

1 Introduction

Tauranga City Council ('TCC') has commissioned MRCagney to assist with the development of the Tauranga Parking Strategy ('the Strategy'), a strategic document that will outline TCC's approach to managing and supplying public parking (both on-street and off-street) throughout Tauranga City. As part of developing the Strategy, there is a need to establish an evidence base to respond to key parking challenges or issues that are present in Tauranga. The identification of these challenges and issues has come about from internal discussions within TCC, discussions between TCC and MRCagney, and feedback obtained from key stakeholders during preliminary engagement that took place during October and November 2018.

Presenting the evidence base will be done in the form of a series of written technical notes. This is the **seventh** of a series of technical notes and will address the issue of Park and Ride. The technical notes in this series are:

- Technical Note 1 (Parking Management in Major centres).
- Technical Note 2 (Financial Viability of Council Supplying New Public Off-street Parking).
- Technical Note 3 (Using Parking to support PT and Active Transport).
- Technical Note 4 (Parking on Residential Streets).
- Technical Note 5 (Kerbside Space Allocation).
- Technical Note 6 (Prioritising Different Types of Parking).
- Technical Note 7 (Park and Ride).
- Technical Note 8 (Parking Enforcement, Monitoring and Technology).
- Technical Note 9 (Impact of Autonomous Vehicles on Parking).
- Technical Note 10 (Parking and Charging Points for Electric Vehicles) – prepared by TCC.

2 The challenge

Tauranga has a bus-based public transport network that has a small patronage base, with a new network implementation that commenced on 10 December 2018. As the network grows alongside population and employment growth, it is inevitable from our experience that calls for park and ride facilities to be established will grow, especially to service peripheral and lower density parts of the city to provide access to the public transport network to more people. This type of feedback has already been received from preliminary engagement that has taken place to date.

There is currently no park and ride in Tauranga so the development of the Parking Strategy is an opportune time to think about and address the following questions:

- What are the benefits and disbenefits of Park and Ride?
- Why provide park and ride in Tauranga?
- When is park and ride the most appropriate intervention?
- Where should Park and Ride investment occur to maximise benefits?
- How should Park and Ride be managed and designed?

Addressing these questions as part of the Strategy development would enable TCC to have a clear understanding on, among other things, whether it should be providing park and ride, and what it should be doing it to improve access to public transport.

The purpose of this technical note is to review how park and ride is provided for and managed in other cities. While this review will include other New Zealand cities with park and ride, unlike the other technical notes, the review will also expand into other overseas cities in recognition of the fact that there are no New Zealand cities with park and ride beyond Greater Wellington and Auckland. Furthermore, the technical note will examine the technical and academic literature to provide an evidential base upon which to make decisions on park and ride supply and management as part of the Strategy development.

3 Tauranga context and potential

3.1 Current context - public transport and Park and Ride in Tauranga

In this section, we establish the scene for Park and Ride and public transport in Tauranga, by covering existing Park and Ride capacity, existing public transport patronage, general population characteristics, and journey to work mode share.

Table 3-1: Population, employment, patronage and journey to work mode shares in Tauranga

Tauranga Public Transport and Park and Ride Statistics	
Park and Ride Capacity	0
Average Weekday Bus Boardings	2,976 ¹
Population	131,500 ²
Population Density	783/km ²
Number of Jobs	61,500 ³
Job Density	366/km ²
Journey to Work Mode Shares (Census 2013)	1.6% Public transport 3.8% Walk 2.9% Bicycle 8.8% Worked at home 0.8% Other ⁴ 1.3% Motorcycle 80.8% Car
Existing bus infrastructure	Links Avenue (AM peak and westbound only) Hewlett Road State Highway 2 Hairini Street State Highway 2a entrance (northbound only)

Please note that Table 3-1 mainly considers Tauranga. However, there is a significant commuter population that travels in from the Western Bay of Plenty District that impacts on the transport network. As such, commuters coming from out of Tauranga should also be a key consideration when considering Park and Ride locations (including considering potential Park and Ride locations outside the Tauranga City boundary).

As evidenced by Table 3-1, Tauranga does not have any existing formal Park and Ride spaces. Its average weekday bus boardings and public transport journey to work mode share are low, however there appears to be significant potential for public patronage growth.

3.2 Tauranga has potential

3.2.1 Local research

Market research undertaken in Tauranga by Key Research in December 2018 and January 2019 highlights that a better bus services (which includes supporting infrastructure) were the main improvements required for motorists

¹ Tauranga BayHopper had an annual patronage of 1,860,251 in the year to June 2016 according to the Bay of Plenty Regional Council's Public Transport Sub-committee Public Transport Patronage Report - June 2016. The average weekday boardings was calculated with the following formula: $P^{*0.8/250/2}$ where P = annual patronage.

² Statistics New Zealand subnational population estimate 2017

³ Employee count, which is a head-count of all salary and wage earners in February 2017, Statistics New Zealand

⁴ Includes ferry, taxi, boat, aeroplane and other transport modes not already stated

to consider transport options other than the car (e.g. better timetable, routes, shelters, app, and more regular services).

These conclusions are in line with the consultation undertaken for the Tauranga Transport Plan (undertaken 25 September to 27 October 2017). 2361 submissions were received. Some key points were:

- The main drivers of respondents' current mode of transport were:
 - Convenience (mentioned 1668 times)
 - Speed (1409 times)
 - Reliability (1038 times)
 - Affordability (838 times)
 - Other factors were safety, environmentally friendly, required for work, health and other reasons (e.g. child drop off, fun etc.).

- 1781 (89%) of the 1,982 respondents who answered this question said that Public Transport, walking and biking options should be delivered sooner than the current 30-year target.

- The topic that received most support was to 'Ensure our city grows in a way that supports high quality public transport, biking and walking options'. The topic 'Importance of reducing reliance on cars' was also highly rated. Within this category, the following feedback themes were mentioned most:
 - Bus frequency / times (204 times)
 - Bus needs to be better (general) (200 times)
 - Bus availability / routes (121 times)
 - Bus reliability (101 times)
 - Park & ride (86 times)
 - Bus affordability (80 times)

The above shows that bus frequencies, travel times, reliability and to some degree affordability are highly important to existing and potential bus users.

3.2.2 How does the bus network compare to people's expectations?

In most parts of Tauranga bus services frequencies are one bus every 30mins, with a few corridors with multiple bus services providing a higher all-day frequency. However, in the book *Human Transit*, Jarrett Walker contends that a minimum frequency of 15 minutes is required to create a convenient turn up and go public transport service (i.e. no need for a timetable). This principle was followed in Auckland when they rolled out their new bus services between 2016 and 2018, which provided a minimum of one bus every 15 minutes from 7am-7pm, seven days a week on all main bus routes. To date the new service has resulted in significant increases in bus patronage. In the recent Auckland Regional Public Transport Plan 2018, they have now stated that they will be providing a minimum of one bus every 10 minutes on routes classified as 'frequent'.

Also of note is:

- That throughout most of Tauranga bus journey times are considerably slower than a journey by car and journey times are no more reliable than a car. This is due to a limited number of bus priority lanes, the added journey time for buses due to bus stops along the route and the average time passengers need to wait for buses to arrive (due to low bus frequencies).

- A two-way bus fare in Tauranga with a smart card is currently \$5.44. Parking is free at all of Tauranga's centres and public streets, except within the City Centre area. Parking fees in the city centre are:
 - \$3, \$4 and \$7 per day in the off-street car parking areas.
 - \$11 per day (early bird) in the car parking buildings.

- \$2 per hour in on-street parking spaces.
- There are areas on the city fringes where on-street car parking is free.

As such if commuters are able to park in the off-street car parking areas then the cost of all-day car parking is cheaper or only slightly more expensive than taking the bus. The cost of parking in car parking buildings is almost twice the cost of a two-way bus fare. For non-commuter trips, three hours parking in the city centre will cost similar to a bus fare (\$6). If car users (potential bus passengers) forget to factor in the cost of petrol and car maintenance into their journey costs, then in many instances the car journey would appear to be cheaper or similar in price to a bus journey. This limited price differential makes modal shift from cars to the bus more challenging in Tauranga. In areas of Tauranga outside of the city centre, a car journey would seem considerably cheaper than a bus journey (due to free parking).

While there are limited studies on the correlation between parking pricing and public transport use in smaller cities, there is strong evidence that there is a very strong correlation between higher parking prices and higher public transport use in larger cities⁵⁶⁷. Feedback received in Tauranga (that the affordability of bus services is important) and common sense, suggests that for many people at some price point the cost of all-day commuter parking will become an incentive for commuters to switch from their cars to public transport.

In summary there appears to be shortcomings of the current bus network in meeting people's desired levels of service (although the new and improved bus network did not influence the 2017 feedback and is unlikely to have influenced the 2018/19 feedback). In addition, there appears to be little to no price incentive to catch the bus over taking a car. However, there are indications that the right improvements would generate a significant number of new bus passengers. The good news is that there are initiatives underway that should help address some of the current shortfalls:

- A new higher frequency bus network has just been implemented (but there is still potential for significant increases in service frequencies).
- A programme of bus priority is being investigated in parts of Tauranga to improve bus journey times and reliability.

As the bus services in Tauranga improve, the potential for appropriately located Park and Ride sites to be successful also increase.

Other factors also show potential for increased bus patronage in Tauranga (and the success of appropriately located Park and Ride sites). Tauranga has:

- High population and employment growth.
- Increasing vehicle congestion.
- A geography conducive to an effective public transport network (e.g. corridors of travel demand along key routes shaped by natural pinch points).

⁵ http://cityobservatory.org/cities_and_the_price_of_parking/

⁶ Auchincloss, A.H., Weinberger, R., Aytur, S., Namba, A. & Ricchezza, A. (2015) Public Parking Fees and Fines: A Survey of U.S. Cities. *Public Works Management & Policy* 20(1) 49–59

⁷ Hess, D. (2001) The Effects of Free Parking on Commuter Mode Choice: Evidence from Travel Diary Data. *UCLA Working Paper Series* 34

4 Literature Review – Park and Ride Supply

4.1 Review of Park and Ride literature and strategies

In this section we review the literature on Park and Ride and the strategies adopted by other cities in respect of supplying Park and Ride. The purpose of this review is to illuminate common objectives identified in the literature and by other cities as to why investments in Park and Ride should be made.

In sub-section 4.1.1 we consider the technical literature, where we have identified several reports that deal exclusively with Park and Ride policy in a more general sense.

In sub-section 4.1.2 we then consider the role of Park and Ride in comparable cities, including Melbourne, South East Queensland (greater Brisbane), Canberra, Vancouver, Edmonton and Auckland. While all of these cities are larger than Tauranga, they provide useful examples of some of the policy challenges associated with investing in Park and Ride, and the strategies that may be adopted to guide their investment.

4.1.1 Reviewing the literature

4.1.1.1 Park and Ride – Best Practice Review

The *Park and Ride – Best Practice Review*⁸ commissioned by the City of Edmonton, Canada, provides a review of Park and Ride best practice in a variety of cities, including objectives and commonly-cited negative consequences as reported in the studied cities.

This review highlighted the following common objectives of Park and Ride:

- Reduce single-occupancy vehicle kilometres travelled (VKT) and overall VKT to mitigate congestion, and air and noise pollution;
- Extend the reach of rapid transit services to a customer base that would otherwise not be viable to serve;
- Provide safe and convenient parking to encourage drivers to transfer to public transport;
- Relocate parking away from the city centre to reduce city centre congestion, thereby freeing up land in the city centre for other land uses; and
- Minimise parking overspill onto local streets.

The review also summarises commonly highlighted negative consequences of Park and Ride on a city and its transport system, comprising:

- The financial cost of providing parking, especially if land values are high;
- The opportunity costs of Park and Ride as the land used for parking could be used for higher-value purposes;
- Encouraging low-density car-based residential developments;
- Adverse traffic, noise and visual effects;
- Poor integration with active transport modes in the station's vicinity, which discourages access to the station by walking and cycling;
- Undermining existing feeder buses to stations; and
- Inequity effects, as Park and Ride caters only for high socio-economic groups who can afford to drive.

⁸ Steer Davies Gleave (2017) *Park and Ride – Best Practice Review*, Steer Davies Gleave, Vancouver, Canada

4.1.1.2 Transportation Research Board Station Access Study

The Transportation Research Board published a comprehensive guideline document on public transport station access, including a detailed chapter on access via Park and Ride.⁹

The guideline highlights the key benefits of Park and Ride being, among other things:

- Extending the reach of public transport beyond terminal stations;
- Providing access to public transport in places where pedestrian access is difficult and/or feeder bus services are limited; and
- Intercepting motorists and removing them from congested motorways.

The guideline also defines a series of high-level objectives that Park and Ride should achieve, including:

- Improve mobility and convenience for travellers;
- Encourage desirable land use and development;
- Minimise expenditure; and
- Minimise adverse effects on communities.

It further defines more detailed objectives, being:

- Increase the availability of alternatives to single-occupancy driving, by providing travellers with opportunities to readily transfer from low- to high-occupancy travel modes and vice versa, which also includes bicycle access to stations.
- Concentrate Park and Ride efforts to enable and extend rapid transit service in areas that could not otherwise be provided (e.g. in many low-density areas).
- Reduce vehicle kilometres travelled (VKT), emissions, and energy consumption by enabling motorists to transfer to rapid transit lines.
- Reduce the demand for spillover parking onto local streets.
- Stabilise parking demand in the city centre by providing viable alternative transportation to support economic development in the city centre.
- Prioritising carpooling and van pooling for public transport passengers may allow for more boardings with the same number of parking spaces.

4.1.2 Park and Ride Strategies in other cities

4.1.2.1 Melbourne

International evidence suggests that many Park and Ride customers will have previously used modes other than the car to access the public transport station.¹⁰ This is especially true when provided in urban areas where Park and Ride effectively competes with walking, cycling, drop-off, and bus connector services.

The effects of new Park and Ride facilities in Melbourne on mode choice was studied in 2010 in a post implementation review¹¹. In 2006, the Victorian State Government committed \$90 million to deliver 5,000 additional Park and Ride spaces in and around Melbourne. By 2008 approximately 580 additional spaces at seven different rail stations had been delivered.

⁹ Transportation Research Board (2012) *Guidelines for Providing Access to Public Transportation Stations*, Transit Cooperative Research Program Report 153

¹⁰ Hamer, Paul. (2010). *Analysing the Effectiveness of Park and Ride as a Generator of Public Transport Mode Shift*. Road and Transport Research. 19.

¹¹ *Ibid* at 10

The study found that of the Park and Ride users who used the new and expanded facilities, only 36% had previously driven to their final destination. This indicates that 64% of new Park and Ride users were already train users who had simply started to drive to the station instead.

This finding was consistent with international projects reviewed as part of the study that indicated 30% of new rail Park and Ride users previously drove to their final destination. It appears that, if not carefully managed, Park and Ride has the potential to cannibalise patronage on connector bus services or undermine walking and cycling access.

Overall the study indicates that new Park and Ride spaces generally do not generate new public transport trips on a pro rata basis, and that Park and Ride is most effective at generating new trips in outlying locations.

4.1.2.2 Vancouver

In Vancouver Translink provides a limited amount of Park and Ride at Skytrain, bus and rail stations. There are only 8,000 Park and Ride spaces across the network, but the system has over 231 million annual boardings (approximately 890,000 boardings per weekday).¹² Therefore, Park and Ride only supplies around 1% of Vancouver's total boardings.

TransLink's policy is to pursue the "highest and best use of land", and pursue Park and Ride only when "it is cost effective and can provide efficient access to the transit network".¹³

Translink's policy notes that Park and Ride has several disbenefits, including:

- Sterilising land around stations that are ideal for dense developments.
- Disconnecting surrounding urban areas from the public transport system.
- Promoting low density urban development.
- Discouraging all-day rides.
- Raising safety and personal security issues.

In effect, Translink favours access by lower cost modes, such as walking and cycling, and/or pursuing opportunities for Transit Oriented Development.

4.1.2.3 Edmonton

The Park and Ride strategy¹⁴ for the City of Edmonton outlines the key objectives as being:

- Reducing congestion by shifting car trips to public transport;
- Targeting trips from regional areas to the dense downtown and university by intercepting car trips around the edge of the main urban area; and
- Focusing Park and Ride on areas where population densities do not support regular bus services.

This strategy indicates that location for Park and Rides should focus primarily on sites where intensive development is either not possible, or feasible in the short to medium term. Ideal sites are areas zoned for transport or utility purposes where other uses are very limited.

¹² *Ibid* at 8

¹³ TransLink (2012) Park and Ride Policy, Translink, Vancouver, Canada

¹⁴ City of Edmonton (2009) *Park and Ride: Transportation Planning Branch Position Paper*, City of Edmonton, Canada

4.1.2.4 Calgary

Calgary's CTrain light rail network has an average weekday patronage of 300,200, and is supported by around 15,000 Park and Ride spaces, accounting for around 15% of weekday patronage at its suburban stations.¹⁵ At each of the Park and Rides, 50% of spaces are reserved for monthly leases, while the remainder are free. After 10.00 am, unused monthly Park and Ride spaces are available for use by the general public.¹⁶

Calgary City Council's Park and Ride policy sets a 15% patronage target via Park and Ride as a formal strategy, which appears to have been realised and will be maintained¹⁷. Moreover, the policy allows private landowners to make their parking available to commuters by amending their planning regulations, makes it clear that station access should focus on the mode that provides the greatest possible catchment, and adopts a set of criteria for determining Park and Ride capacity based on the station catchment, nearby road capacity, and the character of nearby land uses. The policy also expresses a preference for Park and Rides to be located beyond a 5.0 km radius from the city centre.

Calgary City Council's Park and Ride policy contains a strategy to manage Park and Ride. It recognises an oversupply of Park and Ride detracts from the city's goal to minimise car use, generate adverse traffic effects on residential streets and neighbourhoods, as well as undermine patronage on feeder buses to CTrain stations. This view is balanced by the recognition that too little parking may constrain patronage particularly where there are few other options for accessing the system, and the policy acknowledges the need to balance these two aspects. Accordingly, the policy has identified stations at which Park and Ride capacity should be reduced, and as noted above, identified areas for Park and Ride expansion to meet the 15% patronage target.

The policy contains a cursory overview of pricing as a management tool, and considers:

- Different monthly reserve prices in different car parks;
- The amount of the car park allocated to monthly reserve parking;
- A daily Park and Ride tariff;
- A means of putting parking spaces on hold without losing the reservation and the hours during which reserve parking has effect; and
- A means to charge higher tariffs for Park and Ride to people who do not live in Calgary.

At present, all Park and Rides feature pricing as a management tool, where 50% of spaces are reserved for monthly leases at CAD\$85 per month, while the remainder are free. After 10.00 am, unused monthly Park and Ride spaces are available for use by other commuters.

4.1.2.5 South East Queensland (Brisbane)

The South-East Queensland Park and Ride Study¹⁸, undertaken by MRCagney for the Department of Transport and Main Roads, describes the role and purpose that Park and Ride is intended to play. It is described in the context as being one of many possible ways for customers to access public transport services.

The strategy notes that if Park and Ride is carefully planned and managed, it can have a range of benefits.

However, Park and Ride can also have several unintended consequences, including the following:

- Park and Ride can undermine/cannibalise other modes of access to PT;

¹⁵ *Ibid* at 8

¹⁶ Calgary Transportation Department (2016) *A review of Calgary Transit Park and Ride*, Calgary City Council, Canada

¹⁷ <https://www.calgarytransit.com/calgary-transit-park-ride-policy>

¹⁸ MRCagney (2014). *South East Queensland Park 'n' Ride Strategy 2014*, MRCagney, Brisbane, Australia

- Investment in Park and Ride can divert funds from more beneficial transport initiatives;
- Park and Ride can induce localised traffic congestion, reducing the attractiveness and ease of walking and cycling to PT;
- Park and Ride can disrupt local parking markets and, where Park and Ride facilities are utilised to access nearby uses, can undermine the benefits of investment; and
- Park and Ride can impact economic development by reserving large amounts of land for parking and reducing the land available for other, potentially more productive uses.

Other common criticisms of Park and Ride include:

- It generally only caters for peak direction CBD bound trips;
- It encourages urban sprawl;
- It reinforces the requirement for car ownership and in the absence of pricing it can lead to inefficient travel choices; and
- By making it easier for people to use their cars to access their employment, they may subsequently make additional vehicle trips before/after work.

As a result of analysing these benefits and potential negative impacts, the strategy came up with a series of policies with the goal of ensuring Park and Ride spending was optimised to ensure it could deliver the most benefits for the least costs. Key recommendations were:

- Strategically locate Park and Ride facilities to ensure there is a net increase in patronage, rather than just where there is demand for Park and Ride (i.e. will not result in converting users getting to public transport by other means into Park and Ride).
- Locate Park and Ride where there is a catchment of low to medium density residential development with limited access by walking, cycling and connector bus services.
- Focus Park and Ride development in areas where land value is low, and away from town centres and pedestrian areas.
- Do not implement Park and Ride where there is potential for dense mixed-use development, as this type of development can deliver significant patronage, economic value, and improve walkability to the station.
- Carefully locate Park and Ride to ensure it does not cause localised congestion issues.
- Where necessary, actively manage Park and Ride facilities, for example using pricing, to (1) ensure the availability of some spaces throughout the day and (2) prioritise parking for customers with genuine needs and a willingness to pay.

The same strategy recommends the use of pricing, where necessary, to actively manage Park and Ride facilities, as reported in our first technical note. The purpose of using pricing as a management tool is to ensure the availability of some spaces throughout the day and to prioritise parking for customers with a genuine need and willingness to pay.

Other management measures contained in this strategy include:

- A network-wide or corridor-based Park and Ride cap:
- Introduce a cap on Park and Ride numbers on certain corridors or network-wide. This would allow the removal of Park and Ride in certain locations where it is not considered appropriate and replaced at an alternative location on the corridor;

- Gating Park and Ride with access by goCard to prevent Park and Ride use by non-public transport users (e.g. in locations where the station is near other major attractions such as shopping centres); and
- Introducing parking restrictions on streets near a priced Park and Ride to avoid commuters parking for free on nearby streets.

4.1.2.6 Auckland

The *Auckland Transport Parking Strategy*¹⁹ clearly articulates the following key objectives of Park and Ride as being:

- Extension of the market catchment for public transport, especially where connector bus services are cost-prohibitive;
- Contributing to decongestion on Auckland's road network by intercepting commuter trips that would otherwise have been made by car; and
- Allowing relocation of commuter parking away from the City Centre to more peripheral locations.

The objectives in the *Auckland Transport Parking Strategy* are informed by the following principles, which are used by Auckland Transport to identify and prioritise sites for Park and Ride investment in Auckland. These principles include:

- Integration with public transport to extend the customer base and public transport patronage;
- Locate in sites served by rapid and/or frequent public transport, with less effective feeder bus and walking and cycling options;
- Locate in sites that can intercept commuter trips by being 'on the way' from areas of high potential population catchment, and does not worsen local traffic congestion;
- Provide in line with corresponding improvements to public transport such as station upgrades;
- Enable a land use transition that supports transit oriented development in the right locations; and
- Price Park and Rides to manage parking demand, by encouraging travellers to access the station where alternative options are available, which in turn, increases availability to travellers who have limited alternative access options and have a willingness to pay.

With regard to Park and Ride management, the *Auckland Transport Parking Strategy* makes explicit reference to the use of pricing to manage demand, by encouraging travellers to access the station by other means where alternative options are available, which in turn, increases availability to travellers who have limited alternative access options and have a willingness to pay. Notwithstanding this strategy and the existing phenomena across Auckland's Park and Rides where they are full early in the morning peak, pricing does not yet apply to any of Auckland Transport's Park and Rides, except Waiheke Island. Pricing was previously used at Papakura Train Station under the jurisdiction of the former Papakura District Council.

4.1.2.7 Canberra

The *ACT Parking Action Plan*²⁰ from 2015 contains objectives and principles for Park and Ride investment and management in Canberra to service the city's existing bus network and planned light rail network. The principles for consideration comprise:

- Location of Park and Ride relative to the frequent network and planned light rail;
- Costs and value for money;
- Environmental effects on the surrounding environment;

¹⁹ <https://at.govt.nz/media/1119147/Auckland-Transport-Parking-Strategy-May-2015.pdf>

²⁰ https://www.transport.act.gov.au/_data/assets/pdf_file/0008/888191/ACT-Parking-Action-Plan.pdf

- Existing under-utilised parking areas when selecting sites;
- Base the capacity of new Park and Ride on projected demand;
- Transition Park and Rides to different land uses over time as land becomes more valuable in centres;
- Design, landscaping, and aesthetic considerations; and
- Security, safety, surveillance, and lighting.

Guidance of Park and Ride investment and management via these principles is expected to achieve the following objectives:

- Target Park and Ride at customers who cannot access the frequent network by walking, cycling, or feeder buses; and
- Park and Ride must support planned public transport services and future land use objectives as land becomes more valuable and centres evolve.

5 Summary of literature and strategy review: Benefits, Dis-benefits and Costs of Park and Ride

In consideration of the reviews above, in this section we briefly highlight some of the main benefits, dis-benefits and costs that may be associated with the provision of Park and Ride in Tauranga.

5.1 The benefits of Park and Ride

The benefits of Park and Ride are rather obvious: Park and Ride provides a way for people to access the public transport system. In this respect, it is conceptually the same as connector bus services, walking and cycling facilities, and on-demand services, such as taxis.

The access afforded by Park and Ride is particularly relevant in regions where there is a marked transition from low density, car dependent suburbs and rural-residential areas to dense central areas, and where road congestion exists at peak times and central car parking supply is limited and priced accordingly. In such settings, Park and Ride provides a way to connect car and PT systems, allowing each to operate in the parts of the city where it is best suited.

Experience and evidence suggest that carefully planned and managed Park and Ride can generate significant benefits for the wider transport system, including:

- Encouraging public transport patronage.
- Extending the reach of key public transport services to a customer base that would otherwise not be viable to serve. I.e. in lower density areas the population density is unlikely to provide enough potential bus passengers to make a reasonably high frequency bus service viable, as such walking or riding to a bus service is not a viable option.
- Reduced congestion on major routes and around major centres.
- Make higher density centres more accessible (e.g. park and ride makes the bus services that connect to these centres more accessible, which makes the centre more accessible).
- Reducing parking requirements at major centres (as people use park and ride then bus services to access the centre, rather than driving and parking in the centre). This can free up land in major centres for other land uses.
- Providing access to public transport for individuals with mobility issues.
- Potential for park and ride to utilise existing car parks that are not well utilised during the day e.g. sports clubs, supermarkets. On such example is Sylvia Park shopping centre in Auckland, which allows online pre-paid Park and Ride in its car park during weekdays for public transport passengers using the nearby train station and bus stops.

5.2 The dis-benefits of Park and Ride

The key dis-benefits of Park and Ride are:

- The potential for Park and Ride to change the way existing users access public transport services e.g. start to drive to Park and Ride, whereas they previously accessed public transport services by walking, biking or connector bus services.
- Undermining existing feeder buses to stations.
- Investment in Park and Ride can divert funds from more beneficial transport initiatives.
- If investment is made in a Park and Ride instead of improved bus services, then this can create inequity effects, as Park and Ride favours high socio-economic groups who can afford to drive.

- The financial cost of providing parking, especially if land values are high.
- Park and Ride can affect economic development by reserving large amounts of land for parking and reducing land available for other potentially more productive uses such as commercial or residential.
- Encouraging future low-density car-based residential developments.
- Adverse local traffic, noise and visual effects.
- Park and Ride can induce localised traffic congestion, reducing the attractiveness and ease of walking and cycling to PT.
- Park and Ride can disrupt local parking markets and be utilised to access nearby activities (rather than public transport services).

5.3 The costs of Park and Ride

While Park and Ride can generate large benefits, it can also incur significant costs. Much of these costs flow directly from land purchase and construction (in situations where the construction of a new parking area is required). Based on our experience in Auckland, Wellington and Australia, the capital costs of providing surface and structured car-parks in New Zealand can vary between \$10,000 and \$40,000 per parking space respectively, with structured car parks at the higher end of this scale and surface car parks at the lower end. E.g. A surface park and ride for Swanson Station in Auckland completed in 2016 comprising 136 parking spaces costed around \$18,000 per space. As Tauranga is not likely to pursue a multi-storey Park and Ride in the foreseeable future, we think it is more appropriate to consider a cost range of \$10,000 to \$20,000 per parking space to deliver a Park and Ride within the Tauranga context.

Assuming a 6% cost of capital (i.e. cost of debt or opportunity cost of equity), then the annualised capital costs of providing a Park and Ride space in Tauranga is likely to fall somewhere in the range of \$600 - \$1,200 p.a. If we assume that each parking space is used for 200 days per year on average, and generates two peak trips per day, then the capital costs alone (i.e. interest repayments on the money borrowed to build the park and ride facility, or the minimum return required on the equity used to build the park and ride) per trip can equate to \$1.50 - \$3.00 per trip.

This raises an obvious but important question that we pose here but do not answer: Is subsidising Park and Ride to this level an effective way of delivering on strategic transport and land use objectives for Tauranga?

There are, of course, other costs from Park and Ride. First, there is maintenance of the facility. Second, the provision of Park and Ride can attract people who would have otherwise accessed the station by another mode, generating additional driving and localised congestion. Third, Park and Ride can crowd out and/or detract from potential land use development, resulting in an opportunity cost in terms of foregone patronage and/or revenue, as well as reduced civic amenity.

We contend that the Strategy should therefore help guide Park and Ride supply and management in a manner that ensures its relative benefits are likely to exceed its costs. This applies as equally to investment as it does to management, even if the actual intervention is rather different.

It is also important to invest in improvements that are likely to deliver the greatest increase in public transport patronage. As such the costs and benefits of delivering a Park and Ride, should be compared to the costs and benefits of other improvements that could increase public transport patronage (such as higher frequency bus services, new/improved connector bus services, bus priority schemes, or improved walking and biking connections to high frequency services).

6 Recommendations for Tauranga

Drawing on the Tauranga context, studied cities and technical literature review, below are recommended assessment criteria to consider the suitability of potential Park and Ride sites in Tauranga.

Table 6-1: Recommended criteria to assess the suitability of potential Park and Ride sites in Tauranga

Objective	Criteria/Principle	Reason for Criteria/Principle
Locate in attractive locations for potential passengers <i>(Note: Park and Rides can be located outside of the Tauranga City boundaries)</i>	Located close to existing or planned rapid and frequent public transport services, in areas where access by connector buses, bike or walking is less feasible (i.e. typically lower density suburban or rural-residential areas).	<ul style="list-style-type: none"> Locating the Park and Ride near high quality public transport services makes them a more appealing option. Also high frequency public transport services provide access to destinations people want to access. Helps to ensure Park and Rides are located where they are likely to extend the public transport customer catchment, rather than changing the way existing customers access public transport.
	Locate where bus services to main centres are fairly direct and ideally have the advantage of existing or planned bus priority measures along the route.	<ul style="list-style-type: none"> Direct bus routes with bus priority tend to provide faster and more reliable journey times during peak traffic times. If bus journey times are reasonably fast and reliable then people have more of an incentive get out of their cars and onto the public transport service.
	Locate on sites before congested areas and in locations that can intercept a significant number of commuter trips currently being undertaken by car.	<ul style="list-style-type: none"> Access to the site needs to be convenient for a large catchment of potential public transport users, who are already commuting by car. Congestion is worst during peak travel times, therefore targeting commuters is likely to create the greatest benefit for the transport network.
Reduce localised impacts	Locate on sites that do not worsen local traffic congestion to unacceptable levels.	<ul style="list-style-type: none"> If there is congestion getting to and from Park and Ride sites, then this can discourage potential users. The creation of additional localised congestion can create adverse impacts for motorists not associated with the Park and Ride site.
	Manage the adverse environmental effects of Park and Ride.	<ul style="list-style-type: none"> Ensure the site location and design minimises adverse environmental impacts.
Ensure value for money	Benefits of Park and Ride should outweigh costs of developing the facility.	<ul style="list-style-type: none"> In general if the costs of providing a Park and Ride site outweigh the benefits, then the investment would not be deemed good value for money. Careful consideration of the inputs into the cost benefit analysis is required to ensure future benefits and national, regional and local policy direction is given sufficient weighting.
	Net benefits (benefits minus costs) of Park and Ride should outweigh net benefits of investment in other access modes, such as higher frequency bus services, new/improved connector bus services or improved walking and biking connections to high frequency services.	<ul style="list-style-type: none"> It is important to invest in the improvements that are likely to deliver the greatest increase in public transport patronage. As such the costs and benefits of delivering a Park and Ride, should be compared to the costs and benefits of other improvements that could increase public transport patronage. Ideally the business case for a Park and Ride should be compared to a business case for improving public transport.
	Consider the costs of using public transport compared to using a car to access key destinations.	<ul style="list-style-type: none"> If the costs of using a car (including parking) are cheaper or similar to using public transport then this may reduce the appeal of using park and ride.
Alignment with land use and transport objectives	Enable Park and Rides to be converted to different land uses in the future as land values and land use strategies change, including transit oriented development.	<ul style="list-style-type: none"> Allows Park and Rides to be a transition to land uses of higher economic value that will likely further increase bus patronage.
	Do not implement Park and Ride where there is immediate interest in dense residential, or mixed-use development. This type of development can deliver significant patronage to public transport routes and create economic value.	<ul style="list-style-type: none"> Park and Ride sites should be located close to high frequency public transport services. However, sometimes-such locations are ideal for residential and mixed-use developments, which would deliver a significant number of potential passengers within walking distance of the public transport services. Such developments are highly likely to add more economic value to Tauranga than a Park and Ride. However, as noted in the criteria immediately above Park and Rides can act as a transition to residential or mixed use developments, where there is limited potential for such developments to occur in the short-term.
	Locate Park and Ride away from town centres (or other places that required day-time parking) and areas with high pedestrian activity.	<ul style="list-style-type: none"> Town centres or commercial centres tend to: <ul style="list-style-type: none"> Have higher value land Be served by feeder public transport routes Have better walking and biking connections Have higher levels of traffic congestion. Park and Ride can detract from the amenity values of the town centre e.g. busy traffic, traffic noise, and air pollution can detract from the attractiveness of a town centre. The Park and Ride can itself be visually unattractive. People visiting the town centre may choose to park at the Park and Ride rather than use parking within the town centre. This uses up a parking spaces that could have been used by a Public Transport user. Traffic generated from Park and Rides can severely impact on areas with high pedestrian activity if traffic is required to cross this area or any key access points to this area.

Objective	Criteria/Principle	Reason for Criteria/Principle
	Ensure the location and design of Park and Ride sites does not create barriers for access by walking and biking from the surrounding catchment.	<ul style="list-style-type: none"> • Increased traffic associated with a Park and Ride can: <ul style="list-style-type: none"> ○ Make previously quiet streets less appealing for people on bikes and walkers. ○ Make road crossings more dangerous. ○ Increase the number of vehicles crossing pedestrian and cycle paths.
Management of Park and Rides	Where necessary, actively manage Park and Ride facilities to: (1) Ensure the availability of some spaces throughout the day (2) Prioritise parking for customers who are actually using the bus services.	<ul style="list-style-type: none"> • To improve accessibility around the city for the general population it can be useful to ensure that a few Park and Ride spaces are still free during the day for people making non-work/education journeys e.g. trips to the supermarket, town or doctor. • Sometimes people use the Park and Ride parking so they can access nearby activities, rather than to catch public transport. This demand can be eliminated by management techniques, such requiring a validated travel card to be swiped to exit the Park and Ride.
	Consider providing dedicated parking spaces for people who arrived via car-pooling.	<ul style="list-style-type: none"> • Providing car-pooling spaces increases the number of public transport passengers the Park and Ride can generate.
	Ensure Park and Ride feels safe (through design and management).	<ul style="list-style-type: none"> • People will be put off using the Park and Ride if it does not feel safe.