to give buses priority over vehicles. As part of the marketing for this service, timetables were distributed to households in the catchment accompanied by a free ticket to trial the service. As a consequence, patronage has increased on one route by 37% over two years.\(^{14}\)

6.3.1 Application To G21

Better distribution of timetable information to both households within catchment areas and at bus stops and rail stations is an essential part of service marketing and should accompany any major service improvement in the G21 region. Accompanied with the timetable should be route information and information on connecting bus and rail services.

6.4 TravelSmart

The TravelSmart program is an initiative to encourage public transport use through individualised marketing to potential passengers. It has been implemented across Australia, including Victoria through the Department of Infrastructure. Some of the TravelSmart initiatives include:

- TravelSmart Schools - an education program encouraging school communities to identify and solve problems associated with the journey to and from school;
- TravelSmart Communities - interviewing households directly concerning sustainable travel issues (Only completed for a handful of communities); and
- TravelSmart Work – assisting workplaces to encourage walking, cycling, carpooling and other environmentally friendly modes of travel.

The program generally involves direct marketing to schools, communities or workplaces to understand travel needs and presenting information about the alternatives to car travel. When initiated in Western Australia, it was found that the

program resulted in a reduction in car use of 13%, or a total of 100 million vehicle kilometres.

6.4.1 Application To G21

TravelSmart works best where there are strong alternatives to the car, such as walking, cycling and public transport. For this reason, TravelSmart may not be suited to the smaller communities within the G21 region, however, there may be potential for the program within Geelong to consider local bus routes, regional rail connections and opportunities for increased walking and cycling.

6.5 Common Branding and Marketing

Public transport is often presented to the traveller as a fragmented system of unconnected services. This can partially be overcome by integration of timetables and service information, as discussed above. However, a common brand and marketing strategy can achieve considerable benefits in terms of public recognition of the public transport system as a whole.

This has been achieved within Melbourne with the integration of public transport through Metlink. This has allowed a common brand to be developed and integrated within other developments such as integrated fares and integrated service information.

Another direction the Adelaide Metro has marketed is advertising the cost savings and environmental benefits of using public transport to travel to work each day (to the city) compared to driving a car. The company has calculated passengers can save up to $2,700 per year and up to 3.8 tonnes of greenhouse gases using public transport and leaving their car at home. The website also advises if there is a second car in the garage, passengers can save up to $9,000 using public transport to travel to work. The website also provides a savings calculator to determine savings depending on individual circumstances.

6.5.1 Application to G21

There is potential for this type of arrangement within the G21 area. While different operators will provide various services, these could be given a common brand for marketing and information purposes. There is also the potential for operators to network and market together rather than as individuals providing cost savings to the operators and showing the public an integrated service is being worked towards and the benefits of the system.
7. **Evaluation Criteria**

The following evaluation criteria will be used in the development of the Strategy to assess the value of each proposal. This process will determine whether individual projects are consistent with the aims of the G21 Alliance, the DOI and the community. It will attempt to balance the need for short term ‘wins’ against the more substantial gains that can be realised over the medium to long term.

### 7.1 Strategic Goals

A review of the Geelong Region Strategic Plan provided a number of strategic goals that are relevant to the Integrated Public Transport Strategy. These are:

- Improve the comprehensiveness, relevance, reliability and integration of public transport services that are accessible to people of all abilities;
- Improving the community’s awareness of transport services and access to relevant information;
- Improving the capacity for freight and logistics and ensuring such capability supports the economy and future economic development.

*Source: Geelong Region Strategic Plan (p.21)*

- Improve the effectiveness and coverage of public transport related services for both the regional community, visitors and people of all abilities;
- Develop positive community support and awareness with respect to public transport; and
- Develop land use and spatial planning approaches that facilitate access to transport services.

*Source: Geelong Region Strategic Plan (p.67)*

Of the above items, two are less relevant to Integrated Public Transport Strategy: (i) Improving the capacity for freight and logistics, and (ii) Develop land use and spatial planning approaches.
7.2 Guidelines

A framework has been developed to provide focus for the proposed project evaluation criteria. The proposed evaluation criteria used to assess the projects developed as part of the Strategy are formulated from this framework, the Department of Infrastructure’s Investment Appraisal and Evaluation Guidelines and best practice undertaken in other project’s evaluation criteria. The criteria appraise the projects based on the triple bottom line of economic, social and environmental benefits to the community. The framework is detailed in Table 1.

Table 1 Triple Bottom Line Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurable</td>
<td>Ability for quantified evaluation</td>
</tr>
<tr>
<td>Targeted</td>
<td>Criteria based goals</td>
</tr>
<tr>
<td>Relevant</td>
<td>Applicable to study objectives</td>
</tr>
</tbody>
</table>

7.3 Evaluation Criteria

7.3.1 Economic Criteria

In order to provide funding support for the range of physical infrastructure and service provisions which will be identified as part of the G21 Consultancy, it will be necessary to complete a range of economic analyses. These analyses will form the necessary inputs to a series of Business Cases for the range of initiatives proposed.

GHD will rely upon a range of economic and technical criteria for the various project components based on DoI’s Investment Appraisal and Evaluation Guidelines. These Guidelines follow the Business Case procedures as required by the Department of Treasury and Finance (DTF) for investment approval.

The proposed economic appraisal criteria (as distinct from economic evaluation criteria which is concerned with the examination of projects after completion) will incorporate social and environmental effects where relevant to provide a Triple Bottom Line (TBL) assessment.

The following procedural steps will be followed by the economic criteria to be applied to the individual projects:

- Identification/verification of the ‘Strategic Fit’ of the individual proposal, i.e., to what extent the proposal is consistent with and relevant to existing State Government policies and committed projects. Initial confirmation of a range of parallel projects (to form a program of investment) may be best supported by the preparation of a LOGFRAME analysis. LOGFRAME analysis is an approach to the clearer
identification of objectives, inputs, outputs, assumptions and risks, associated with

a particular project or an array of projects;

- Clear specification of project objectives, including the range of beneficiaries and
  area of influence. Demand forecasts, under a range of scenarios, will need to be
developed in parallel. All feasible options will be outlined, including the ‘do-nothing’
and/or ‘minimalist’ positions;

- Identification of the likely nature and range of benefits for each of the proposed
  options. These will relate to local/community/regional/state impacts including:
  - travel time savings (commuting and waiting);
  - savings in car/taxi use;
  - savings in accidents/reductions in accident ‘risk’;
  - increased commuter satisfaction;
  - impacts on property values; and
  - increased participation in employment/improved accessibility to jobs.

Other specific project benefits will be identified during the community consultations.
The estimation of the economic benefits will be based on a comparison of the ‘with’
situation after the project, as compared to the ‘do-nothing/minimalist’ position, to avoid
double counting.

Care will be taken to ensure that only economic benefits to users and potential users
will be included. Financial gains to transport operators will be excluded (part of any
separate financial analysis);

- Identification of all relevant project-related costs. These will cover both
  infrastructure component costs (capital and ongoing maintenance) and service
  delivery costs, such as the financial contributions to bus service operators (operator
  subsidies), as contracted with private bus operators. All costs will be expressed in
  2005 constant prices, with GST cost components (10%) deducted;

- A 20-year analysis will be undertaken to match all costs and benefits. The forecast
demand estimates will be incorporated in relation to the range of identified benefits.
All costs of the project components will be shown, including any initial start-up or
planning costs;

- Estimation of the net benefits of the individual projects over the project life. All net
  benefits will be traced over the 20-year project life, on an annual basis. Where
  relevant, the residual value of the physical infrastructure will be included as a
  benefit, in the final year. The net annual benefits of the individual projects will be
  analysed using discounted cash flow (DCF) techniques. Four different investment
  criteria will be estimated:
  - Net Present Value (NPV), using DTF’s preferred interest/discount rate;
  - Economic Internal Rate of Return (EIRR);
  - Benefit-Cost Ratio (BCR); and
  - Benefit-Investment Ratio (BK).
The minimum cut-off or ‘hurdle’ rates or values for the individual projects will also be set, in accordance with both DoI and DTF practice (as reflected in the annual budgetary approval process);

- Completion of a range of sensitivity analyses and risk assessments. This will involve the re-estimation of key criteria for specific projects where critical assumptions relating to annual costs, patronage growth, fare levels, etc., may be seen to be “sensitive” to the project’s overall viability. How to mitigate or manage specific risk factors will be documented;

- Identification of relevant non-quantifiable impacts. In any project, particularly projects involving consumer behaviour, there will be impacts which cannot be accurately quantified and monetised. These impacts will be separately identified and listed. Ranking in likely order of magnitude will be undertaken. If necessary, multi-criteria analysis techniques could be applied to assist in identifying their relative importance to the quantified impacts;

- Separating out the distributional/external impacts. Not all non-user or externality impacts can be included in the DCF analyses. It will be important to ensure that multiplier impacts are not included (such as construction impacts); and

- Preparation of a clear summary of Investment Results. Any project recommendation will need to be supported by a clearly identified range of project options and corresponding economic appraisal results. It is proposed to present all project results, in both spreadsheet and narrative form, together with all relevant assumptions in a fully transparent way.

### 7.3.2 Social Criteria

Social criteria and benefits, while harder to define, for this project have been developed based on analysing the options for their ability to meet the objective:

- Improve the comprehensiveness, relevance, reliability and integration of public transport services that are accessible to people of all abilities.

Five criteria have been developed with measurable quantities to assess the social benefits of the options and their relevance to meeting the Strategy’s objectives:

- Identification of the access options to major employment centers and educational centers;
  - Distance from employment and education
- Identification of the access to other transit and connecting services;
  - Number of connecting services
- Review of the service provision to regional areas and other households of concern;
  - Number of services to that particular area
- Review of the access provisions for all potential users of the service;
  - Service proximity to all potential users of the service
Evaluation of consistency with other regional and local transport and land use plans;
  - Highlighted in other studies.

While the economic appraisal will be based on quantified evaluation, the social and environmental appraisal will be based on a qualitative analysis in many cases due to the nature of their benefits. This qualitative analysis will be based on the study team’s assessment of the expected benefits as “high”, “medium” or “low” for each of the criteria. Table 2 details some measurable amounts by which the social criteria can be prioritised.

<table>
<thead>
<tr>
<th>Social Appraisal Measures</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Distance from employment and education</td>
<td>Less than 500m</td>
<td>Between 500m and 2 km</td>
<td>Greater than 2 km</td>
</tr>
<tr>
<td>2. Number of connecting services</td>
<td>Greater than 3 connecting services</td>
<td>2 connecting services</td>
<td>1 or less connecting services</td>
</tr>
<tr>
<td>3. Number of services to that particular area</td>
<td>5 or more services</td>
<td>Between 2 and 4 services</td>
<td>1 or less services</td>
</tr>
<tr>
<td>4. Service proximity to all potential users of the service</td>
<td>Within 1 km proximity to 50% of the suburb</td>
<td>Within 1 km proximity to 30% of the suburb</td>
<td>Within 1 km proximity to 10% of the suburb</td>
</tr>
<tr>
<td>5. Highlighted in other studies</td>
<td>Highlighted in more than 1 study</td>
<td>Highlighted in 1 study</td>
<td>Not mentioned in other studies</td>
</tr>
</tbody>
</table>

7.3.3 Environmental Criteria

The criteria that has been developed to measure and assess the environmental benefits of the options and their relevance to meeting the Strategy’s objectives:

- Evaluation of effects on the natural environment taking into consideration:
  - Air quality - Impact of vehicle emissions on air quality;
  - Noise - Traffic noise levels;
  - Effects on natural areas and parklands - Influence on existing natural areas and parklands; and
  - Energy consumption - Use of recycled materials and low energy devices.

- Effects on land use patterns and future land use development
  - Level of improvement in future land use.
In a similar fashion to the social analysis, Table 3 indicates some measurable amounts by which the environmental criteria can be prioritised.

Table 3 Environmental Appraisal Measures

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of vehicle emissions on air quality</td>
<td>Negligible impact on air quality</td>
<td>Minor impact on air quality</td>
<td>Significant impact on air quality requiring monitoring</td>
</tr>
<tr>
<td>Traffic noise levels*15</td>
<td>Less than 50dB</td>
<td>Between 63dB and 50dB</td>
<td>Greater than 63dB</td>
</tr>
<tr>
<td>Influence on existing natural areas and parklands</td>
<td>Negligible impact</td>
<td>Impacts on 1 existing natural area</td>
<td>Impacts on 2 or more existing natural areas</td>
</tr>
<tr>
<td>Use of recycled materials and low energy devices</td>
<td>More than 2 energy reducing initiatives</td>
<td>Displays 1 energy saving initiative</td>
<td>No energy saving system implemented</td>
</tr>
<tr>
<td>Level of improvement in future land use</td>
<td>Significant improvement</td>
<td>Minor Improvement</td>
<td>Negligible improvement</td>
</tr>
</tbody>
</table>

*15 Values sourced from VicRoads Traffic Noise Reduction Policy
8. Summary

8.1 Best Practice Overview

Review of different facets of public transport best practice both nationally and internationally indicates that some of these practices are employable in the G21 Integrated Public Transport Strategy. The areas that were reviewed were:

- Buses, focussing on CAT services, the Adelaide O-Bahn and alternative bus fleets;
- Rail, reviewing TGV High Speed Rail Service and light rail;
- Community service transport, reviewing demand responsive systems in Adelaide and Dubbo and community transport;
- Infrastructure at stops and stations;
- Dissemination of travel information; and
- Alternative transport practices.

It was determined that several practices were applicable to the G21 region including:

- Attributes of both SmartBus and CAT services can be tailored to meet the needs of the G21 region;
- Alternative bus fleets as vehicles require replacing, providing lower operating costs and better manoeuvrability through areas;
- Demand responsive system, similar to Dubbo and Adelaide’s services where buses deviate from routes to offer a door-to-door service and increase security and accessibility;
- Investigation of access to station interchanges and bus stops;
- Provision of information to patrons on a GIS database of stop locations and conditions;
- Improved marketing and travel information distribution;
- Alternative funding sources; and
- Integrated ticketing systems.

8.2 Evaluation Criteria Summary

Evaluation criteria were developed to assess the value of the proposals to be identified in development of the Strategy. This process will determine whether individual projects are consistent with the aims of the G21 Alliance, the DOI and the community. The objective by developing these criteria is to balance the need for short term ‘wins’ against the more substantial gains that can be realised over the medium to long term.
The evaluation criteria developed are based on a triple bottom line evaluation looking at the economic, social and environmental benefits of the options being considered. Table 1 outlines the key criteria that will be evaluated:

**Table 4  Key Criteria for Evaluation Appraisal**

<table>
<thead>
<tr>
<th>Evaluation Area</th>
<th>Criteria for Benefits</th>
</tr>
</thead>
</table>
| Economic        | ▶ Net Present Value (NPV), using DTF’s preferred interest/discount rate;  
                  ▶ Economic Internal Rate of Return (EIRR);  
                  ▶ Benefit-Cost Ratio (BCR); and  
                  ▶ Benefit-Investment Ratio (BK). |
| Social          | ▶ Access to major employment centers and educational centers;  
                  ▶ Access to other transit and connecting services;  
                  ▶ Service provision to regional areas and other households of concern;  
                  ▶ Access provisions for all potential users of the service; and  
                  ▶ Consistency with other regional and local transport and land use plans. |
| Environmental   | ▶ Effects on the natural environment taking into consideration:  
                  ▶ Air quality;  
                  ▶ Noise;  
                  ▶ Effects on natural areas and parklands;  
                  ▶ Energy consumption; and  
                  ▶ Effects on land use patterns and future land use development. |
8.3 **Next Step**

The next step is to develop a Draft G21 Integrated Public Transport Strategy taking into consideration the best practices reviewed in this report, information on the baseline conditions determined in Phase A of the study (including input from targeted community forums) and outputs from the demand model being developed of the region as part of the study.

The Draft G21 Integrated Public Transport Strategy and the long and short-term actions will be presented to the G21 Advisory Committee as well at a second round of community forums. These forums provide an opportunity for community members involved in the issues forums to see the outcomes of the Strategy. Following these forums and incorporation of comments provided by the Advisory Committee, a final version of the G21 Integrated Public Transport Strategy will be made available.
Appendix A

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