

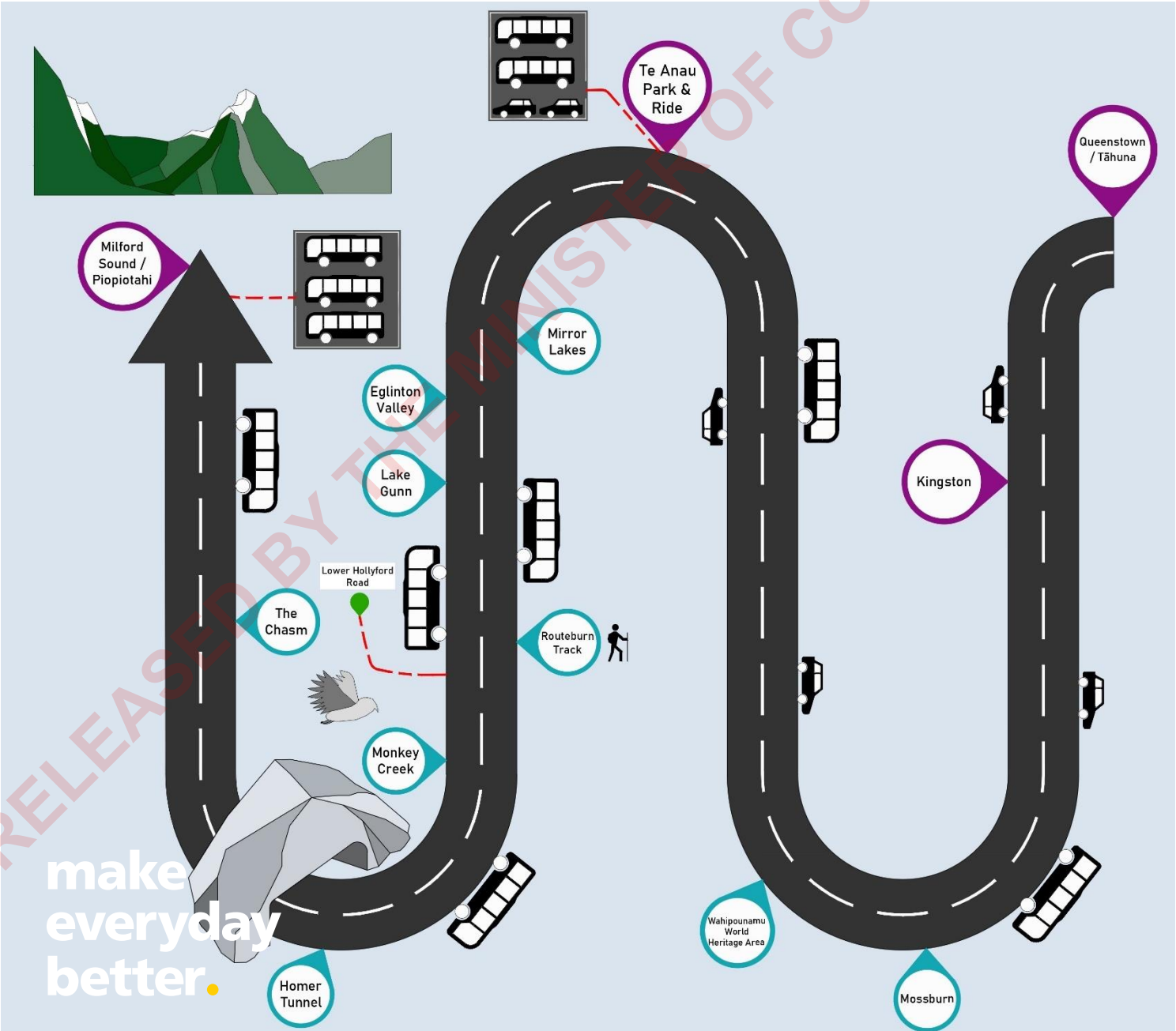


# Milford Sound Piopiotahi Park and Ride Design Report

## Feasibility Study

Prepared for Milford Opportunities Project  
Prepared by Beca Limited (Beca)

14 May 2024



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- Appendix B – Park and Ride Cost Estimate**
- Appendix C – SID and Risk Registers**
- Appendix D – Bus Depot Concept Design**
- Appendix E – Bus Depot Cost Estimate**

Revision History

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# Executive Summary

Forecasts of demand for a Park and Ride bus service to Milford Sound Piopiotahi indicate that up to approximately 2,700 users per day if a Park and Ride facility was provided in Te Anau. This forecast is based on an assumed 6,000 visitors per day to Milford Sound Piopiotahi. It assumes that Park and Ride is compulsory for international visitors and that parking spaces are reduced by approximately 60% at Milford Sound Piopiotahi, as proposed in the Milford Opportunities Masterplan.

The level of demand for a Park and Ride service is forecast to be almost half of the number of visitors to Milford Sound Piopiotahi. The majority of the remaining visitors are likely to travel by tour bus, with a small proportion of visitors (only New Zealand nationals) being forecast to travel to Milford Sound Piopiotahi by car.

Locating the Park and Ride facility at Knobs Flat or Eglinton Reveal is likely to attract a similar level of Park and Ride demand (up to approximately 2,600 users per day).

The modelling indicates that demand for Park and Ride would be significantly lower if use of the service is not made compulsory for international visitors.

An additional 1,000 people per day are anticipated to travel to intermediate nodes for other purposes (tramping, etc.) along the Milford Road corridor. A large proportion of these (potentially as many as 750 people per day) could be attracted to a Hop On Hop Off bus service.

In order to cater for the forecast level of demand for Park and Ride and Hop On Hop Off services, up to 18 buses per hour would need to operate the bus services at peak times, depending on the degree to which the current peak in demand is able to be smoothed (and therefore the operating schedule that is adopted). This translates to a fleet size of approximately 70 buses being in operation at peak times of the year.

The annual operating cost to provide this level of service is estimated to be up to \$15 million, depending on the vehicle type and Park and Ride site location and the operating schedule. Some of the operating cost could potentially be recovered by charging users of the service.

The capital costs of the bus fleet are dependent on what vehicle technology is adopted. Assuming buses cost \$600,000 per vehicle (the typical cost of a diesel bus currently), the capital cost of a new fleet of conventional diesel buses would be up to approximately \$46million, depending on the operating schedule. A fleet of electric buses could cost around \$60-\$80million, though the difference in cost between electric buses and conventional buses has been reducing recently.

It is estimated that over 200 drivers could be needed at peak times of the year, depending on the operating schedule. A significant number of the staff requirement is likely to be seasonal; however.

The operation of a Park and Ride service could reduce the total vehicle kilometres travelled (VKT) on the transport network, and also can help reduce carbon consumption. Up to a 44% reduction in VKT is estimated if a Park and Ride site is provided at Te Anau, depending on the operating schedule. Carbon emissions (measured as CO<sub>2</sub>-e kilo-tonnes) are estimated to reduce by up to 31% if a Park and Ride site is provided at Te Anau.

A number of alternative concept layouts for a Park and Ride facility and an associated bus depot have been developed for the three potential Park and Ride locations considered (Te Anau, Knobs Flat and Eglinton Reveal). A multi criteria analysis of the site location and Park and Ride site layout options indicated that a two-storey level Park and Ride site at Te Anau is most likely to deliver the aims of MOP. This preferred option was confirmed by a number of sensitivity tests.

In view of the significant cost associated with the Park and Ride facility which could be required, it is likely that Park and Ride would be implemented in a phased way. This could include both the infrastructure and level of service provided. Further consideration needs to be given to how bookings for a Park and Ride service would be managed.

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# 1 Introduction

## 1.1 The Problem/Opportunity

Milford Sound Piopiotahi is one of New Zealand’s most popular visitor attractions. It is located in part of New Zealand’s largest National Park (Fiordland), as shown in Figure 1-1, and holds United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage status.



Figure 1-1: Location Plan

As visitor numbers have risen, pressure on the natural environment and the limited infrastructure has increased. The rapid growth in visitors is risking ‘killing the goose that lays the golden egg’.

Key transport issues include:

- The journey along Milford Road offers a stunning experience; however, its many attractions are often missed as most visitors focus on getting to Milford Sound Piopiotahi as quickly as possible, often within a rushed one-day visit from Queenstown.
- A day trip from Queenstown is at the limit of allowable bus driver hours.
- This results in limited time for many visitors to do anything other than a boat cruise at Milford Sound Piopiotahi, and creates intense congestion (typically between 11am and 3pm).
- Milford Road is ranked third for personal safety risk of any Waka Kotahi New Zealand Transport Agency administered road in Aotearoa New Zealand and is considered challenging for international and inexperienced domestic drivers.

Both the Department of Conservation (DOC) and Southland District Council (SDC) recognised that new thinking was required to protect the area's conservation values and deliver a safer, deeper visitor experience. In 2017, a multi-agency organisation called Milford Opportunities Project (MOP) was created to look at how visitors are managed into the future at Milford Sound Piopiotahi.

## 1.2 Masterplan for Milford Sound Piopiotahi

In 2018, the MOP commenced the development of a Masterplan for Milford Sound Piopiotahi (the Milford Opportunities Masterplan or Masterplan) to help sustain and protect the journey experience. The Masterplan has a 50-year horizon, and was developed through a wide range of stakeholder engagement, consultation and using the best of Aotearoa New Zealand expertise. It is underpinned by substantial fact driven technical analysis which covered a wide range of topics including tourism, transport, legal and governance, hazards, landscapes, iwi. Engagement was undertaken with the community, key stakeholders, national interests and the New Zealand public.

The Masterplan was launched in 2021 and included a visitor experience values statement which articulated that, as a World Class Visitor Experience, Milford Sound Piopiotahi:

- Delivers intergenerational, holistic and values-based products and services. The overall experience is Authentic and Immersive.
- Includes Mana Whenua values which are woven through authentic narratives and aligned to manaaki principles and includes recognising the importance of access to their taonga for Mana Whenua.
- Delivers a moving experience that immerses visitors more fully into the grandeur of the natural environment with the assistance of high-quality infrastructure and services.
- Is not congested or chaotic. Products and services development and design focuses on more evenly spread demand throughout the day and overnight.
- Uses technology to deliver real time visitor information, services, communication and community.
- Delivers these while ensuring comfort, safety, shelter, easy access for all visitors.
- Maintains UNESCO World Heritage status.

Key to addressing the transport issues was introducing a managed Transport and Access model whereby access will be controlled and a Park and Ride system would be introduced using zero emission buses and smart technology to improve safety and provide a better visitor experience.

The Masterplan proposed Establishing a new Te Anau Hub to become a stand-alone destination, the beginning of the journey to Milford Sound Piopiotahi and central departure hub for Fiordland and the wider Murihiku Southland destinations. It also proposed developing multiple experiences along the Corridor structured around key nodes to:

- Appeal to a diverse set of visitors.
- Provide an opportunity to offer a wide range of experiences.
- Allow visitors to choose the way they want to engage with the place through a range of experiences.

The Masterplan vision is intended to guide further investigate and undertake feasibility analysis and early design of the transport and infrastructure concepts presented in the Masterplan. It will take a dedicated focus and passion to deliver, requiring complex negotiation to revise existing commercial arrangements. Its funding model will be precedent setting. The role that iwi play to intertwine their history, culture, Treaty rights and commercial interests into the experience will also be complex.

### 1.3 Proposed Future Transport and Access Model

A future Transport and Access model was developed in 2021. This proposes to filter people into Milford Sound Piopiotahi at a flow rate that supports the destination and improves the visitor experience. Use of Park and Ride could be encouraged by restricting the number of private vehicles entering Milford Sound Piopiotahi to permitted users.

The model proposes that all international visitors would need to use Park and Ride to access Milford Sound Piopiotahi. Strong encouragement would be needed for New Zealand visitors. For the limited remaining parking in Milford Sound Piopiotahi, pre-booked visitor parking spaces are proposed (and potentially reducing the existing capacity by approximately 60%). A booking system would assist in giving domestic visitors more certainty that a car park is available prior to departure. Those staying at accommodation in Milford Sound Piopiotahi or along the corridor may also have the option of private vehicle access.

Tangata whenua and recreationists that require private vehicles (such as those with boats, heavy equipment, or hunters) may also be provided access. In the case of recreationists such access is likely to be permitted potentially with a combination of one-off or annual passes. Recreationists undertaking day or multi day walks are also anticipated to find the model's proposed 'Hop on Hop Off' bus service an attractive alternative to leaving a private vehicle unattended at a track head.

Another key component of the model is the adoption of a cap on visitor arrivals to Milford Sound Piopiotahi. A cap of 1,000 arrivals per hour was recommended as the optimal level considering economic, experiential, and environmental factors.

On-road real-time information about Park and Ride bus service arrivals and capacities is proposed to be provided. Buses could potentially be located via the global positioning system (GPS) and dispatched centrally based on monitored demand. This could mean that if buses are located by GPS, any spare seating capacity has the potential to be used by Hop on Hop Off bus service users, though this may be less attractive to users of the Park and Ride service.

The final element in the model is the proposed introduction of an access fee (entrance fee) on international visitors to Milford Sound Piopiotahi. The purpose of the access fee is cost recovery, namely to recoup development and operational costs, and to generate surplus funds that can be invested in conservation initiatives and other local/community projects.

From a tourism and recreational perspective, smoothing visitor loadings, constraining private vehicles and designing key short stop sites and nodes more efficiently could allow for higher annual visitation while improving the quality of the visitor experience.

Although noted as being likely to be challenging for some, the proposed model could assist in delivering the desired outcomes of the Masterplan, including safer roads, a much-reduced environmental footprint and more assured access to vehicle parking in key locations.

## 2 Study Purpose and Scope

In order to inform the feasibility of proceeding with the Masterplan concepts, in 2023 MOP commissioned a more thorough investigation into the proposed Park and Ride system component of the Transport and Access model. MOP is aiming to provide a forward-thinking solution that decarbonises travel and protects and enhances Milford Sound Piopiotahi.

### 2.1 Purpose

The purpose of the study is to identify a feasible and sustainable Park and Ride system that balances demand with customer experience, cost effectiveness and sustainability. The study is also required to consider bus operational requirements and pedestrian movements at the Park and Ride sites and at Piopiotahi village. Concept designs were required to be prepared to determine the size and location of supporting infrastructure.

### 2.2 Scope

#### 2.2.1 Stage One: Feasibility Study

The scope of the feasibility study is to determine how the transport of visitors along the corridor each day will work and achieve the desired mode shift. A model is required to be built to inform this and enable forecasts to be prepared of:

- Vehicle numbers and likely parking demand at key nodes on Milford Road.
- Visitor numbers at Milford Sound Piopiotahi.
- The resulting emissions/environmental impacts.
- The repercussions at the nodes in terms of accident black spots and road safety.
- The volumes of people likely to voluntarily use Park and Ride if it is not made mandatory for some visitors.

The model is required to be adaptable to run different scenarios depending on whether and how access is proposed to be managed. In addition to the existing (baseline) scenario, this should include:

- The Masterplan proposal to restrict access to the road via a permit system where New Zealanders can self-drive but international visitors must use a Park and Ride transport system.
- Alternative proposals to manage access including options.

The request for proposal (RfP) required that the model test the following three scenarios:

- 2,000 visitors per day, equating to typical winter demand.
- 4,000 visitors per day, equating to the current daily limit defined in the National Park's Conservation Strategy.
- 6,000 visitors per day, equating to the maximum level of demand that is likely to be experienced.

Additional information required to be considered includes:

- If there are implications to scheduling due to the number of visitors getting off at each node under a proposed Hop On Hop Off transport option.
- The implications of current boat times and whether they would need to change to flatten the curve.

- The options and implications of different styles of trip (express/Hop On Hop Off/guided excursions) which can be catered for within the transport system design.
- The number of buses and drivers required for different levels of service.
- If driver availability and shift times affect the schedule, and if this can be optimised through the possibility of autonomous vehicles.
- What a transition period during implementation could look like (e.g. is an interim model required using the existing bus capacities).
- What the impact of retaining access for New Zealanders in their vehicles will have on parking at each node and waiting times at the tunnel.
- The implications of the transport system also designed to offer a visitor pick-up/public transport system for Te Anau as part of picking up dropping off visitors at various locations around the town.

### 2.2.2 Stage Two: Concept Design

After the feasibility stage, and with collaboration with other workstreams, the transport model forecasts should be used to develop a high-level concept of the size and location of supporting infrastructure that will allow a Park and Ride system to run successfully.

The feasibility stage is required to investigate the level of supporting infrastructure required at the Milford Sound Piopiotahi and Te Anau transport hubs, for example:

- Turning circles and manoeuvring areas, vehicle tracking of proposed bus movements.
- Number of bus bays required at the transport hub.
- Whether there is a minimum size workshop for the size of fleet required?
- What bus parking area will be required when not in operation?
- What car parking will be required to support a Park and Ride transport hub approach?
- How pedestrian movements is accounted for in each scenario?
- Whether there are potential links with other transport networks such as Invercargill, Dunedin or Queenstown.

Different options are required to be considered, and the best and next best recommended with customer experience to be considered and prioritised throughout the process. The concept design is to include cost estimates.

Consideration of bus fuel options is not in the scope of the study as it is being considered in a separate feasibility study.

### 3 Current Transport Situation and Future Visitor Demand

This chapter provides a brief context to the current transport situation and the anticipated future growth in visitor demand. The source of the data referenced in this chapter is the MOP Transport and Access Report, unless otherwise stated.

#### 3.1 Existing Users

##### 3.1.1 Total Visitor Numbers

The number of people visiting Milford Sound Piopiotahi in 2019 was approximately 870,000 according to the Masterplan. The number of visitors doubled between 2012 and 2018.

According to the study brief, current traffic volumes have almost returned to pre-COVID levels, though cruise boat use has not yet returned to pre-COVID levels (i.e. car mode share has been increasing since COVID).

##### 3.1.2 Mode Choice

Approximately 95% of visitors to Milford Sound Piopiotahi access it by road, with the remainder arriving by air. There were 193,500 inbound vehicle movements in 2019, of which 91% were private vehicles (79% cars and 12% campervans). Buses (tour coaches and small buses accounting for 9% of vehicle movements). The existing vehicle split at Milford Sound Piopiotahi is shown in Figure 3-1. It should be noted that these figures are pre-Covid, and that there has been a trend towards a greater proportion of self-drive visitors in recent years.

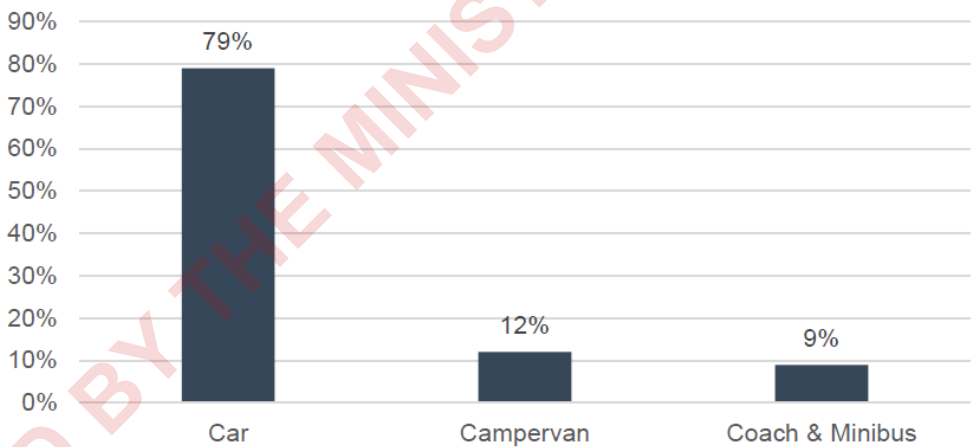


Figure 3-1: Mode Choice

The estimate of air transport demand is based on passenger seats into Milford Sound Piopiotahi (currently around 61,000 per year) and assuming 75 per cent seat utilisation. Note that with a maximum seat capacity, air's mode share would be 6% of total visitation.

##### 3.1.3 Traffic Volumes

On peak days in 2019, around 1,000 vehicles per day entered Milford Sound Piopiotahi. Of these, there are about 80 tour coaches and minibuses per day.

##### 3.1.4 Vehicle Occupancy

The average vehicle occupancy at Milford Sound Piopiotahi is shown in Figure 3-2. Coaches and buses carry over ten times as many people as cars and campervans. Based on this information,

this indicates that tour coaches carry half the people entering Milford Sound Piopiotahi, despite making up only approximately 9% of the total traffic is total volume. Cars and camper vans carry the other half of people.

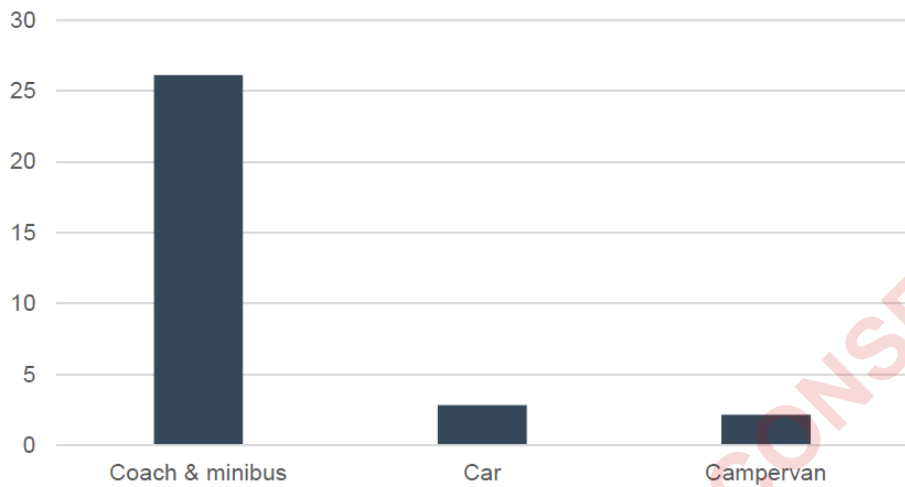


Figure 3-2: Average Vehicle Occupancy

3.1.5 Day Trip Origins

Most visitors to Milford Sound Piopiotahi who stay overnight in the local area stay in Te Anau (79% of visitor nights). A further 17% stay in Milford Sound Piopiotahi itself or the Milford corridor and 4% stay in Manapouri (located approximately 21km south of Te Anau).

90% of all international overnight visitors to Manapouri, and 83% of all international overnight visitors to Te Anau, also visit Milford Sound Piopiotahi.

Around 55% of international visitors to Milford Sound Piopiotahi stay overnight in the local area (Milford Sound Piopiotahi/Milford corridor/Te Anau/Manapouri). The remaining 45% of international visitors are day visitors from further afield, predominantly Queenstown, which is an 8+ hour return drive.

While Te Anau makes a more logical leaping off point for exploring Fiordland National Park and Milford Sound Piopiotahi, it is undermined by perceptions of a weaker visitor offering and no options available for domestic and international flight connections with the consequence of a relatively small proportion of international visitor flows being to Te Anau (mainly international tour groups) and onwards from there via the Southern Scenic Route to Invercargill (where direct flights operate to Auckland).

3.1.6 Trip Origins by Mode

Public transport (generally in the form of coach-based day trips starting and finishing in Queenstown and to a lesser extent Te Anau), plays a significant role as an access mode to Milford Sound Piopiotahi.

3.1.7 Trip Destinations

The current Milford Sound Piopiotahi experience is predominantly centred around boat cruises and first time/one-off visitors. Around 95% of visitors to Milford Sound Piopiotahi take a cruise, with the remaining 5% engaging in a variety of specific day trip or multi-night (often camping-based) activities along the Corridor or accessed from it (e.g., kayaking or walking on the Lake Marian Track, which is located a short distance down the Hollyford Road after the turnoff from the Milford Highway, or on the Milford Track, which terminates at Milford Sound Piopiotahi).

Use of DOC campgrounds in the Milford Corridor have increased rapidly in recent years. Annual combined use of the eight DOC Conservation Campsites between Te Anau and Milford Sound in 2018-2019 was 400% (45,000) higher than in 2013-2014 (approximately 7,000). By volume Cascade Creek has had the most growth in usage since 2014 (higher by >400%/32,000), with other sites following to varying degrees. Cascade Creek is the last accommodation option before reaching Milford Sound Piopiotahi and is often used by those travelling on early boats.

Around Te Anau the day use activities associated with Brod Bay in particular have also appeared to increase strongly.

Most day trip visitors to Milford Sound Piopiotahi also engage in visits to a small selection of key short-stop attraction sites along the Milford Corridor. This occurs for both self-drive and coach-based travel, with self-drive visitors having more site and visit-time flexibility (including the option for a few of camping in the Corridor as a Milford visit base).

The Milford Sound Piopiotahi village is not currently to a standard that would be expected from a world-class tourism attraction.

3.1.8 Visits by Time of Day

Visits to Milford Sound Piopiotahi typically have a pronounced peak during the day the current issues are most acute for four hours a day (11am-3pm i.e. late morning - early afternoon, peaking at around 120 vehicles per hour – or one vehicle every 30 seconds.). The inbound vehicle flow peaks between 8am and 1pm, and the outbound flow begins at around midday, as shown in Figure 3-3. It should be noted that a small number of trips are made before 5am by staff employed at Milford Sound Piopiotahi, and recreational purposes (e.g. fishing).



Figure 3-3: Visits by Time of Day

This pattern of demand is largely due to the travel time from Queenstown which results in large number of visitors arriving at the same time rather than being spread out across the day. Day return trips by car from Queenstown takes a minimum of 12 hours and bus trips typically take around 13 hours. The majority of people (around 91%) cruise around midday.

Bus trips from Queenstown mostly leave before 7am and stop in Te Anau for a rest break at around 9.30-10am, though some day trips leave as early as 5.45am or as late as 8.15am. From there, it is about two and a half hours journey to Milford Sound Piopiotahi with stops at one or two of Mirror Lakes, Monkey Creek and The Chasm along with a toilet break at Knobs Flat. Arrival in Milford

Sound Piopiotahi is typically just in time for the 1pm cruise departures from Milford Sound Piopiotahi and departing Milford around 3pm. Buses have a half-hour rest break in Te Anau and most return to Queenstown by around 8pm in the evening. The final arrival in Queenstown is often slow and punctuated with numerous stops to let customers off at the Frankton Hub, bus stops along Frankton Road and at hotels in the town centre.

Bus driver hour rules and break requirements heavily influence how the bus journey is operated from Queenstown. The rest break in Te Anau occurs to meet legislated requirements about the timing and length of driver rest breaks. Driver hours are capped at 14 hours with a nine-hour break before the next shift and the requirement for rest breaks every two hours or so. These result in very little margin for delay in the return trip from Milford Sound Piopiotahi.

By contrast, the same experience by bus from Te Anau typically involves a seven-hour trip, leaving Te Anau between 8.30-10am, depending on the operator, and arriving back in Te Anau by 5pm. Longer day trips are possible from Te Anau incorporating longer stops on the Milford Road and a longer cruise in Milford Sound Piopiotahi. Some other operators leave at their convenience as well.

3.1.9 Visits by Month of Year

A key feature of access to Milford Sound Piopiotahi is that visitor demand is highly seasonal, with the busiest month of the year being around ten times as busy as the quietest month, as shown in Figure 3-4. This number of visitors per month is understood to have a similar profile to the number of vehicles per month, though comparable data on the number of people visiting each month was not available.

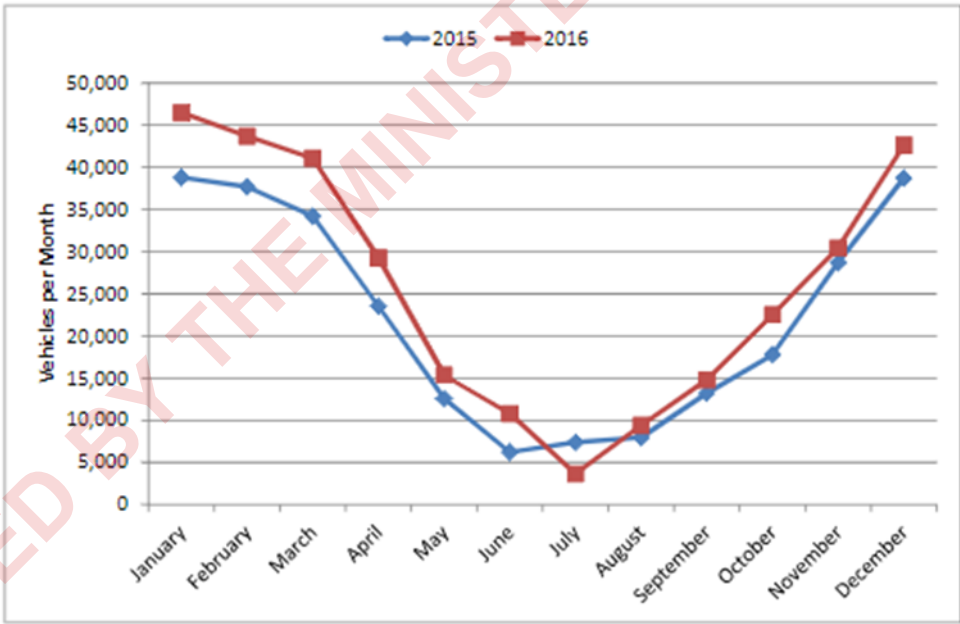


Figure 3-4: Visits by Month of Year

This shows that 62% of visitors arriving in the five months between November-March and 27% of visitors arriving in the two busiest months: January and February.

3.2 Cruise Boat Capacity and Utilisation

The peak capacity – indoor and outdoor – of the current cruise boat fleet is estimated at 2,500. The average utilisation rate of the cruise boats operating in Milford Sound Piopiotahi varies between 23% in August and 52% in February, with an average across the year of 40%. These utilisation

rates are calculated against scheduled capacity which is only a subset of total capacity i.e. the cruise boat operators could schedule more services outside peak demand periods if there was sufficient demand to support them. The main constraint on growth therefore is the time of day that passengers arrive in Milford Sound Piopiotahi, rather than the cruise boat capacity or the overall number of visitors.

### 3.3 Car Parking Demand

The high concentration of visitors in the middle of the day creates issues with parking availability and overcrowding which has led to some visitors parking on verges, sometimes in unsafe locations. MSTL have subsequently had to employ staff to mitigate this.

The issue of parking availability may be detracting from the visitor cruise boat experience. This can sometimes be exacerbated by other (recreational) visitors, such as when there are a large number of people fishing at times when the fish are migrating through the area.

### 3.4 Road Safety

A key consequence of the current Queenstown and daytrip focus for the Milford Road and Milford Sound Piopiotahi is the compression of the road travel experience. While the Milford Road itself could not by any standards be considered congested in absolute numbers, the combination of increasing congestion in Queenstown, visitors underestimating their travel times (including queueing for the traffic signal controlled one-lane Homer Tunnel), and the limited number of other activities apart from cruises to do in Milford Sound Piopiotahi, has significant negative consequences for road safety on the Milford Road corridor.

Milford Road has low collective but high personal risk, while SH95 to Manapōuri has low collective and medium personal risk. Collective risk refers to the total amount of crashes while personal risk refers to the chance of an individual being involved in a crash.

Milford Road has a two-star KiwiRAP safety rating, which means there are “major deficiencies in some road features such as poor roadside conditions and /or many minor deficiencies such as insufficient overtaking provision, narrow lanes, and /or poorly designed intersections at regular intervals”.

According to the 2018 Frankton to Milford Sound Corridor Management Plan undertaken by Waka Kotahi, the major issues on the road are challenging terrain requiring a high level of driver skill and concentration throughout the journey. The “journey is challenging with winding narrow formations and steep ascents and descents...narrow seal width, drop-offs, embankments and unprotected hazards along the corridor length [which] means that if a driver makes a mistake, the consequence is likely to be severe.” There is limited ability to address some of these issues because the road is in a National Park and the terrain means that re-engineering the road would be challenging and expensive in many locations. The Alpine Fault Magnitude 8 (AF8) and avalanche slip risk is also a collective risk.

Other issues on Milford Road include limited passing lanes and passing bays leading to driver frustration and risky overtaking manoeuvres; an alpine driving environment where weather conditions can and do change rapidly with black ice forming on shaded sections and bridge decks. This is particularly an issue when people feel they are in a 'race to catch the boat' situation which can occur when the journey takes visitors longer than they expected.

In addition, there is currently intermittent cell phone coverage between north of Te Anau Downs and Milford Sound Piopiotahi. This can result in lengthy response times to crashes on the road, exacerbated by emergency services only being located at Te Anau and by limited response

capability of the Milford Emergency Response Team based in Milford Sound Piopiotahi. Driver fatigue is also an issue, especially on the return trip to Queenstown for people visiting Milford Sound Piopiotahi as a day return trip from Queenstown.

**3.5 Future Growth**

Pre-COVID, tourism growth was forecast to reach 1.2 million visitors per year by 2023 (visitor numbers were 870,000 in 2018) and were projected to reach two million by 2035, according to the study brief. Current projections indicate that visitor numbers will return to pre-COVID levels by 2026.

## 4 Park and Ride System Options Considered

### 4.1 Overview

A strategically located Park and Ride system can provide a useful mechanism for intercepting long distance car trips and diverting them onto public transport. Generally, for Park and Ride to be successful where there is no compulsion to use it, the overall time, convenience and cost of Park and Ride needs to be competitive with travel by other modes.

### 4.2 Potential Park and Ride Sites

Discussions with MOP identified three potential locations for a Park and Ride car park that need to be considered. These are at Te Anau, Knobs Flat and Eglinton Reveal, and the locations are shown in Figure 4-1. It should be noted that no detailed analysis has been undertaken of the specific locations where a Park and Ride car park could be located in Te Anau or Knobs Flat.

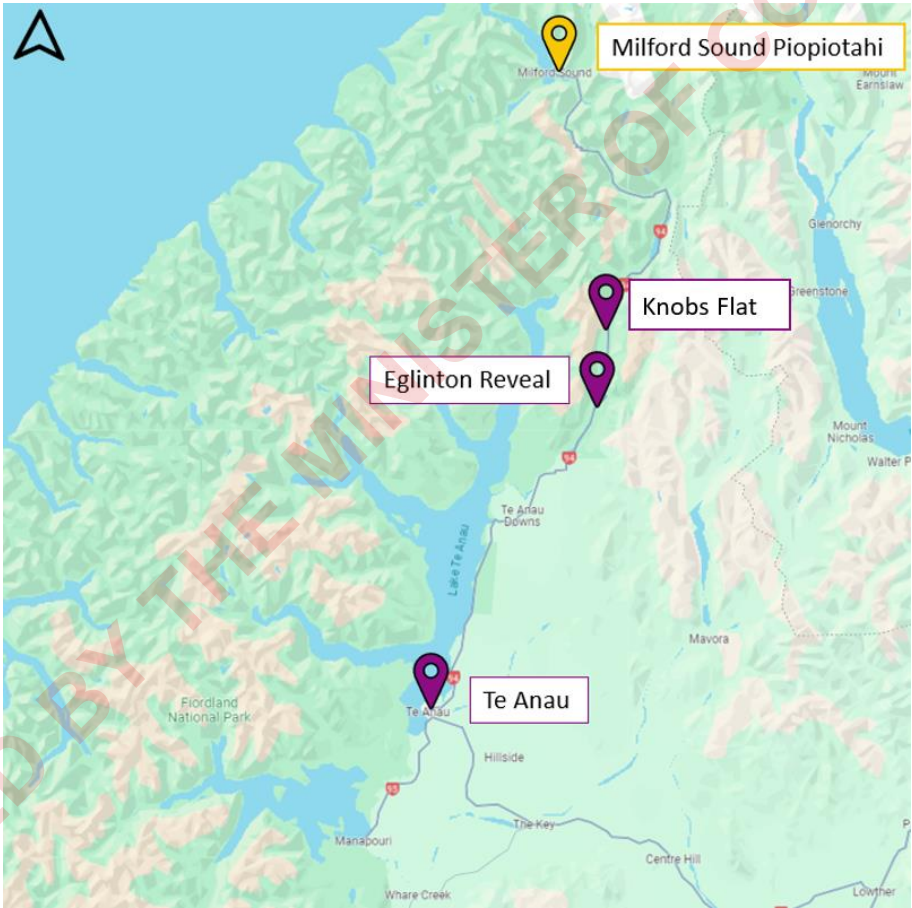


Figure 4-1: Potential Park and Ride Site Locations

### 4.3 Intermediate Nodes that Could be Served by a Hop On Hop Off Service

The Masterplan identified that, there is an opportunity to establish nodes and short stop experiences between the Te Anau and Milford Sound Piopiotahi visitor hubs at the southern and northern end of the Milford Corridor.

The following locations that offer multiple trails and experiences were designated as nodes in the Masterplan:

- Eglinton Reveal (Mirror Lakes).
- Te Huakaue Knobs Flat.
- Cascade Creek.
- The Divide.
- Gertrude Valley/Lake Marian trail head.
- Cleddau Cirque.

The Masterplan noted that Mirror Lakes and The Chasm remain important short stop destinations, and that a wide range of minor short stop experiences and controlled camping opportunities will continue to be available. It also indicated that infrastructure will be tailored to service the size, type and duration of visitors. The nodes and short stop locations will also be enhanced or established where experiences represent special landscapes, higher conservation values and/or places significant to mana whenua.

#### 4.4 Operation of Separate Park and Ride and Hop On Hop Off Services

For the purpose of this study, consideration has been given to both a Park and Ride service focussed on serving visitors to Milford Sound Piopiotahi and a separate 'Hop On Hop Off' service focussed on trips to the intermediate nodes made by recreationalists.

It is envisaged that users of the main Park and Ride service will stay with the same bus and group from the Park and Ride site they park their car at through to Milford Sound Piopiotahi. This service will stop at a set group of nodes that the passenger will know ahead of time, including a node where toilet facilities exist.

The Hop On Hop Off service would allow passenger will get on a bus at as many or as few stops as they like, and have flexibility on the amount of time they spend at each stop.

It should be noted however that the Park and Ride service to Milford Sound Piopiotahi could potentially be operated such that it calls at all the main nodes defined in the Masterplan on a demand responsive basis. Users of the service could indicate in advance of boarding the bus (or to the bus driver) where they wished to leave the bus. Similarly, users could indicate at the intermediate stop that they wished to be picked up. If this method of operation is adopted, the mechanism for this can be established as consideration is given to the technology options use for the bus service.

#### 4.5 Could Park and Ride have a Dual Role as a Local Bus Service in Te Anau?

Operating a Park and Ride service from Te Anau could provide the opportunity for it to also function as a local bus service in Te Anau. This could allow potential Park and Ride users to leave their cars at their accommodation, thereby potentially reducing the number of car parking spaces needed at a Park and Ride site.

The route in Te Anau operated would, in part, depend on the location chosen for a Park and Ride site. A small charge could be made for local use of the service to cover any additional (marginal) operating cost.

It should be noted that the use of the Park and Ride service as a local bus service would likely require a minimum frequency to be provided all year round (say every 30 minutes). However, in the future, advances in bus scheduling and passenger tracking technology may make it more practical to operate a local bus service on a more demand responsive basis e.g. allowing users to see what

Park and Ride service buses will be operating, and whether there are any seats available for local travel.

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## 5 Demand Model Development

### 5.1 Overview of Demand Model

A logit-based spreadsheet demand model was developed to provide forecasts of demand by mode for a Park and Ride service under a range of scenarios. The key model outputs include forecasts of demand by mode, vehicle kilometres travelled (VKT) and transport enabled emissions (from all road users).

The model also incorporates calculations of bus fleet size and bus operating costs (as described later in this report).

### 5.2 Demand Model Structure

The model leverages an existing multi-modal ‘sketch planning tool’<sup>1</sup> developed by Beca for other projects. It estimates the demand by mode (bus, car and Park and Ride) for trips made from the two main trip origins (Queenstown and Te Anau) to Milford Sound Piopiotahi.

The high-level (four stage) model structure is shown in Figure 5-1.

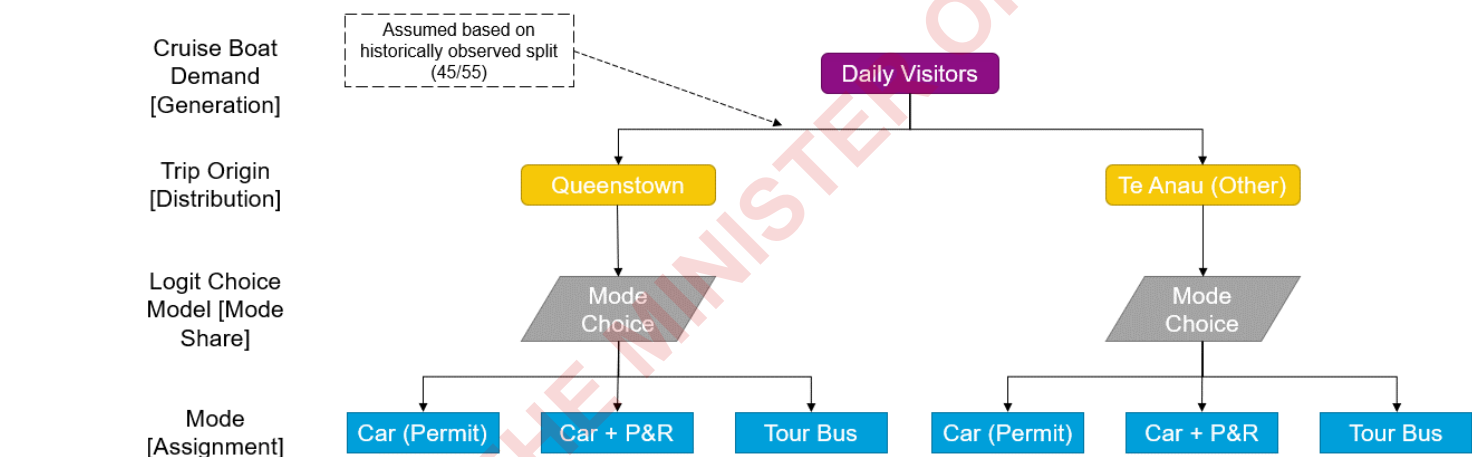


Figure 5-1: High-level Demand Model Structure

Table 5-1 summarises outlines the functionality and specification of each stage of the modelling process.

<sup>1</sup> An internal spreadsheet model used to estimate high-level travel demands and the associated emissions by mode in response to different land use and network assumptions.

Table 5-1: High-level Demand Model Stages

Demand Model Stage	Functionality	Specifications
Generation	Total trips produced by attraction to activity (i.e. daily visitors to Milford Sound Piopiotahi).	<p>The daily visitors for the future scenarios were informed for testing. These were:</p> <ul style="list-style-type: none"><li>• 2000 cruise boat users (low demand)</li><li>• 4000 cruise boat users (medium demand)</li><li>• 6000 cruise boat users (high demand).</li></ul> <p>In addition, there are two user groups:</p> <ul style="list-style-type: none"><li>• International visitors (80%)</li><li>• Domestic visitors (20%).</li></ul>
Distribution	Spread production of trips between origins.	<p>The model was simplified to two origin groups due to limited available data. These were assumed to be:</p> <ul style="list-style-type: none"><li>• Te Anau (Locally) (55%)</li><li>• Queenstown (45%).</li></ul>
Mode Share	Logit choice model distributes trips by user group and origin, across different modes. The model uses a generalised cost function to determine users preferred mode.	<p>The modelled modes for future scenarios are:</p> <ul style="list-style-type: none"><li>• Car</li><li>• Tour Bus</li><li>• Park and Ride.</li></ul> <p>The generalised cost function (for mode choice) accounts for:</p> <ul style="list-style-type: none"><li>• Travel time by mode</li><li>• Users Value of Time</li><li>• Vehicle operation cost (fuel, rental costs)</li><li>• Parking cost</li><li>• Tour Bus and Park and Ride costs</li><li>• Group size</li><li>• ASC (Alternative Specific Constant) – i.e. the observed preference for a mode that travel time and cost do not quantify.</li></ul>
Assignment	Assigns users to origin and destination by user group and mode.	<p>The model assesses the impact of limiting parking capacity at Milford Sound Piopiotahi cruise boat terminal. The model iterates through the mode share and assignment stages twice.</p> <p>Users are assigned to their preferred mode. Where car demand exceeds the carpark capacity, the exceeding users must make a second mode choice. These users are assigned to their second preferred mode.</p> <p>Users are assigned to modes regardless of their preferred travel time. Daily demand is then spread across the day (in hourly time slices), based on the currently observed visitor arrival profile.</p>

### 5.3 Demand Modelling Process

Initially, a base year model was developed and calibrated against observed data on current travel options to replicate the current transport behaviours for travel to Milford Sound Piopiotahi. The base year model was then applied to test the demand response when a Park and Ride service and other measures proposed in the Masterplan are introduced.

The base model includes a generalised cost function which is used in the logit choice model to estimate travellers' preference for each mode. The logit choice model use parameters which adjust the model sensitivity to the generalised cost function (i.e. how sensitive the transport users are to cost). It is necessary to calibrate these parameters so that they reflect the currently observed travel patterns. The calibrated model and parameters are then applied to future scenario modelling.

The overall modelling process is summarised in Figure 5-2.

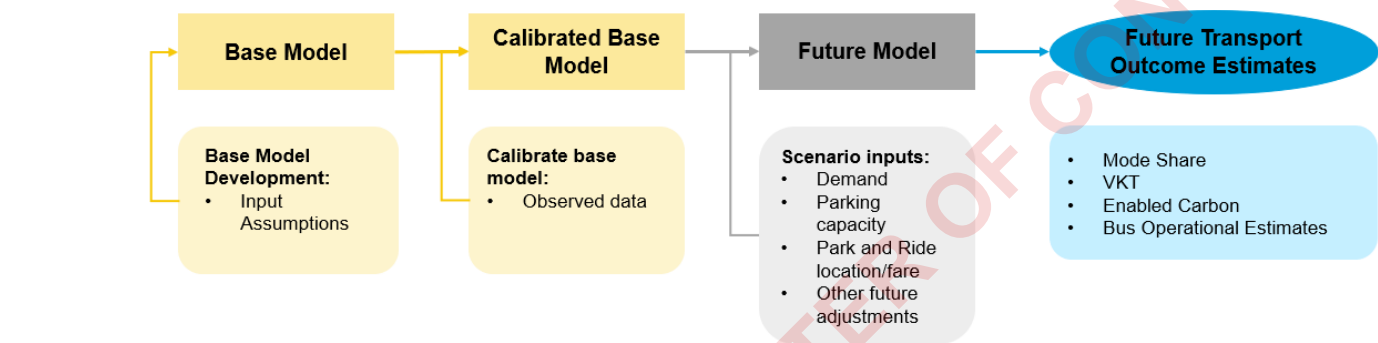


Figure 5-2: Modelling Process

### 5.4 Demand Model Key Assumptions

The trip generation and distribution stages of both the base year and future model have been developed based on available observed data. The main assumptions are summarised in Table 5-2.

Table 5-2: Model Assumptions

Model Stage	Assumption	Source	Base Model	Future Model
Generation	80% of cruise boat users are international visitors, and 20% domestic visitors	MOP Tourism Report (Visitor Solutions Ltd & Fresh Info Ltd, 2021) <sup>2</sup>	✓	✓
Distribution	45% of trips originate from Queenstown, and 55% from Te Anau (locally)	MOP Tourism Report (Visitor Solutions Ltd & Fresh Info Ltd, 2021)	✓	✓
Generalised Cost Function (Mode Share)	Distance between all origin and destination pairs	Estimated based on Google Maps (2023)	✓	✓
	Car travel time between all origin and destination pairs	Estimated based on Google Maps (2023)	✓	✓
	Tour bus (and for future Park and Ride) travel time between all origin and destination pairs	Estimated based on InterCity Schedule (2023)	✓	✓
	Value of time (\$/hr): <ul style="list-style-type: none"><li>• International: \$50</li><li>• Domestic: \$50</li></ul>	Estimated based on other strategic models and refined during calibration	✓	✓
	Car rental cost (\$/day): <ul style="list-style-type: none"><li>• International: \$125</li><li>• Domestic: \$62.50 (assuming 50% of domestics pay for a rental).</li></ul>	Estimated based on InterCity Schedule (2023)	✓	✓
	Fuel price is assumed to be \$2.63 (\$/km)  Fuel consumption (L/km) is obtained from VEPM, using the average speed (distance/ travel time) between origin and destination pairs.	NZTA Vehicle Emission Prediction Model (VEPM) and New Zealand retail fuel data from figure.nz (2023) <sup>3</sup>	✓	✓
	Typical parking cost: \$25/day	Site visitation estimate (2023)	✓	✓
	Typical tour bus fare (\$/person): <ul style="list-style-type: none"><li>• Queenstown: \$110</li><li>• Te Anau: \$70.</li></ul>	RealNZ ticket price (2023)	✓	✓
	Average group size is assumed to be 2.8 people, based on average car occupancy.	MOP Tourism Report (Visitor Solutions Ltd & Fresh Info Ltd, 2021)	✓	✓

5.5 Base Model Calibration

Where possible, observed pre-COVID (2019) data was used to calibrate the model rather than data from more recent years. This data is considered to be more representative of current travel patterns, as COVID severely impacted on visitor numbers to Milford Sound Piopiotahi.

The key calibration data utilised included:

- **Generation:** Visitor numbers were estimated by taking the average daily visitors of the peak 5-months (January, February, March, November, December) of the year. This was 3,579 for 2019 (Visitor Solutions Ltd & Fresh Info Ltd, 2021).
- **Mode Share:** 50% of trips are made by tour bus, and 50% by car (Visitor Solutions Ltd & Fresh Info Ltd, 2021).

Using this information, the model parameters were adjusted so that the model reflected observed travel patterns. The key generalised costs parameters used are specified in Table 5-3.

Table 5-3: Generalised Cost Parameters

Parameter	Specification	
ASC (Alternative Specific Constant) - for car (mins)	International Visitors: 190mins	Domestic Visitors: 260mins

5.5.1 Daily and Hourly Demand Profile

The daily demand profile was determined based on observed travel patterns to Milford Sound Piopiotahi, based on the traffic flow from Traffic Monitoring System (TMS) count data collected at Te Anau.

The daily demand was then applied to the profile of people arriving between 5am and 3pm, to allow for first scheduled cruise boat departure (currently at 8:30am) and the last scheduled departure (currently at 4:45pm)<sup>4</sup>. The hourly people profiles for trips from Te Anau and Knobs Flat/Eglinton Reveal are shown in Figure 5-3.

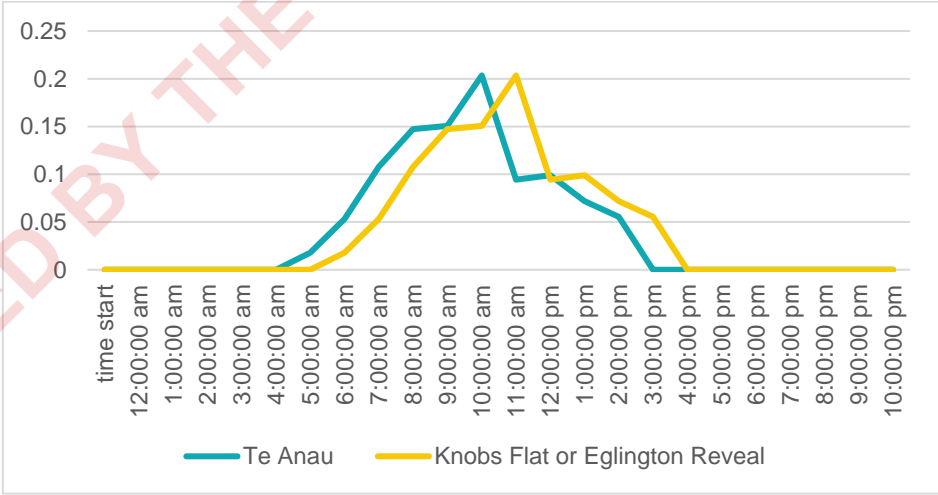


Figure 5-3 Hourly Cruise Boat User Arrival Profile

<sup>4</sup> This has been obtained for boat cruise departure times, from the provided summer 2023-2024 schedule (excluding on demand services).

### 5.6 Future Model Functionality

The future model was developed to enable the following main future scenarios to be tested:

- Three levels of demand for travel to Milford Sound Piopiotahi: 2,000 (low), 4,000 (medium), and 6,000 (high) visitors per day.
- Compulsory or optional use of Park and Ride for overseas visitors.
- Park and Ride sites at Te Anau, Eglinton Reveal or Knobs Flat (note that as Eglinton Reveal and Knobs Flat are in close proximity, these have been modelled as a single site).

In the future year model, the calibrated base year model parameters and generalised cost functions for tour bus and cars, as detailed in Table 5-2 and Table 5-3, are applied to the future model.

As Park and Ride is a new mode in the future, a new generalised cost function was estimated to determine the travel cost. For visitors originating from Queenstown the generalised cost function is assumed to be the car travel cost between Queenstown and the Park and Ride site, plus the bus travel cost to Milford Sound Piopiotahi (revised to reflect the Park and Ride fare). For visitors originating from Te Anau the generalised cost function is assumed to be the car travel cost between Te Anau and the Park and Ride site plus the cost of bus travel to Milford Sound Piopiotahi (revised to reflect the Park and Ride fare).

The model also has the functionality to test a number of other input assumptions summarised in Table 5-4.

Table 5-4: Future Model Sensitivity Inputs, Functionality and Assumptions

Input	Functionality	Impact	Assumption
Reduced car parking capacity at Milford Sound Piopiotahi	Model responds to car parking capacity and utilisation.	Daily Demand by Mode	Parking capacity is reduced by 60% to 130 car parks in the MOP Masterplan.
Car parking turn-over at Milford Sound Piopiotahi	Model responds to car parking utilisation.	Daily Demand by Mode	Parking is assumed to operate by a mechanism, where visitors must book a park. These are assumed to be assigned for half a day (i.e. a car park is utilised twice daily)
Park and Ride fare	Model responds to changes in Park and Ride fare	Daily Demand by Mode	Assumed to be less than a typical tour bus (assumed to be \$60 per person).
Trip origin shift	Model responds to shift in percentage of trips originating locally, to account for increased attraction to Te Anau for multi-day stays.	Daily Demand by Mode	Assumed to be the same as in the base year, 45% Queenstown and 55% Te Anau.
Duration of stay at Milford Sound	Conversion of demand from daily to hourly can be adjusted to test increased visiting time at Milford Sound Piopiotahi, due to visitor centre and other destinations.	Hourly Demand by Mode <sup>5</sup>	Hourly profile is assumed to be the same as in the base year. See Section 5.5.1 for base year profile.

<sup>5</sup> The model will not change the daily demand by mode, but will revise the proportion arriving at each hour.

## 6 Demand Forecasts

### 6.1 Milford Sound Piopiotahi Demand Forecast Scenarios Considered

The main demand forecasts prepared were for core Masterplan option (i.e. assuming *compulsory use of Park and Ride* by international tourists and *reduced car parking* at Milford Sound Piopiotahi i.e. a 60% reduction in car parking capacity), and for three variants of the Masterplan option. A Do-Nothing (i.e. Business as Usual) scenario has also been tested (i.e. assuming no Park and Ride system is introduced). The main scenarios tested are summarised in Table 6-1.

Table 6-1: Scenarios Tested

Scenario	Core Masterplan Option (i.e. Park and Ride with Reduced Car Parking Provision and Use of Cars Not Permitted by International Tourists)	Park and Ride with Reduced Car Parking Provision Only	Park and Ride with Use of Cars Not Permitted by International Tourists Only	No Restrictions on Car Use for International Tourists and No Reduced Car Parking Provision	Do Nothing (i.e. No Change)
Reduced Car Parking Provision*	✓	✓	n/a	n/a	n/a
Restrictions on Car Use for International Tourists	✓	n/a	✓	n/a	n/a
Park and Ride	✓	✓	✓	✓	n/a

\* A 60% reduction in car parking capacity is assumed at Milford Sound Piopiotahi, with each car park space assumed to be utilised twice per day

### 6.2 Forecast Demand for Park and Ride to Milford Sound Piopiotahi: Core Masterplan Option

The car, bus and Park and Ride demand forecasts for the Core Masterplan proposals are summarised in Table 6-2. Separate forecasts have been prepared for a Park and Ride site at Knobs Flat/Eglington Reveal.

Table 6-2: Forecast Demand for Core Masterplan Option (Person Trips)

Park and Ride Location: Te Anau			
Scenario	Car	Tour Bus	Park & Ride
2,000 visitors/day	136	951	913
4,000 visitors/day	273	1,902	1,825
6,000 visitors/day	409	2,853	2,738

Park and Ride Location: Knobs Flat/Eglinton Reveal			
Scenario	Car	Tour Bus	Park & Ride
2,000 visitors/day	139	993	868
4,000 visitors/day	277	1,986	1,737
6,000 visitors/day	416	2,978	2,605

The forecasts indicate that the capacity of the car park at Milford Sound Piopiotahi (up to 728 people per day) is not reached (the highest demand forecast is 409 car users per day).

As the number of daily international visitors is four times greater than the number of domestic visitors, by mandating Park and Ride for international visitors, demand for car travel to Milford Sound Piopiotahi is reduced substantially.

The modelling indicates that demand for Park and Ride is only slightly lower if the site is located at either Knobs Flat or Eglinton Reveal than at Te Anau. This is because the main factor which affects mode choice is making Park and Ride compulsory for international tourists, rather than the cost of travel or the availability of car parking spaces at Milford Sound Piopiotahi.

It is noted that in the 6,000/day scenario, demand in the busiest hour may exceed the Masterplan's proposed cap of 1,000 visitors per hour. Demand management may therefore be needed to limit hourly demand at peak times of the year.

6.3 Forecast Demand for Park and Ride to Milford Sound Piopiotahi: Potential Variants of the Masterplan Option

6.3.1 Reduced Car Parking Provision Only

The demand forecasts on the basis of there being no restriction on car use for international visitors, but assuming car parking provision is reduced at Milford Sound Piopiotahi, is summarised in Table 6-3.

Table 6-3: Forecast Demand Assuming Cars are Permitted for all Visitors, and Reduced Parking (Person Trips)

Park and Ride Location: Te Anau			
Scenario	Car	Tour Bus	Park & Ride
2,000 visitors/day	673	676	651
4,000 visitors/day	728	1,670	1,602
6,000 visitors/day	728	2,691	2,581

When Park and Ride is not mandated for international visitors, the model forecasts that car use increases compared to the Masterplan scenario. For the 6,000 and 4,000 visitors per day scenarios, car use is forecast to reach the maximum capacity of the car park at Milford Sound Piopiotahi (i.e. 728 visitors per day).

6.3.2 Use of Cars Not Permitted by International Tourists with No Reduction in Car Parking Provision

The demand forecasts assuming that international visitors are not permitted to use cars, and that there is no reduction in car parking provision at Milford Sound Piopiotahi, is summarised in Table 6-4.

Table 6-4: Forecast Demand Assuming Park and Ride is Compulsory for International Visitors but there is No Restricted Parking (Person Trips)

Park and Ride Location: Te Anau			
Scenario	Car	Tour Bus	Park & Ride
2,000 visitors/day	136	951	913
4,000 visitors/day	273	1,902	1,825
6,000 visitors/day	409	2,853	2,738

In this scenario, mandating international tourists to use Park and Ride or a tour bus to access Milford Sound Piopiotahi reduces the overall demand for travel by car to below the capacity of the car park. The forecast demand by mode is forecast to be the same as that for the Core Masterplan option.

6.3.3 No Restrictions on Car Use for International Tourists and No Reduced Car Parking Provision

The demand forecasts assuming that a Park and Ride facility is provided, that travel by car is permitted for all visitors, and that there is no reduction in car parking provision at Milford Sound Piopiotahi, are summarised in Table 6-5.

Table 6-5: Forecasts Demand Assuming Travel by Car is Permitted for All Visitors and No Reduced Parking Provision (Person Trips)

Park and Ride Location: Te Anau			
Scenario	Car	Tour Bus	Park & Ride
2,000 visitors/day	680	673	648
4,000 visitors/day	1,360	1,345	1,295
6,000 visitors/day	2,040	2,018	1,943

This test indicates that although Park and Ride services are still utilised, having no restrictions on mode choice and parking capacity results in significant demand for travel by car to Milford Sound Piopiotahi compared to the Masterplan scenario.

6.3.4 Do Nothing (i.e. No Park and Ride Provided)

The demand forecasts by mode based on assuming where no change is made, i.e. no Park and Ride system is provided and no reduction is made to car park capacity, is summarised in Table 6-6.

Table 6-6: Forecasts Demand Assuming a Do Nothing Scenario (Person Trips)

Park and Ride Location: Te Anau			
Scenario	Car	Tour Bus	Park & Ride
2,000 visitors/day	1,004	996	n/a
4,000 visitors/day	2,007	1,993	n/a
6,000 visitors/day	3,011	2,989	n/a

6.4 Summary of Forecasts of Park and Ride Demand to Milford Sound Piopiotahi

Figure 6-1 to Figure 6-3 compares the car, bus, and Park and Ride travel demand forecasted for all the scenarios tested. These have been grouped by the three visitor per day scenarios, to help show the difference in travel behaviour between the different options.

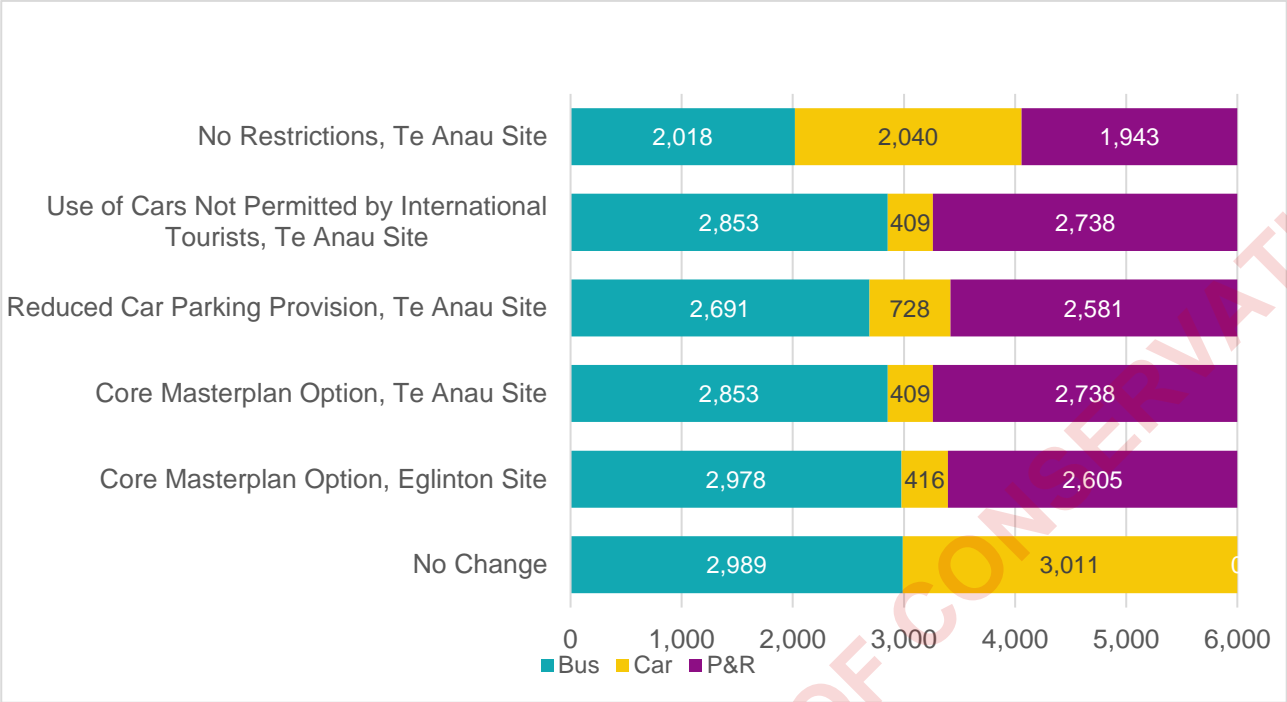


Figure 6-1: Visitor Arrivals by Mode to Milford Sound Piopiotahi for Key Scenarios (Assuming 6000 Visitors/day)

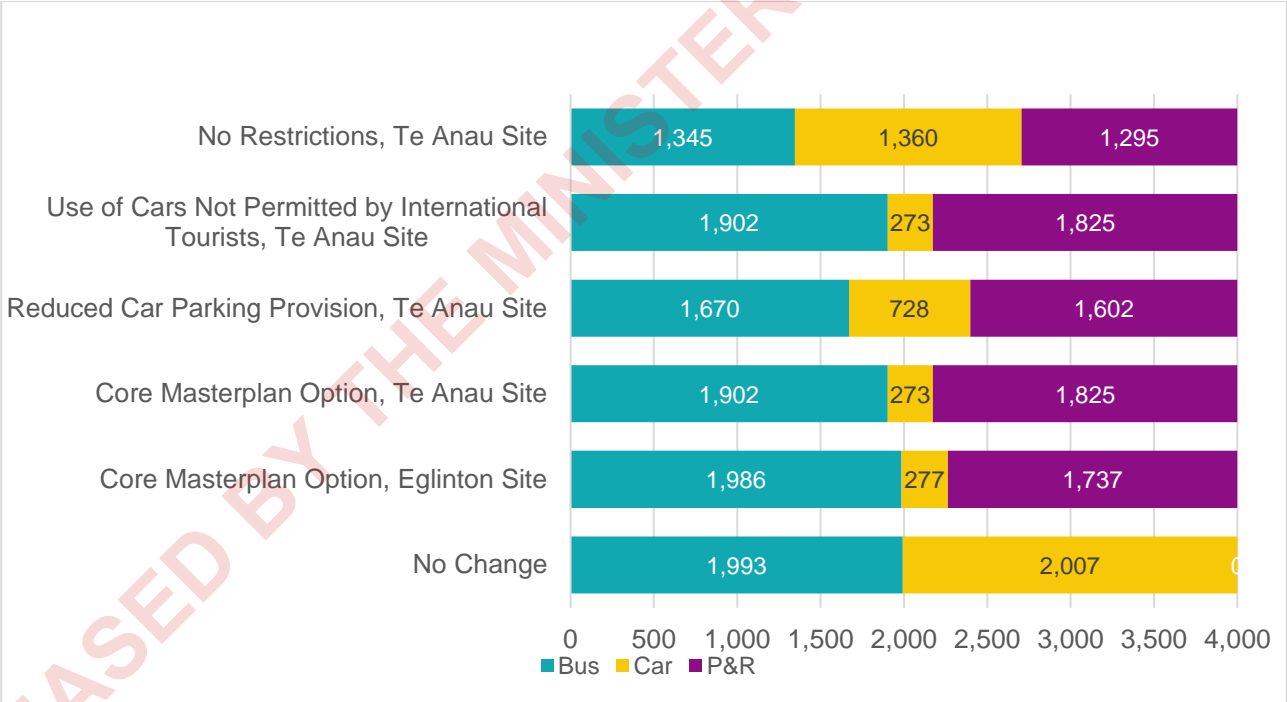


Figure 6-2 Visitor Arrivals by Mode to Milford Sound Piopiotahi for Key Scenarios (Assuming 4000 Visitors/day)

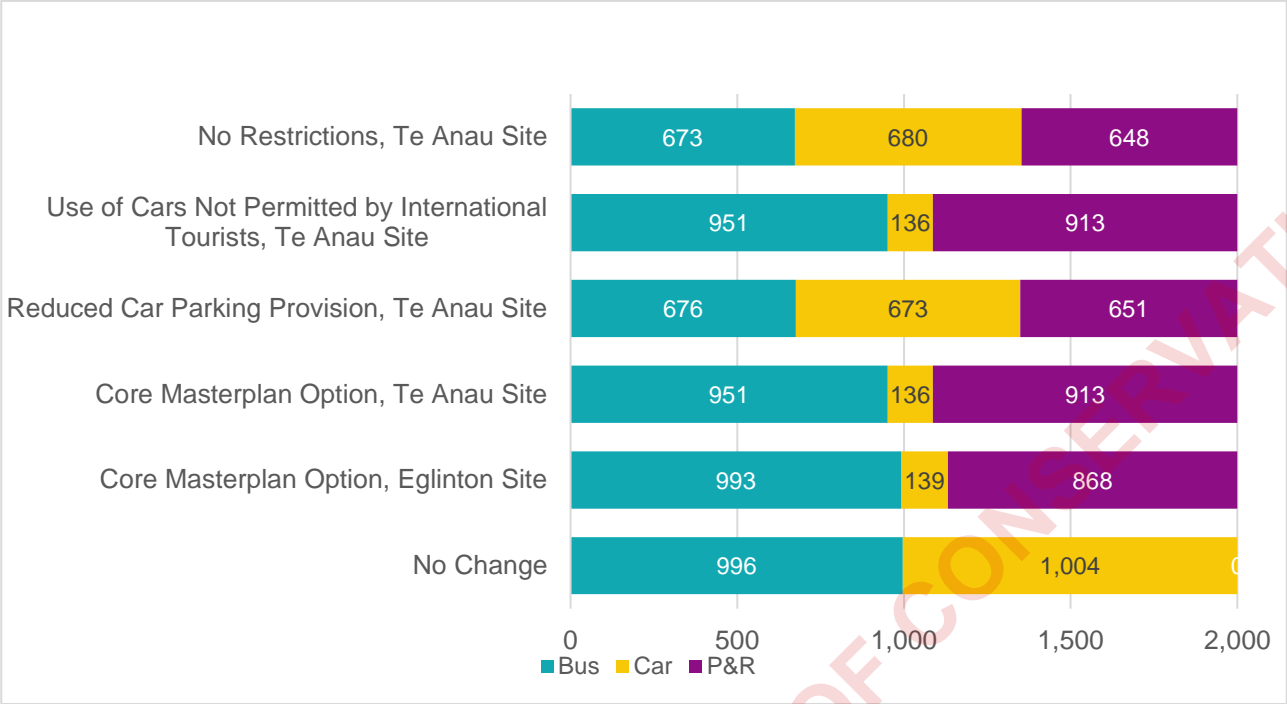


Figure 6-3 Visitor Arrivals by Mode to Milford Sound Piopiotahi for Key Scenarios (Assuming 2000 Visitors/day)

6.5 Sensitivity the Duration of Visitor Stay at Milford Soud Piopiotahi

The model was used to test the sensitivity of demand for Park and Ride if visitors stay longer at Milford Sound Piopiotahi than at present. This test was only undertaken for the core Masterplan option (i.e. assuming use of Park and Ride is compulsory for international visitors and assuming that parking provision is reduced at Milford Sound Piopiotahi).

In order to test this scenario, the utilisation at parking spaces at Milford Sound Piopiotahi was reduced from twice per day assumed in the core model test to 1.6 and 1.3 times per day to represent visitor stays of four and five hours respectively. This adjustment to the model is a proxy for people travelling by car visiting occupying a car parking space for longer. It should be noted that the trip arrival and departure time do not influence mode choice in the model.

The estimated impact of longer visit durations on forecasted demand by mode are summarised in Table 6-7. This shows that if visitors have a longer stay at Milford Sound Piopiotahi (to four or five hours), it does not impact on the forecasts demand by mode. This is because in the core Masterplan scenario, not all of the car parking capacity at Milford Sound Piopiotahi is forecast to be utilised. The modelling indicates that it is only when the utilisation of car park spaces reduces to once per day does the demand for travel by car reduce.

Table 6-7: Sensitivity Test Results: Longer Visit Duration (Person Trips)

Park and Ride Location: Te Anau (assuming 6,000 visitors/day)			
	Car	Tour Bus	Park & Ride
Core Masterplan (assumes visitors stay around 3 hours on average at Milford Sound Piopiotahi)	409	2,853	2,738
Core Masterplan (assumes visitors stay around 4 hours on average at Milford Sound Piopiotahi)	409	2,853	2,738
Core Masterplan (assumes visitors stay around 5 hours on average at Milford Sound Piopiotahi)	409	2,853	2,738

6.6 Sensitivity of Park and Ride Demand to Milford Sound Piopiotahi to the Proportion of Overnight Visitors at Te Anau

The demand model was also used to test the sensitivity of demand for Park and Ride to an increase or decrease in multi-day stays within Te Anau. This is accounted for by changing the percentage of trips originating locally. This is currently observed to be 45% from Queenstown, and 55% from the local Te Anau area.

A shift to 55% and 65% of trips originating from Te Anau has been tested for the Masterplan high demand scenario (6000 visitors/day), assuming the Park and Ride is in Te Anau. The results of this test are summarised in Table 6-8. An increase in the number of overnight visitors at Te Anau results in an increased demand for tour buses and decreased demand for Park and Ride. This is largely because parking availability is not at capacity at Milford Sound Piopiotahi, and tour buses are slightly more attractive than Park and Ride services.

Table 6-8: Modelled Demand for Shift in Percentage of Overnight Visitors

Park and Ride Location: Te Anau			
Visitor Origin	Car	Tour Bus	Park & Ride
45% Te Anau / 55% Queenstown	402	2,833	2,765
55% Te Anau / 45% Queenstown (Core Masterplan Option)	409	2,853	2,738
65% Te Anau / 35% Queenstown	416	2,873	2,712

6.7 Estimated Demand for Hop On Hop Off Service

MOP have provided estimates of additional demand to the other Hop On Hop Off nodes along the Milford Sound Piopiotahi corridor for other recreational activities such as hiking and hunting, that could be served by a Park and Ride service. It is assumed that there are an additional 1000 visitors on a peak day (i.e. in the 6000 high demand scenario).

It is estimated by MOP that up to 75% of these users could be attracted to a Hop On Hop Off/Park and Ride service.

As there is limited available data on the transport patterns of the potential users of a Hop On Hop Off service (e.g. which nodes will be used as Hop On Hop Off), the demand profiles for these users is assumed to be the same as the Park and Ride users (i.e. as shown in Figure 5-3).

The demand for a Hop On Hop Off service, adjusted on a pro rata basis for each demand scenario considered, is summarised in Table 6-9.

Table 6-9: Additional Demand for Park and Ride from Non-Cruise Boat Users (Hop On Hop Off Person Trips)

Scenario	Hop On Hop Off Service Demand
2,000 visitors/day	250
4,000 visitors/day	500
6,000 visitors/day	750

It should be noted that there is limited data with which to estimate the likely destination of these trips.

6.8 Park and Ride Car Park Space Requirement

6.8.1 Spaces Needed to Accommodate Cruise Boat Visitor Demand Only

The number of car parking spaces required at the potential Park and Ride sites has been estimated for the Masterplan option (i.e. International Compulsory Park and Ride, Restricted Parking). This has been estimated based on the assumption that vehicles occupy a car parking space for an average of nine hours at the Te Anau Park and Ride site, allowing for a typical six-hours travel time and around three hours at Milford Sound Piopiotahi.

For the potential Park and Ride site at Knobs Flat/Eglinton Reveal, cars are assumed to occupy a parking space for an average of seven hours, allowing four hours for travel time. This allows for a small number of car parking spaces to be utilised more than once per day.

The car park space requirements calculated are summarised in Table 6-10.

Table 6-10: Parking Provision Needed at Park and Ride Sites

Park and Ride Location	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	261	271
4,000 visitors/day	523	542
6,000 visitors/day	791	813

The number of car parking space calculated to be required for a Park and Ride site at Te Anau Park and Ride site has been adjusted to take account the likelihood that a proportion of Park and Ride users are likely to choose to walk to the Park and Ride site from their accommodation, instead of driving there. Of the 55% of trips that originate in Te Anau, 80% of these trips commence from Te Anau itself, and 50% of trips stay in Te Anau for two-nights (based on information in Visitor Solutions Ltd & Fresh Info Ltd, 2021). We have therefore assumed that 40% of Park and Ride users will walk from local accommodation, and the other 60% drive and require a carpark (i.e. this reduces the parking demand of visitors originating from Te Anau by 32%).

It should be noted that this estimate is considered to be conservative, as there are other opportunities that could reduce the parking space requirement at Te Anau, such as the use of accommodation shuttle buses by accommodation providers, etc.

As very little accommodation is available at or near to Knobs Flat/Eglinton Reveal, it has been assumed that all trips commencing at this location need a car parking space.

6.8.2 Spaces Needed to Accommodate Additional Demand for Other Nodes/Non-Cruise Boat Users (i.e. Hop On Hop Off Service)

As indicated earlier, it is estimated that there would up to 1,000 additional trips per day made on a Hop On Hop Off service. Approximately 75% of these travellers are estimated to use a Hop on Hop Off service.

The total parking requirements for a Hop On Hop Off service, and the overall parking requirement, is summarised in Table 6-11.

Table 6-11: Parking Capacity Adjusted to Meet Demand for both a Park and Ride and a Hop Off Service

Park and Ride Location	Te Anau		Knobs Flat/Eglinton Reveal	
	Hop On Hop Off Only	Park and Ride and Hop On Hop Off	Hop On Hop Off Only	Park and Ride and Hop On Hop Off
2,000 visitors/day	89	350	89	360
4,000 visitors/day	178	701	179	721
6,000 visitors/day	261	1,052	269	1,081

6.8.3 Sensitivity of Park and Ride Car Park Space Requirements to Increased Stay at Milford Sound Piopiotahi

The model was used to test the sensitivity of the Park and Ride car park capacity, if visitors stay longer at Milford Sound Piopiotahi than was assumed in the main model test (i.e. four or five hours rather than three). In order to test this scenario, two adjustments were made to the model for the high demand core Masterplan option (i.e. assuming use of Park and Ride is compulsory for international visitors and assuming that parking provision is reduced at Milford Sound Piopiotahi):

- The daily occupancy of parking spaces at Milford Sound Piopiotahi was reduced (from two to 1.6 and 1.3 respectively for the four and five hour tests).
- The hourly demand profile was adjusted to reflect visitors arriving earlier and departing later.

The results of the sensitivity test are summarised in Table 6-8. This indicates that if visitors do stay up to five hours at Milford Sound Piopiotahi, there would only be very a small increase in the need for car parking spaces at the Park and Ride sites.

Table 6-12: Car Parking Provision Sensitivity Test: Longer Visit Duration at Milford Sound Piopiotahi

Assuming 6,000 visitors/day		
Park and Ride Location	Te Anau	Knobs Flat /Eglinton Reveal
Core Masterplan (assumes visitors stay around 3 hours on average at Milford Sound Piopiotahi)	791	813
Core Masterplan (assumes visitors stay around 4 hours on average at Milford Sound Piopiotahi)	798	864
Core Masterplan (assumes visitors stay around 5 hours on average at Milford Sound Piopiotahi).	805	914

6.9 Mode Share

Figure 6-4 to Figure 6-6 show the estimated mode share between the key tested scenarios. These have been grouped by the three visitor per day scenarios, to compare the different options. Park and Ride has the highest uptake at the Te Anau site, and when Park and Ride is compulsory for all international visitors. Figure 6-4 shows that, for the reduced car parking provision option (i.e. the option in which all visitors can drive), only a slightly smaller proportion of people use a tour bus (45% compared to 48%).

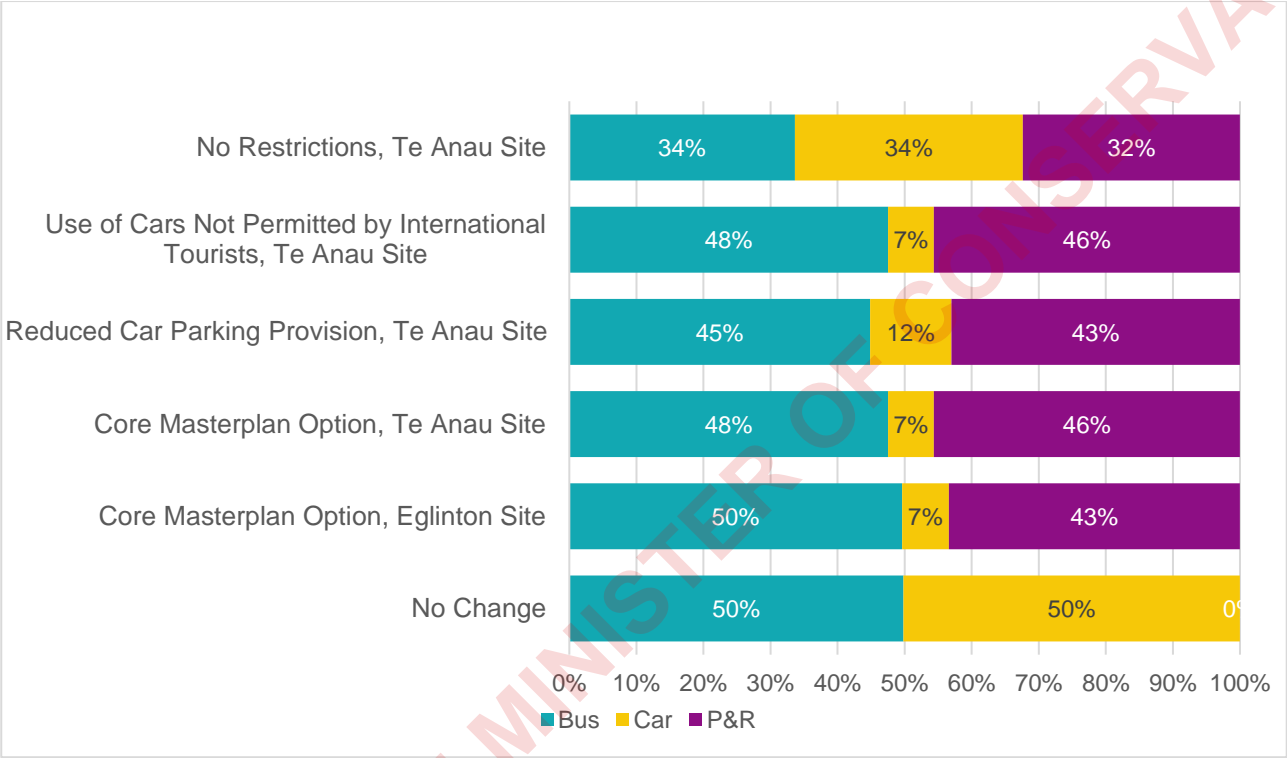


Figure 6-4: Total Mode Share for Key Scenarios (Assuming 6000 Visitors/day)

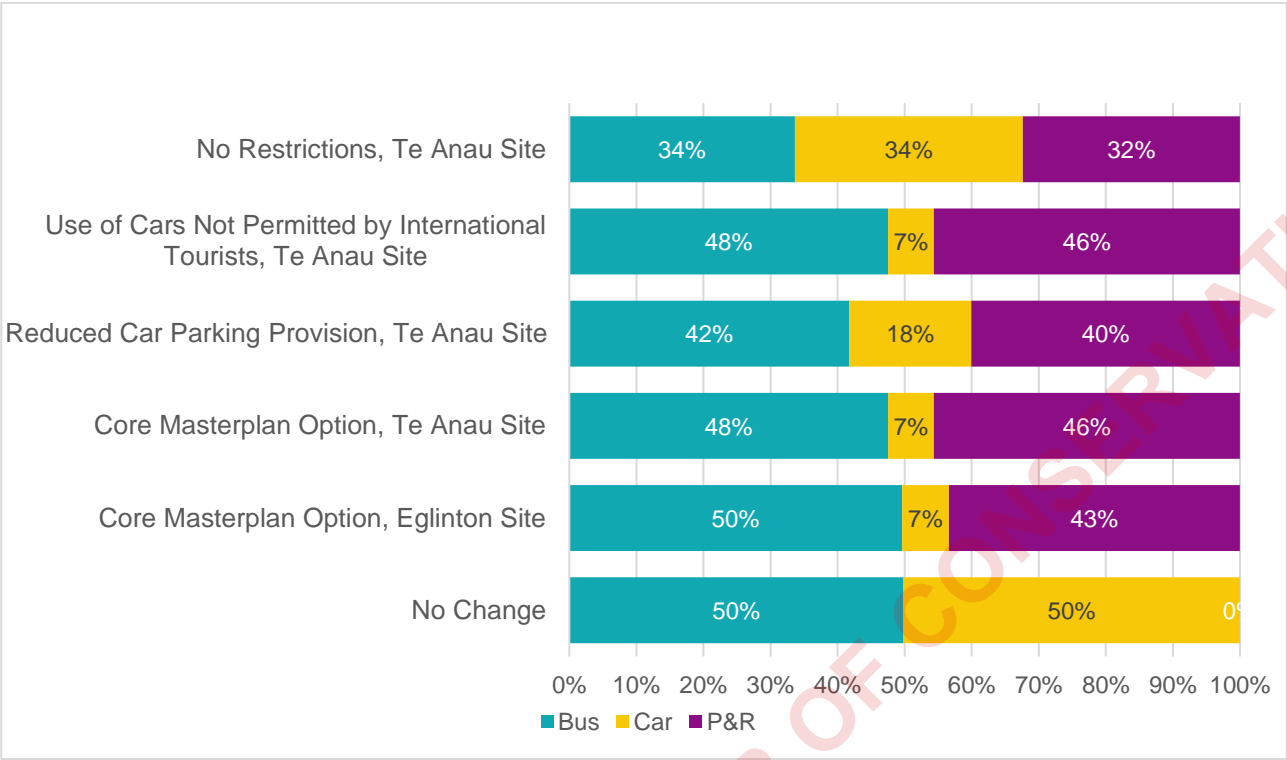


Figure 6-5 Total Mode Share for Key Scenarios (Assuming 4000 Visitors/day)

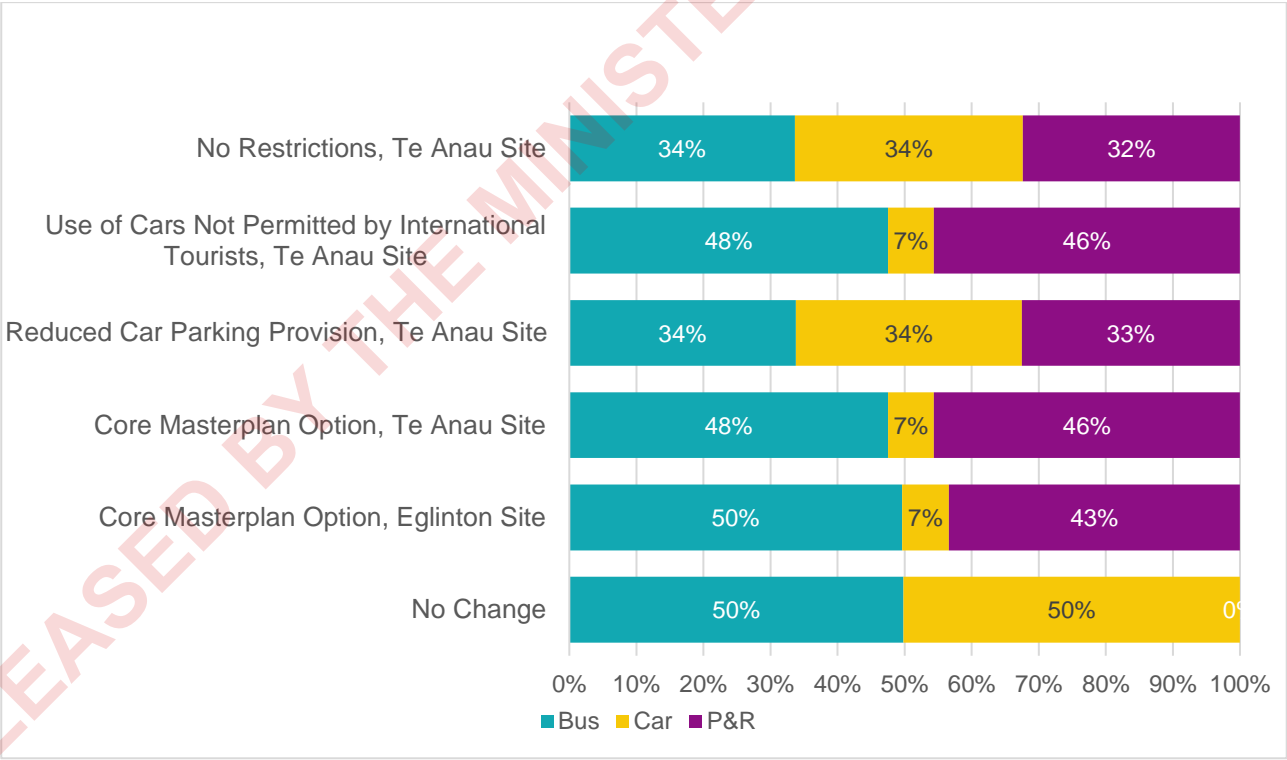


Figure 6-6 Total Mode Share for Key Scenarios (Assuming 2000 Visitors/day)

The mode share for the three key scenarios, high demand masterplan options for both locations and for a Do Nothing scenario, are summarised in Table 6-13.

Table 6-13: Mode Share for Three Key High Demand Scenarios

Scenario	Tour Bus	Car	P&R
Masterplan Option, Te Anau Park and Ride	48%	7%	46%
Masterplan Option, Eglinton Park and Ride	50%	7%	43%
Do Nothing	50%	50%	N/A

6.10 Estimated VKT Impact

The impact of implementing Park and Ride on the total VKT has calculated by multiplying the final demand by mode and origin, by the return journey distance between the origin and the Milford Sound Piopiotahi Cruise Boat Terminal. Figure 6-7 to Figure 6-9 summarises the VKT by mode for the key scenarios tested. These have been grouped by the three visitor per day scenarios. The figures show the total network VKT, and percentage decrease from if no Park and Ride is provided (i.e. Do Nothing). For all scenarios considered, the provision of Park and Ride results in a substantial reduction in VKT.

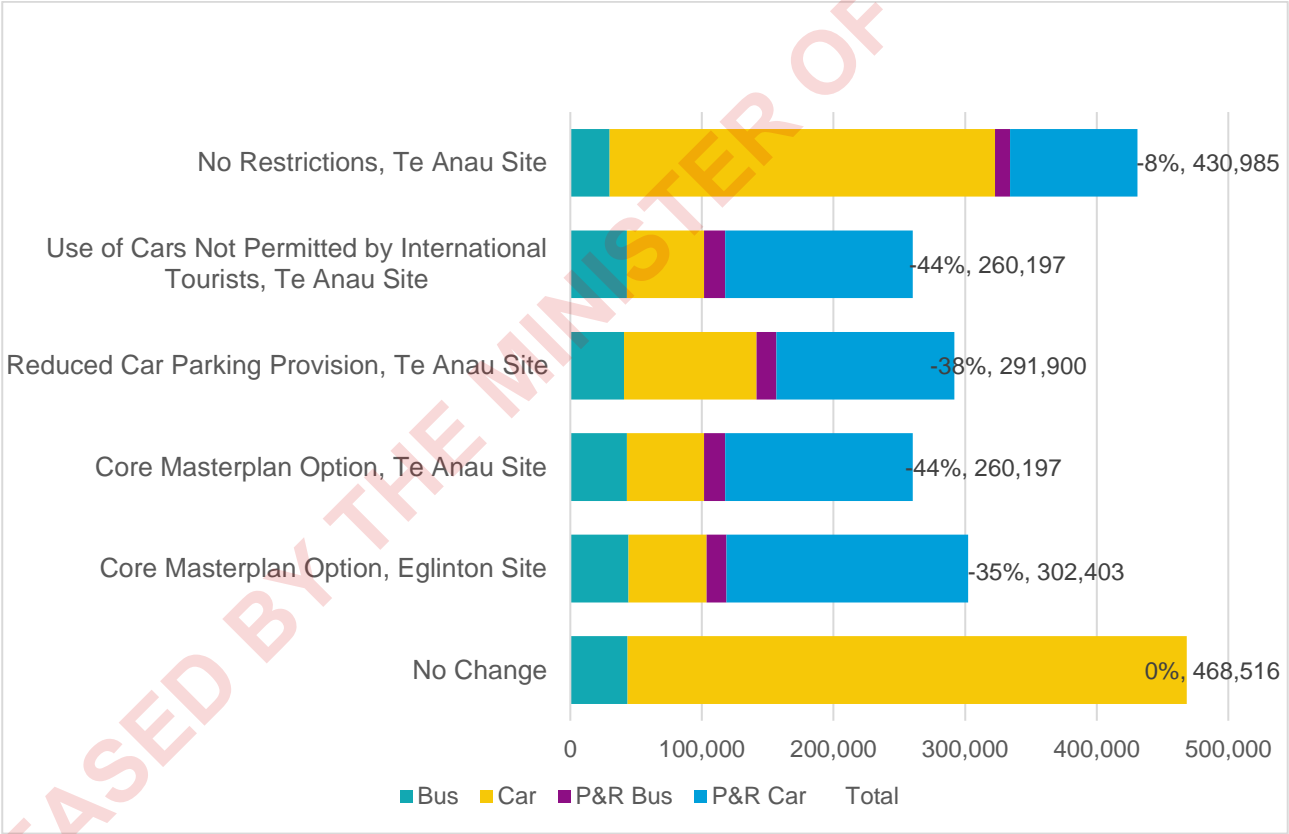


Figure 6-7: Network Vehicle Kilometres Travelled for Key Scenarios (Assuming 6000 Visitors/day)

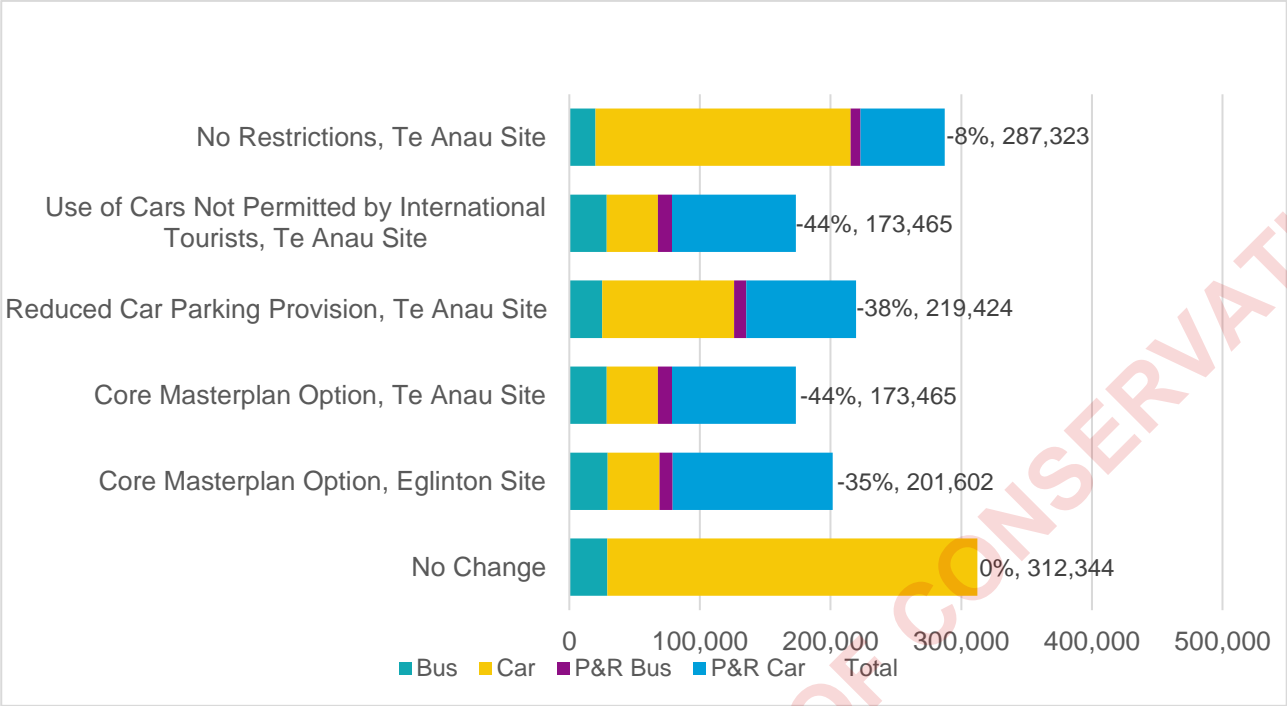


Figure 6-8: Network Vehicle Kilometres Travelled for Key Scenarios (Assuming 4000 Visitors/day)

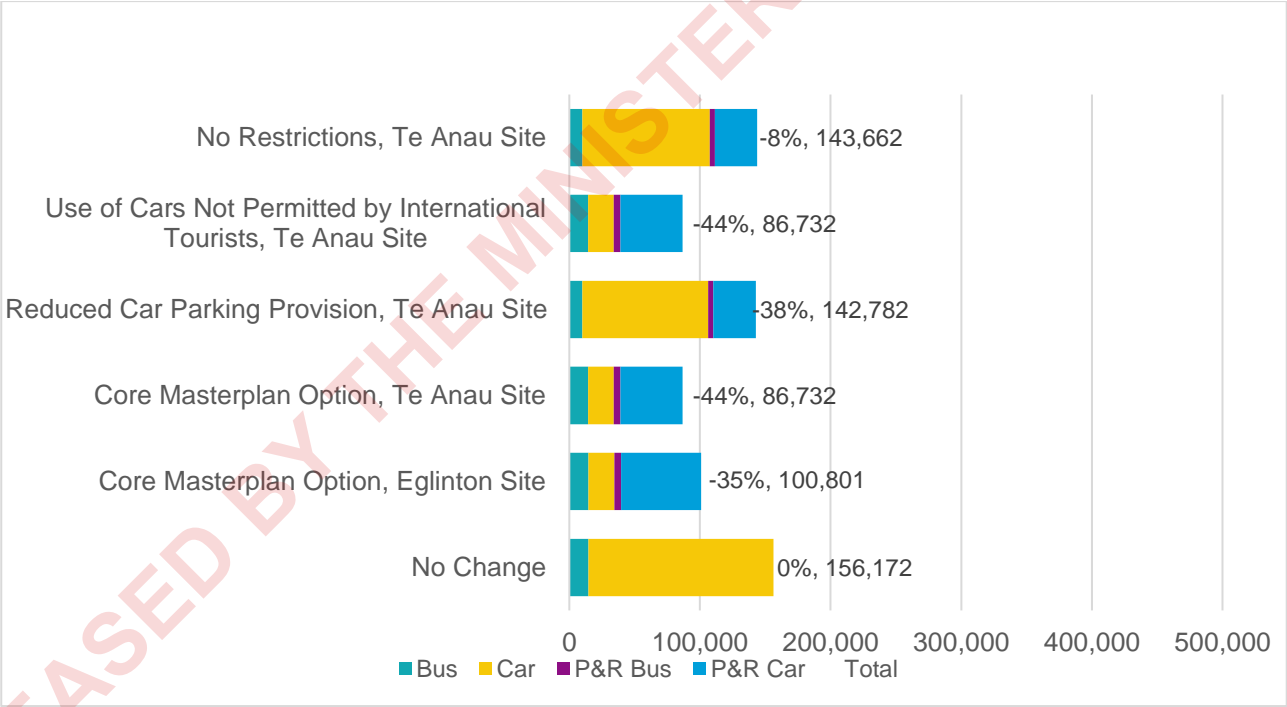


Figure 6-9: Network Vehicle Kilometres Travelled for Key Scenarios (Assuming 2000 Visitors/day)

The masterplan option has the most significant decrease in VKT. For the Te Anau site the VKT decrease from business as usual is 44%. Assuming the Park and Ride site is located either at Knobs Flat or Eglinton Reveal, the VKT decrease from a Do Nothing scenario is estimated to be approximately 35%. The total VKT for the high demand masterplan options are summarised in Table 6-14 (rounded to the nearest 1,000).

Table 6-14: Total VKT for Three Key High Demand Scenarios

Scenario	VKT (Kilometres)
Masterplan Option (High Demand), Te Anau Park and Ride	260,000
Masterplan Option (High Demand), Eglinton Reveal Park and Ride	302,000
Do Nothing – i.e. Business as Usual (High Demand)	469,000

6.11 Estimated Enabled Carbon Impact

The enabled carbon emissions or the vehicle emissions are estimated by applying the Waka Kotahi’s Vehicle Emission Prediction Model 6.3 (VEPM) emission rates to the calculated VKT (as in Figure 6-7) and by average speed and vehicle type. The enabled carbon emission has been assessed for Year 2026 for the future scenarios.

The VEPM 6.3 2026 default fleet distribution is used for the calculation which assumes the bus fleet comprises of 0.04% of electric vehicles (i.e. the percentage of the current bus fleet which is electric). Figure 6-10 to Figure 6-12 summarise the emission estimates by mode for the key scenarios tested. These have been grouped by the three visitor per day scenarios.

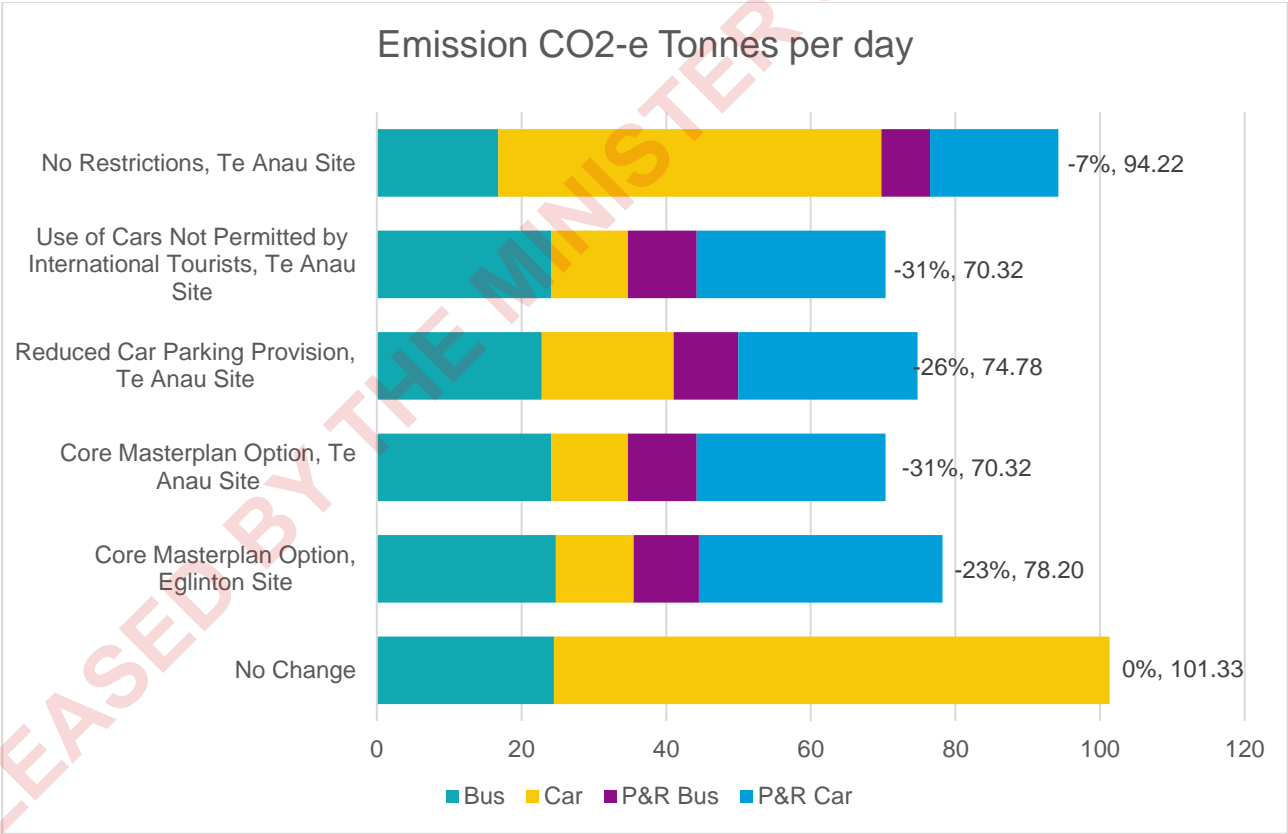


Figure 6-10: Network Enabled Carbon Emissions (Assuming 6000 Visitors/day)

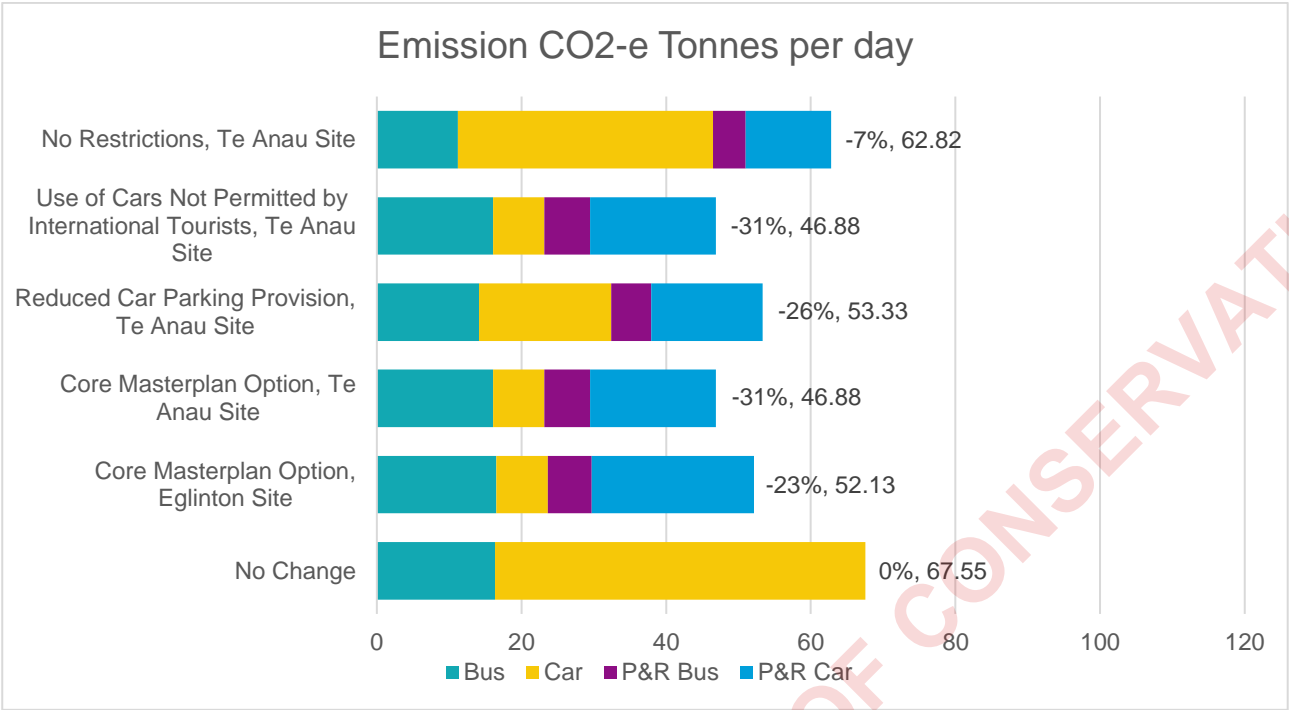


Figure 6-11: Network Enabled Carbon Emissions (Assuming 4000 Visitors/day)

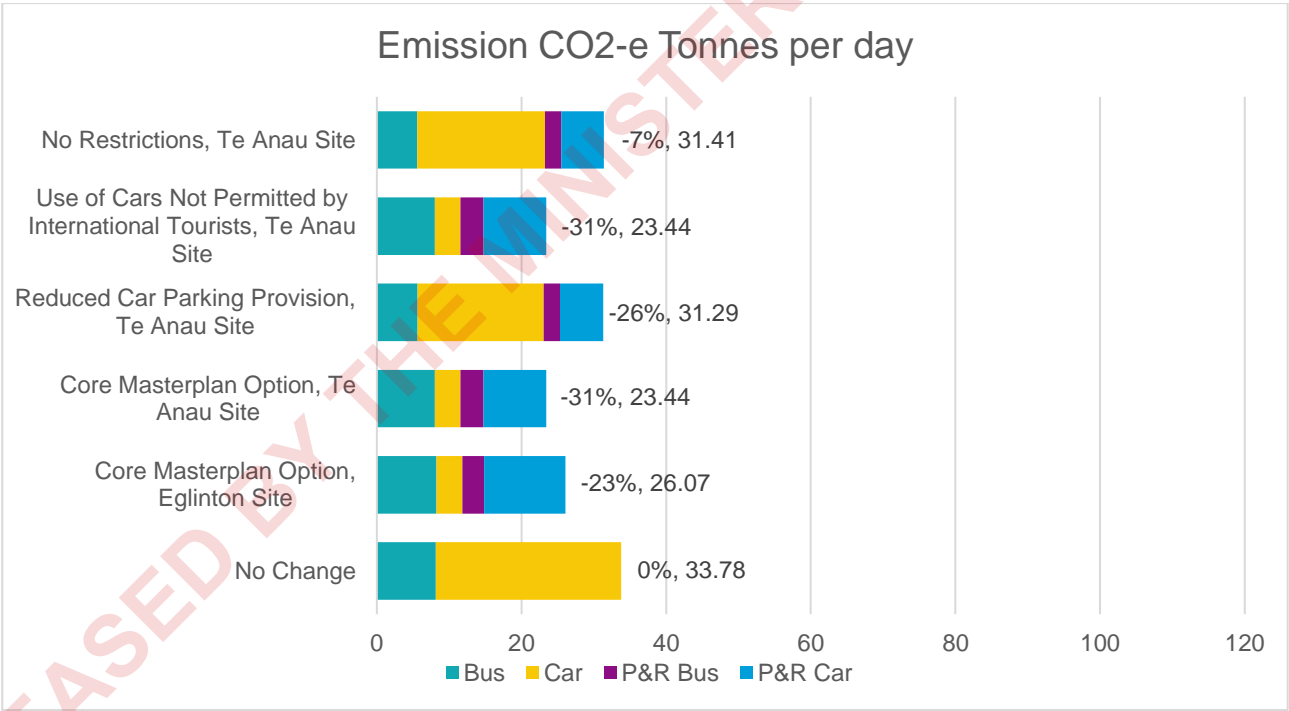


Figure 6-12: Network Enabled Carbon Emissions (Assuming 2000 Visitors/day)

Like the VKT impacts, the enabled carbon of light vehicles in the Do-Nothing scenario are substantial given that approximately 50% of visitors travel by car. Introducing Park and Ride to Milford Sound Piopiotahi significantly decreases emissions for all options.

For the Masterplan option, assuming the Park and Ride site location is Te Anau, the decrease in emissions from there being no Park and Ride (i.e. Do Nothing) is forecast to be approximately 31%. If a Park and Ride site is located at Knobs Flat or Eglinton Reveal, the total decrease in emissions from the Do Nothing scenario is forecast to be approximately 23%.

The total enabled emissions estimated by mode for the Masterplan option and a Do Nothing scenario is summarised in Table 6-15.

Table 6-15: Total Enabled Emissions for High Demand Scenarios

Scenario	Enabled Emission per Day (CO2-e Tonnes)
Masterplan Option (High Demand), Te Anau Park and Ride	70.3
Masterplan Option (High Demand), Eglinton Reveal Park and Ride	78.2
Do Nothing i.e. Business as Usual (High Demand)	101.3

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## 7 Bus Operations and Cost

This chapter provides details of the likely operations and costs of a Park and Ride and Hop On Hop off bus service. It should be noted that the projections are only for Park and Ride and Hop On Hop Off bus services i.e. they do not take into account the operation of private tour bus services.

### 7.1 Park and Ride Service Level / Fleet Size Requirement

The minimum required number of bus trips from each potential Park and Ride site needed to meet the forecast level of demand has been estimated for each of the three demand scenarios considered based on an assumed average occupancy of 40 people per bus (i.e. approximately 80% of a 49 seat bus), and an assumed journey time for the service (including bus driver/vehicle layover time).

It has been assumed that bus services from Te Anau have a round trip time of six hours (including time to stop at intermediate nodes and approximately 15-30 minutes layover time typically at each end of the route). Note that this does not assume that the same driver bringing visitors to Milford Sound stays at Milford Sound to wait for the same group of bus passengers to return on the same bus.

Bus services from Knobs Flat/Eglinton Reveal are assumed to have a round trip time of four hours. Park and Ride and Hop On Hop Off bus service users may therefore use a different bus on their return journey to their outward journey. This method of bus service operation is suggested in order to make best use of driver and bus resources.

Bus service departures from the Park and Ride service have been assumed to demand from a Park and Ride site in Te Anau between approximately 6am and 3pm, and from a Park and Ride site at Knobs Flat/Eglinton Reveal site between approximately 7am and 4pm.

On this basis, the required number of bus departures per day to meet the estimated level of demand has been calculated. This calculation assumes the distribution of demand across the day is similar to the current distribution. The estimated number is summarised in Table 7-1, Table 7-2, and Table 7-3 for each of the three demand scenarios.

The required number of bus departures from the Park and Ride sites to meet the estimated level of Park and Ride demand in the busiest hour of the day is shown in Table 7-4, Table 7-5 and Table 7-6 for the three demand scenarios.

In addition, the required number of bus departures across the day from the Park and Ride sites to meet the hourly Park and Ride and Hop On and Hop Off demand is shown in Figure 7-1 and Figure 7-2 for the 6,000/day visitor scenario. It should be noted that a 15:00 hours departure time from Te Anau will result in a 22:00 hours finish time approximately. The departure pattern is shown in table format in Table 7-7 and Table 7-8.

Based on the required number of departures per day, and assumed travel times/timetable, the minimum fleet size required to operate the level of service needed is summarised in Table 7-9, Table 7-10 and Table 7-11 for each demand scenario. It should be noted that additional vehicles would be required to cover maintenance needs (typically around 10%, though this would depend on whether the buses are conventional diesel buses or electric or hydrogen powered, etc.).

Table 7-1: Departures Required to Meet Demand Per Day (Park and Ride Service Only)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	23	22
4,000 visitors/day	46	43
6,000 visitors/day	68	65

Table 7-2: Departures Required to Meet Demand Per Day (Hop On Hop Off Service Only)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	6	6
4,000 visitors/day	13	13
6,000 visitors/day	19	19

Table 7-3: Departures Required to Meet Demand Per Day (Combined Requirement)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	29	28
4,000 visitors/day	58	56
6,000 visitors/day	87	84

Table 7-4: Departures Required to Meet Peak Hour Demand (Park and Ride Service Only)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	5	4
4,000 visitors/day	9	9
6,000 visitors/day	14	13

Table 7-5: Departures Required to Meet Peak Hour Demand (Hop On Hop Off Service Only)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	1	1
4,000 visitors/day	3	3
6,000 visitors/day	4	4

Table 7-6: Departures Required to Meet Peak Hour Demand (Combined Requirement)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	6	6
4,000 visitors/day	12	11
6,000 visitors/day	18	17

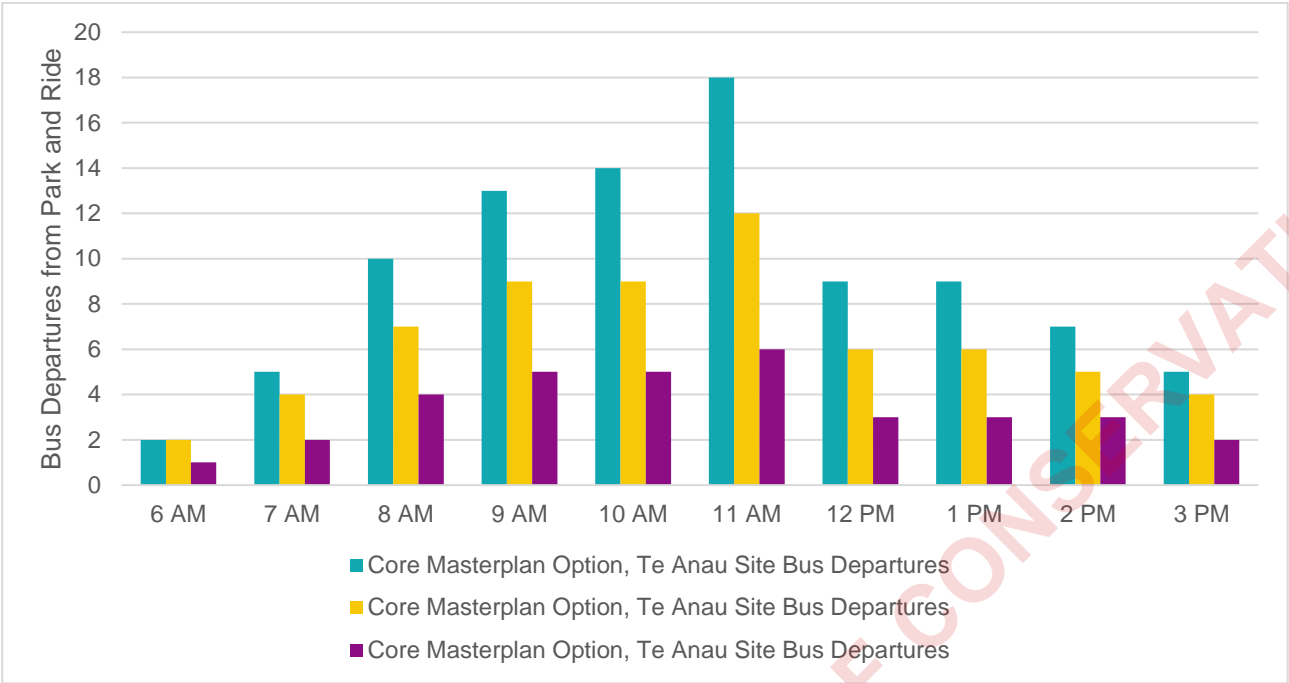


Figure 7-1 Hourly Bus Departures Required to Accommodate Park and Ride and Hop On Hop Off Demand at Te Anau (Assuming 6000 Visitors/day)

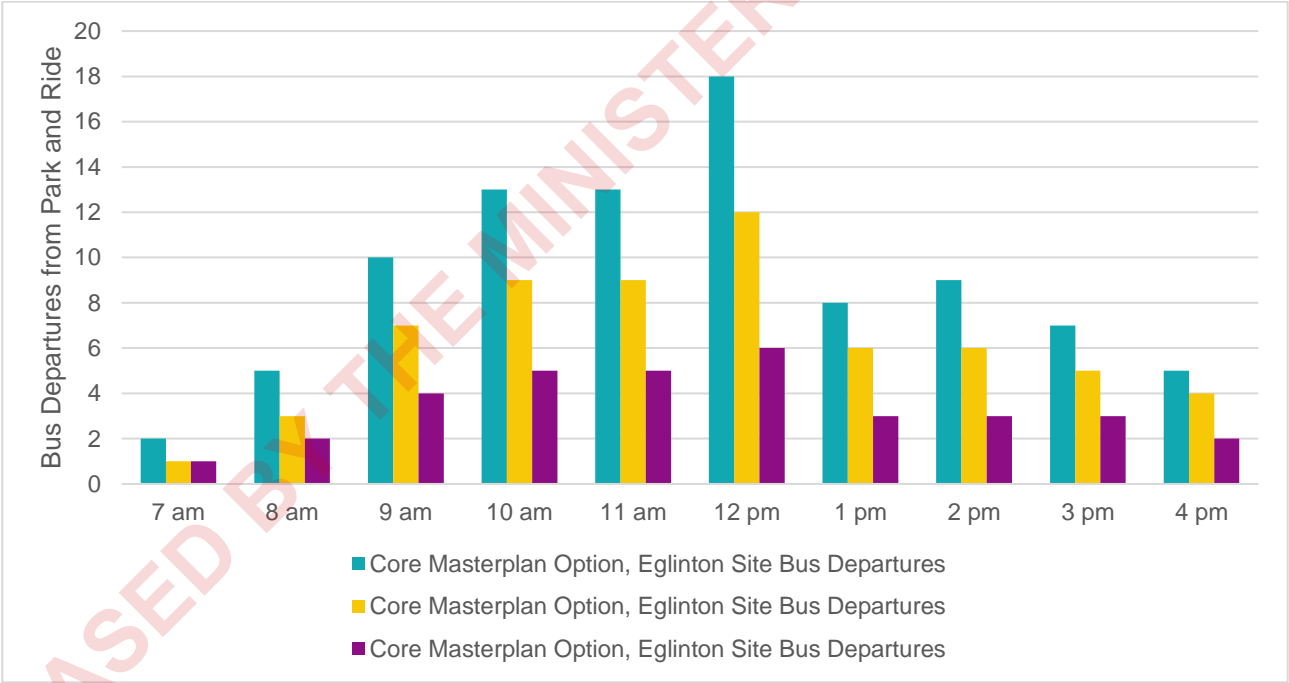


Figure 7-2 Hourly Bus Departures Required to Accommodate Park and Ride and Hop On Hop Off Demand at Eglinton Reveal (Assuming 6000 Visitors/day)

Table 7-7: Example Timetable (Te Anau Park and Ride Service: 6,000 Visitors/day)

Depart Te Anau
06.00
06.30
07.00 then every 12 minutes until 08.00
08.00 then every 6 minutes until 09.00
09.00 then at least every 5 minutes until 10.00
10.00 then at least every 5 minutes until 11.00
11.00 then at least every 5 minutes until 12.00
12.00 then at least every 7.5 minutes until 13.00
13.00 then at least every 7.5 minutes until 14.00
14.00 then at least every 10 minutes until 15.00
15.00 then at least every 12 minutes until 16.00

Table 7-8: Example Timetable (Knobs Flat/Eglington Reveal Park and Ride Service: 6,000 Visitors/day)

Depart Knobs Flat/Eglington Reveal
07.00
07.30
08.00 then every 12 minutes until 09.00
09.00 then every 6 minutes until 10.00
10.00 then at least every 5 minutes until 11.00
11.00 then at least every 5 minutes until 12.00
12.00 then at least every 5 minutes until 13.00
13.00 then at least every 7.5 minutes until 14.00
14.00 then at least every 7.5 minutes until 15.00
15.00 then at least every 10 minutes until 16.00
16.00 then at least every 12 minutes until 17.00

Table 7-9: Fleet Size Required (Park and Ride Service Only)

Scenario	Te Anau	Knobs Flat/Eglington Reveal
2,000 visitors/day	18	13
4,000 visitors/day	37	26
6,000 visitors/day	55	40

Table 7-10: Fleet Size Required (Hop On Hop Off Service Only)

Scenario	Te Anau	Knobs Flat/Eglington Reveal
2,000 visitors/day	5	4
4,000 visitors/day	10	8
6,000 visitors/day	15	11

Table 7-11: Fleet Size Required (Combined Requirement)

Scenario	Te Anau	Knobs Flat/Eglington Reveal
2,000 visitors/day	23	17
4,000 visitors/day	47	34
6,000 visitors/day	70	51

It should be also noted that the calculations are based on the existing demand profile. That said, flattening of the demand profile is not likely to result in a significant change to the fleet size required, particularly if a Park and Ride site is provided at Te Anau, as very few buses would be able to make more than one return trip per day given the likely round-trip time of six hours. For any significant savings to be made on the fleet size, demand would need to be encouraged to leave very early (say before 9am) and after around 1pm. This would need aggressive incentives to travel outside the 9am-1pm time window to result in any significant impact on the fleet size.

The demand profile could be ‘smoothed’ in a number of ways, including pricing incentives to travel at off-peak times, integrated management of Park and Ride and Hop On Hop Off services and (potentially) integrated management of both the tour bus fleet and the Park and Ride fleet (i.e. via booking system).

7.2 Park and Ride Service Level / Fleet Size Requirement Sensitivity Test

A sensitivity test has been undertaken to assess the impact of Park and Ride service users spending longer at Milford Sound Piopiotahi. The test was undertaken for the Core Masterplan option, and assumed that Park and Ride services from Te Anau have a round trip time of eight-hour hours (including time to stop at intermediate nodes and approximately 15-30 minutes layover time typically at each end of the route) instead of six hours. For the Knobs Flat/Eglinton Reveal Park and Ride site, the test assumed a round trip time of six hours rather than of four hours.

The results of this test are summarised in Table 7-12, Table 7-13, and Table 7-14. The resultant number of hourly bus departures to meet the forecast level of demand are shown in Figure 7-3 and Figure 7-4.

Table 7-12: Departures Required to Meet Demand Per Day (Park and Ride Service Only) – Sensitivity Test

Average Length of Stay at Milford Sound Piopiotahi	Te Anau	Knobs Flat/ Eglinton Reveal
3 hours	68	65
4 hours	69	65
5 hours	68	65

Table 7-13: Departures Required to Meet Peak Hour Demand (Park and Ride Service Only) – Sensitivity Test

Average Length of Stay at Milford Sound Piopiotahi	Te Anau	Knobs Flat/ Eglinton Reveal
3 hours	14	13
4 hours	12	12
5 hours	14	13

Table 7-14: Fleet Size Required (Park and Ride Service Only) – Sensitivity Test

Average Length of Stay at Milford Sound Piopiotahi	Te Anau	Knobs Flat/ Eglinton Reveal
3 hours	55	40
4 hours	54	39
5 hours	55	40

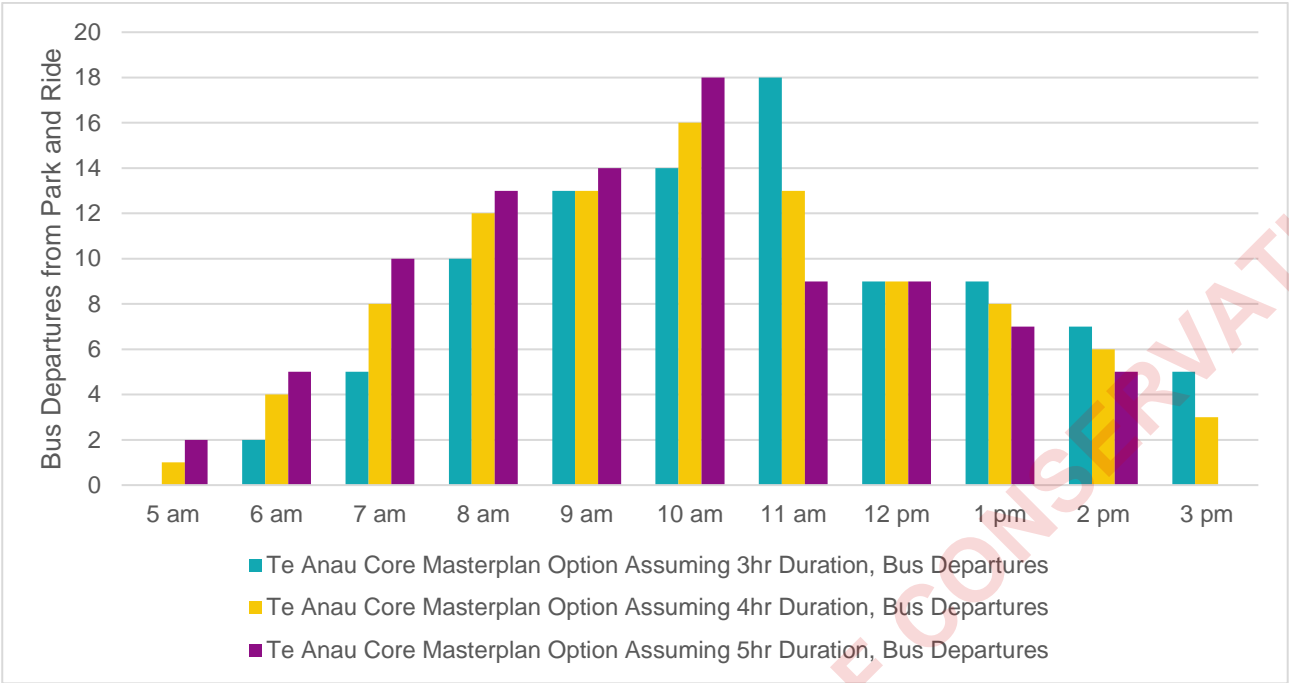


Figure 7-3: Hourly Bus Departures Required to Accommodate Park and Ride and Hop On Hop Off Demand at Te Anau (Assuming Trip Visit Durations of 3, 4 and 5 hours)

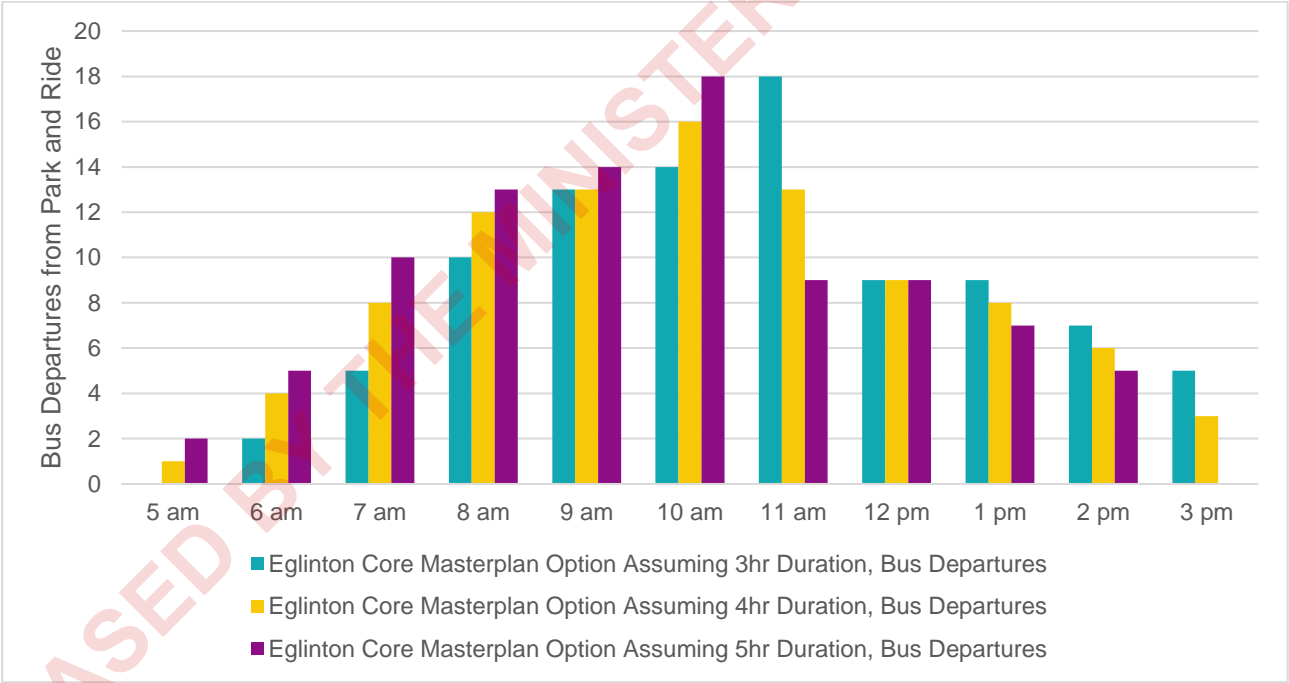


Figure 7-4: Hourly Bus Departures Required to Accommodate Ride and Hop On Hop Off Demand at Knobs Flat/Eglinton Reveal (Assuming Trip Visit Durations of 3, 4 and 5 hours)

Increases in trip visit duration in Milford Sound Piopiotahi causes minimal impact on the Park and Ride Service Level and Fleet Requirements for both sites.

### 7.3 Bus Service Fleet Specification

The quality and comfort of the vehicles operating passenger transport services can have a great influence on system attractiveness. The suggested bus fleet specification is as follows.

- A single deck low floor configuration is required to allow fast boarding and alighting through multiple doors, to maximise the use of floor space, and to provide sufficient headroom in the passenger cabin to allow for a significant ratio of standing passengers.
- Seating capacity for 49 people.
- A distinctive exterior design and livery that identifies the vehicle as Park and Ride.
- A high-quality interior design, distinct from conventional bus design and promoting a premium user experience.
- Space for luggage, which could be provided either as dedicated luggage racks, and/or areas of clear floor space near seating.
- Allowance to carry bikes.
- Space to carry scooters and other personal mobility devices.
- Door designs that allow all-door boarding and alighting from multiple doors for fast dwell times and high passenger turnover.
- Offboard ticketing to facilitate high turnover with short dwell times.

If new diesel engine buses are purchased, they should meet Euro emission and noise standards. Hybrids and full electric buses are likely to be more common in the future however.

### 7.4 Bus Operating Costs

As a minimum the following costs need to be included in determining operating costs:

- Vehicle hours (in service and out of service)
- Vehicle kilometres (in service and out of service).

These costs need to include:

- Vehicle leasing / ownership costs
- On-vehicle crew costs
- Vehicle operating costs
- Overhead operating costs (administration and management)
- Profit.

Bus operating costs vary according to a number of factors including the type and size of vehicles used, the location, the commercial model adopted, etc. Estimating costs is therefore not straightforward.

The maturing nature of existing technologies and the emergence of new technologies mean that there is a wide range of options that could be considered.

For the purpose of this study a generic bus operating cost of \$1.7 per vehicle-km, \$50 per vehicle-hour and \$55,000 annual cost per vehicle has been assumed on the basis that a conventional diesel bus fleet is operated. On this basis, the daily operating costs (rounded to the nearest thousand) for the Park and Ride and Hop On Hop Off service are estimated to be as summarised Table 7-15, Table 7-16, and Table 7-17 for each demand scenario considered.

Table 7-15: Operating Costs for Park and Ride Service Only (\$ per day)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$21,000	\$11,000
4,000 visitors/day	\$41,000	\$23,000
6,000 visitors/day	\$62,000	\$34,000

Table 7-16: Operating Costs for Hop On Hop Off Service Only (\$ per day)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$5,000	\$4,000
4,000 visitors/day	\$11,000	\$6,000
6,000 visitors/day	\$17,000	\$9,000

Table 7-17: Operating Costs (Combined Requirement) (\$ per day)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$26,000	\$15,000
4,000 visitors/day	\$52,000	\$29,000
6,000 visitors/day	\$79,000	\$43,000

The approximate annual cost of operating a Park and Ride and Hop On Hop Off service would be up to \$15 million (assuming the service operated from Te Anau, and depending on the actual timetable operated) and up to \$9 million (assuming the service operated from Knobs Flat/Eglinton Reveal, and depending on the precise timetable operated). This estimate is calculated on the assumption that the daily costs associated with the 6,000 visitors per day scenario is operated for one month of the year, that the daily costs associated with the 4,000 visitors per day scenario is

operated for five months of the year and that the daily costs associated with the 2,000 visitors per day scenario is operated for the rest of the year.

It should be noted that some or all of the Park and Ride bus operating costs could potentially be recovered from users of the service.

No analysis has been done of what level of cost recovery is likely has been undertaken, as this is being considered separately in the MOP commercial work stream.

7.5 Capital Cost of Buses

The capital costs of the bus fleet are dependent on what vehicle technology is adopted. Conventional diesel buses typically cost around \$400-600,000 per vehicle.

The capital cost of an electric bus is currently much higher than for a diesel bus (typically in the region of \$700-800,000 per vehicle though the cost of this technology is changing rapidly at the moment). Hydrogen fuel cell buses currently cost around \$1,000,000 per vehicle, whereas biofuel buses cost in the region of \$500-600,000 per vehicle.

On the assumption that diesel buses cost \$600,000 per vehicle, and that there is a requirement for an additional 10% vehicles for maintenance purposes, the approximate capital cost of a new fleet for the Park and Ride and Hop On Hop Off service would be as summarised in Table 7-18, Table 7-19, and Table 7-20.

It is estimated therefore that the bus fleet capital cost could be as high as \$46 million (under the high demand scenario), depending on the location of the Park and Ride facility chosen. It may be possible for some of the Park and Ride services to be operated by older vehicles however, given the seasonal nature of demand.

Table 7-18: Diesel Bus Fleet Capital Cost for Park and Ride Service (\$ million)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$11.9m	\$8.6m
4,000 visitors/day	\$24.4m	\$17.2m
6,000 visitors/day	\$36.3m	\$26.4m

Table 7-19: Diesel Bus Fleet Capital Cost for Hop On Hop Off Service (\$ million)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$3.3m	\$2.6m
4,000 visitors/day	\$6.6m	\$5.3m
6,000 visitors/day	\$9.9m	\$7.3m

Table 7-20: Diesel Bus Fleet Capital Cost - Combined Service Requirement (\$ million)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$15.2m	\$11.2m
4,000 visitors/day	\$31.0m	\$22.4m
6,000 visitors/day	\$46.2m	\$33.7m

On the basis of battery-electric buses costing \$750,000 the capital cost of a new fleet would be as summarised in Table 7-21, Table 7-22, and Table 7-23. This calculation also assumes a 10% spare fleet for maintenance purposes indicates a capital cost of up to approximately \$58 million may be required for the high demand scenario, again depending on the location of the Park and Ride facility chosen.

Table 7-21: Battery-electric Bus Fleet Capital Cost for Park and Ride Service (\$ million)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$14.9m	\$10.7m
4,000 visitors/day	\$30.5m	\$21.5m
6,000 visitors/day	\$45.4m	\$33.0m

Table 7-22: Battery-electric Bus Fleet Capital Cost for Hop On Hop Off Service (\$ million)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$4.1m	\$3.3m
4,000 visitors/day	\$8.3m	\$6.6m
6,000 visitors/day	\$12.4m	\$9.1m

Table 7-23: Battery-electric Bus Fleet Capital Cost - Combined Service Requirement (\$ million)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	\$19.0m	\$14.0m
4,000 visitors/day	\$38.8m	\$28.1m
6,000 visitors/day	\$57.8m	\$42.1m

7.6 Bus Operational Staff Requirement

Staff requirements to operate the Park and Ride service will depend on a number of factors, including the location of the Park and Ride site, the precise timetable operated (e.g. the degree to which measures are implemented to spread demand, thereby enabling buses to make more than one return trip per day) and the working agreements (e.g. use of split shifts, number of days drivers work, etc).

Based on the proposed timetable, it is possible that up to three drivers per bus would be needed. The resultant maximum number of drivers required on this basis is summarised in Table 7-24, Table 7-25, and Table 7-26 for each potential Park and Ride site location.

It should be noted however that the seasonal nature of demand would mean that a lower number of drivers than has been estimated for the 6,000 visitors per day scenario is likely to be needed. A significant proportion of the drivers required could therefore be employed on a seasonal basis.

Table 7-24: Bus Driver Requirements (Park and Ride Service Only)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	59	43
4,000 visitors/day	122	86
6,000 visitors/day	182	132

Table 7-25: Bus Driver Requirements (Hop On Hop Off Service Only)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	17	13
4,000 visitors/day	33	26
6,000 visitors/day	50	36

Table 7-26: Bus Driver Requirements (Combined Requirement)

Scenario	Te Anau	Knobs Flat/Eglinton Reveal
2,000 visitors/day	76	56
4,000 visitors/day	155	112
6,000 visitors/day	231	168

7.7 Park and Ride Service Management

It is anticipated that to provide for the intended reliability, performance and customer experience that a system of active, real-time management will be required. Early intervention to resolve issues and maintain system performance will be key to delivering the quality of product sought.

A control centre could be specific to the route or an additional function of the road controlling authority or the Milford Road Alliance’s existing control centre at the Homer Tunnel. In any case, it will be necessary to install video panels, which show the entire bus route, so that an operator can monitor for example the location of buses, status of traffic signals at junctions, charging points, cameras, ticketing machines, alarms, etc and be able to inform of any incidents to the necessary staff or agency.

## 8 Potential for Use of Automated Buses

Vehicles are becoming increasingly automated and technologies are rapidly evolving. All major car manufacturers are investing heavily in automation. All motorised vehicles are likely to be equipped with increasingly automated functions, but it is unclear when all vehicles could become fully automated (driving autonomously). It is also unclear whether automated vehicles could operate independently, or as part of integrated networks. The degree of automation will depend on technological capabilities, social norms, benefits, costs, and regulations.

Automated vehicles (AVs) could have a profound impact on public transport operations. If buses no longer require a human driver then this could fundamentally shift the costs of providing bus services.

Public transport services are already utilising autonomous technology, particularly when operating in access-controlled environments, such as railways and bus ways. As the technology continues to develop, we expect it will become possible to deliver autonomous rail and bus services in mixed traffic. Driverless buses and shuttles have already been utilised in Switzerland, Greece, China, and the Netherlands, while a trial at Christchurch Airport began in 2017. These services currently require a human to monitor driving and take over controls if need be.

There are however some unique barriers to autonomous public transport services, including:

- Public transport vehicles are expensive to replace; fleets are generally replaced over longer time periods, and large investments often require government funding.
- Public transport services are generally regulated to higher safety standards and procedures than private vehicles or ride-sharing services.
- Buses usually carry more people than cars, so the number of people affected by an incident is often greater.
- Governments are generally risk-averse and may avoid applications of new technologies when the benefits of their experiences will accrue to others and are not easily quantifiable.

It is uncertain when vehicles with 'level five' automation (requiring no human intervention for driving to any location where it is legal to drive) will begin operating on public roads. Automated buses are generally acknowledged to be more likely to be suited to supplementing urban mass public transport systems with both collective and personal on-demand and shuttle services when demand is low or pick-up points are far apart. These new fleets could supplement what is currently on offer in the form of readily-available car-sharing services, driverless taxis, or personalised means of public transport.

While we are optimistic about the potential benefits of using autonomous vehicles on the Milford Road corridor, the use of autonomous buses on Park and Ride services to Milford Sound Piopiotahi is likely to present some unique challenges due to the challenging nature of the corridor. In this section, we identify some of the key barriers to introducing autonomous buses on the Milford Road corridor and explore how they may be overcome.

### 8.1 Incompatible Infrastructure

Autonomous vehicles currently rely on road markings to be able to centre the vehicle in its lane. Road markings on sealed surfaces are subject to wear and tear, while unsealed roads do not have them at all. Autonomous vehicles may therefore be unable to operate in many parts of New Zealand due to poor quality and/or absence of road markings. Maintaining good quality road markings on Milford Road will be a particular challenge given its challenging environment.

## 8.2 Regulatory Frameworks

### 8.2.1 Outdated Framework

Road safety on the Milford Road corridor is a known key issue, and will be a particular challenge when considering the introduction of automated buses on the Milford Road corridor.

In the case of an accident, prevailing regulations in almost every country hold the vehicle's occupant(s), specifically the driver, responsible to varying degrees. New Zealand's regulations do not explicitly require a human to be operating a vehicle on public roads, however they generally presume that the human driver is "in control" of, and therefore responsible for, the vehicle they are travelling in. In the case of autonomous vehicles, it is not clear on whom to attribute responsibility for accidents and therefore liability for damages.

Most vehicles that currently offer semi-autonomous modes warn that the human driver remains responsible for the vehicle's actions even under semi-autonomous operation. Some vehicle manufacturers have indicated that they will accept responsibility for the behaviour of their vehicles when they reach full autonomy. Other manufacturers, like Google, believe that it is unreasonable to expect humans to constantly supervise a vehicle for which they are not required for primary driving functions. Google have committed to only releasing fully autonomous vehicles and will immediately accept responsibility for their vehicles' actions, rather than initially releasing semiautonomous vehicles which transfer responsibility to passengers.

There may therefore be a need to develop specific regulations that efficiently manage the liability that is faced by manufacturers for vehicles using challenging corridors like Milford Road.

### 8.2.2 Ethical Regulations

One of the largest debates regarding the implementation of autonomous vehicles is their capability to make ethical judgements in uncommon and unlikely scenarios. This is likely to be a particular challenge for the introduction of autonomous buses on the Milford Road corridor.

Consider a situation where an autonomous bus is carrying one passenger, and is following a truck. Now suppose the truck ahead brakes suddenly and unexpectedly, such that the autonomous vehicle cannot brake in time. In this situation, should the autonomous vehicle elect to crash into the truck, potentially injuring or killing the vehicle's passenger? Or swerve to one side and potentially endanger the occupants of other vehicles?

While unlikely, these kinds of scenarios do occur and would be more common on the Milford Road corridor than on many roads in New Zealand. And although we may be forgiving of the spur of the moment choices that are made by human drivers in such scenarios, decisions that are made systematically by design will likely be more heavily critiqued. In the case of autonomous vehicles, the chosen course of action is predetermined by software and, by extension, is arguably an intentional decision regarding whose lives should be protected.

Vehicle manufacturers arguably have an incentive to design software that protects the occupants of their vehicle at the expense of the safety of other people, as people may be unlikely to purchase or travel in a vehicle which is known to protect the lives of others before themselves. In this context, there may be a need for public engagement and regulations to define the appropriate course of action for autonomous vehicles. The marketability of a vehicle that protects the lives of others before that of the occupants remains an open question.

### 8.3 Vehicle Testing Regulations

New Zealand's current regulations do not explicitly require a driver to be present for a vehicle to be legally used on public roads. However, if a driver is present, they are required to be licensed and are responsible for the vehicle's actions.

Some additional vehicle testing regulations may be necessary to ensure the safety and reliability of autonomous vehicles before they are released. This may involve, for example, requiring new models to undergo comprehensive local driving tests on the Milford Road corridor before being permitted for public use. Some states in the U.S.A. have already enacted legislation regarding licensing and restrictions for autonomous vehicles. Updating vehicle testing regulations should ease the transition to autonomous vehicles, and allow the public to be more confident that their vehicle meets independently set and monitored standards.

### 8.4 Consumer Support and Awareness

Releasing autonomous technology before it is capable of safely navigating all reasonably expected scenarios could damage public perception, especially if this causes injuries or fatalities to passengers or pedestrians. In 2016, Uber began testing their self-driving technology in San Francisco, California. Their vehicles were caught running red lights, travelling through stop signs, turning unsafely, and failing to give way to pedestrians (Levin, 2016). The lack of safe driving practice and failure at complying with local road rules creates the potential for serious accidents with avoidable injuries and/or fatalities. In the occurrence of such an avoidable accident, public support would likely be severely damaged, which might delay the overall transition to autonomous vehicles.

Lack of consumer awareness also creates opportunities for avoidable accidents to occur. Currently, most vehicles with an auto-pilot mode require the driver to constantly supervise the vehicle, enforcing this by requiring the driver to interact with the vehicle's systems in some way, such as by keeping their hands on the steering wheel, or tracking their eyes to ensure they are watching the road (Riswick, 2016). Tesla's manuals make it clear that drivers need to be prepared to take over from the auto-pilot, if it acts unpredictably (Gardner, 2016); however, it is questionable whether it is reasonable to expect a human to continuously supervise a vehicle in autonomous operation for long periods of time, which could be the case if autonomous buses are used on Milford Road.

## 9 Park and Ride Site Infrastructure

### 9.1 Design Standards

In developing concept layouts for a potential Park and Ride site, the following design standards were taken into consideration:

- Southland District Council and Invercargill City Council – Subdivision, Land Use, and Development Code of Practice 2023
- AS/NZS 2890.1:2004 – Parking Facilities – Off-Street Car Parking Facilities
- NZS 4121:2001 – Design for Access and Mobility
- New Zealand Transport Agency Waka Kotahi Walking Cycling and Public Transport
- Milford Opportunities Project: A Masterplan for Milford Sound Piopiotahi and the Journey 2021
- Operative Southland District Plan 2018.

This led to the identification of the following typical and minimum values used for the design:

#### 9.1.1 Single Storey Car Park

- Minimum 7.9m aisle width (*SDC Subdivision, Land Use and Development Bylaw 2012*)
- Minimum 3.5m lane width
- Minimum 2.5m x 5.1m car park layout
- Minimum 2.5m x 7.5m motorhome car park layout
- Minimum 2.5m x 5.4m accessibility car park layout
- Minimum 15m x 5m bus parking layout
- A minimum of 15 bus bays
- Approximately 1000 minimum car parking spaces
- 2000m<sup>2</sup> pedestrian waiting area
- Visitor experience hub (where applicable).

#### 9.1.2 Multi Storey Car Park

- Minimum 7.0m aisle width (*AS/NZS 2890.1:2004*)
- Minimum 3.5m lane width
- Minimum 2.5m x 5.1m car park layout
- Minimum 2.5m x 7.5m motorhome car park layout
- Minimum 2.5m x 5.4m accessibility car park layout
- Minimum 15m x 5m bus parking layout
- A minimum of 15 bus bays
- Approximately 1000 minimum car parking spaces
- 12.0m maximum building height
- 1:6 maximum ramp grade
- 2000m<sup>2</sup> pedestrian waiting area
- Visitor experience hub (where applicable).

## 9.2 Design Philosophy

In developing concept designs for the potential Park and Ride sites, the following approach has been adopted:

- Minimise conflicts between vehicles, pedestrians, and buses.
- Minimise accessibility parking and pedestrian walking distance to bus shelters.
- Provide access suitable for prams/wheelchairs, etc.
- Provide dedicated bus lanes and bus access points within the car park to minimise delays to buses.
- Provide dedicated pedestrian routes.
- Provide multiple vehicle/bus entry points where possible to minimise the impact of a breakdown or incident to provide contingency.
- Provide areas for potential amenities where applicable which could include bus shelters, toilets, elevators, stairs and ticketing office.
- Option footprints have been proposed based on providing different floor area shapes due to multiple site location being evaluated.
  - Providing for a Visitor Experience Hub integrated with the Park and Ride facility at Te Anau.
- Minimum of 15 bus bays for departing services to accommodate the forecast frequency of park and services.
- A height restriction of 9.0m has been assumed based on Table 12 of the *Operative Southland District Plan 2018* where the zoning of the Park and Ride has assumed to be General Residential or Commercial Precinct adjoining the General Residential zone
  - Elevators are considered architectural appurtenances and are excluded from the overall height restriction.
  - As generic designs for multistorey parking facilities have been completed, it is possible that the height restrictions for potential sites such as Knob's Flat and Eglinton Reveal may be greater than the 9.0m specified and should be reviewed if the proposal is progressed to the next design stage (though it is noted that heights that are greater than 9.0m may be appropriate subject to resource consent).

## 9.3 Concept Design Options

The following concept design options for Park and Ride were developed. More detailed sketches of the required infrastructure footprint for each of the options are included in Appendix A.

### 9.3.1 Single Storey Park and Ride, Te Anau and Knobs Flat – Option 1

This option has been developed for both Te Anau and Knobs Flat. To mitigate conflicts, separate entry and exit points have been designated for buses and vehicles. Provision for motorhome parking is allocated within the one-way parking area. Furthermore, preliminary considerations have been made to include potential rain gardens, pending detailed stormwater design in subsequent stages. Bus parking is located at one end and is connected to the visitor waiting area. Two layouts have been developed for Option 1, with one including an allowance for a Visitor Experience Hub. Refer to Figure 9-1 for Option 1 (for illustrative purposes only).



Figure 9-1: Option 1 (Single Storey Park and Ride, Te Anau and Knobs Flat)

**9.3.2 Single Storey Park and Ride, Eglinton Reveal – Option 2**

This option has been developed for the proposed site in Eglinton Reveal. This site is constrained by a bank and a nearby forest. These constraints the site footprint result in only one row of bus bays being provided, and extend the length of the design footprint. As a result of this, vehicle movement across the bus lanes has been allowed to improve vehicle accessibility to the upper parking area. Bus bays are located centrally to minimise walking distances for pedestrians that move between parking rows using dedicated access paths. Motor home parking provisions have been incorporated within the designated one-way parking area (refer to Figure 9-2 (for illustrative purposes only)). Note that initial considerations were made for possible rain gardens.

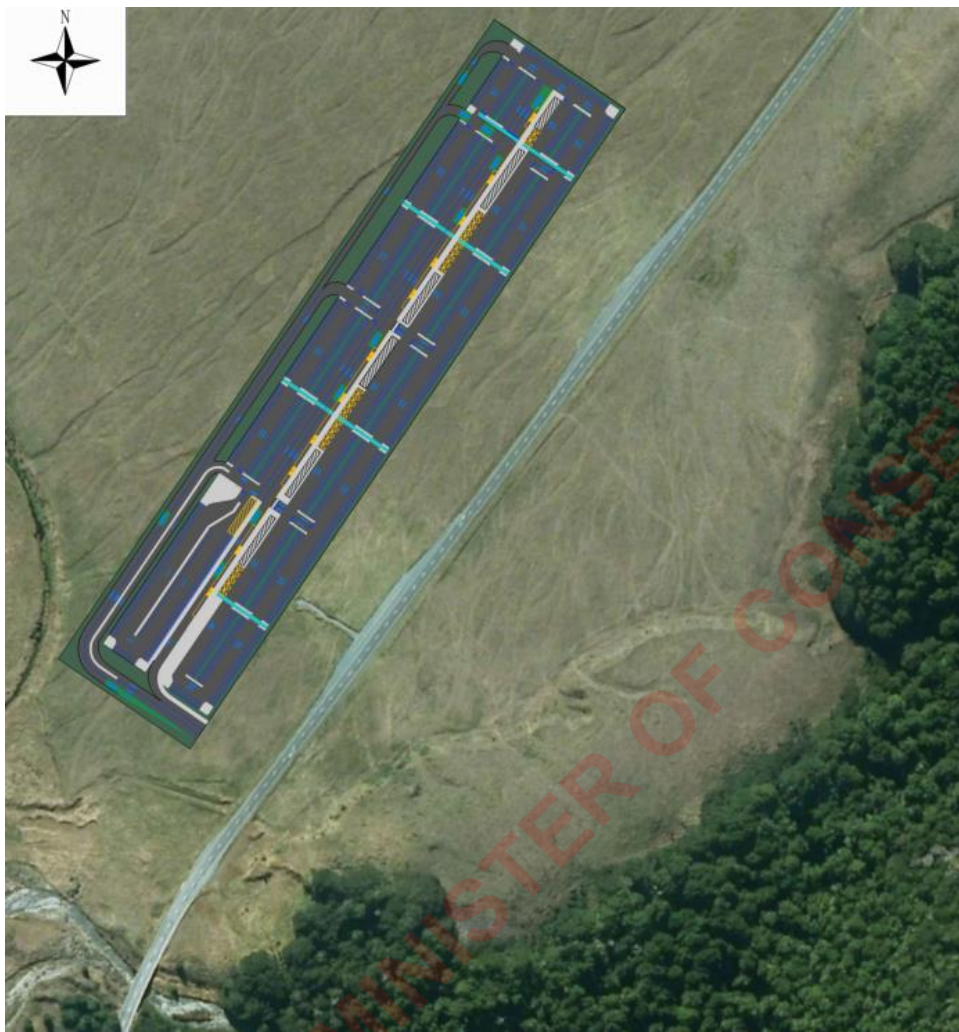


Figure 9-2: Option 2 (Single Storey Park and Ride, Eglington Reveal)

9.3.3 Two-Storey Park and Ride Site – Option 3

This option is designed for smaller sites where constraints may make a multi-storey design preferable to reduce the footprint area compared to a single-storey design. The introduction of a multi-storey structure introduces the constraint of columns, resulting in a reduction of parking aisle width to 7m. Access and exit to the first floor is provided through separate one-way ramps. Pedestrian movement will occur through dedicated access paths with areas also allowed for stairs and elevators. To minimise the height of the structure, the bus bays have been located outside of the main structure. Motorhome parking provisions have been allowed for on the ground floor. Two layouts have been proposed for Option 3, with one including allowance for a Visitor Experience Hub (refer to Figure 9-3 (for illustrative purposes only)).

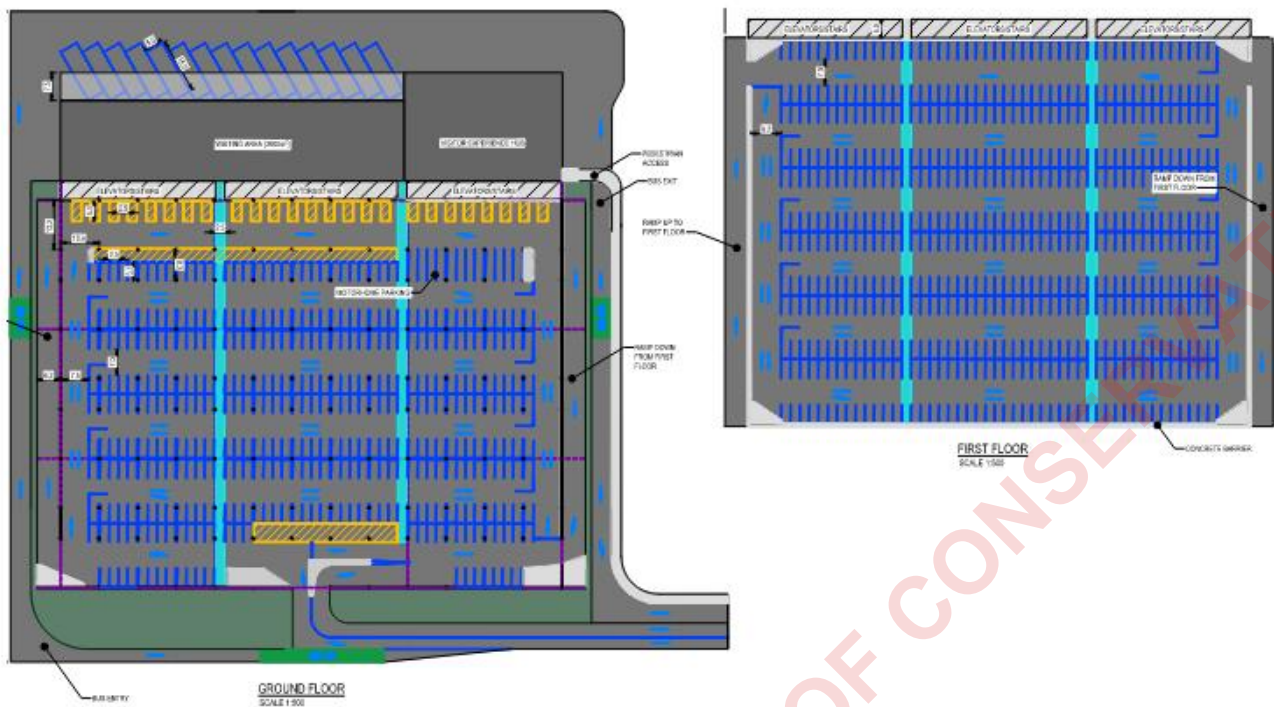


Figure 9-3: Option 3 (Two-Storey Park and Ride Site)

9.3.4 Three-Storey Park and Ride Site – Option 4

As with Option 3, this option is designed for smaller sites where constraints may make a multi-storey design preferable to reduce the footprint area. The introduction of a multi-storey structure introduces the constraint of columns, resulting in a reduction of the parking aisle width to 7m. Pedestrian movement can occur through dedicated access locations with areas allowed for stairs and elevators. Access and exit to the floor is provided by means of one-way ramps. To minimize the height of the structure, the bus bay area has been located outside of the main structure. The footprint size is increased compared to Option 3 due to motorhome parking having to be provided outside of the main structure. This is because of the floor to ceiling height cannot accommodate motorhomes sufficiently (refer to Section 9.2). Two layouts have been proposed for Option 4, with one including allowance for a Visitor Experience Hub (refer to Figure 9-4, inclusive of the Visitor Experience Hub (for illustrative purposes only)).

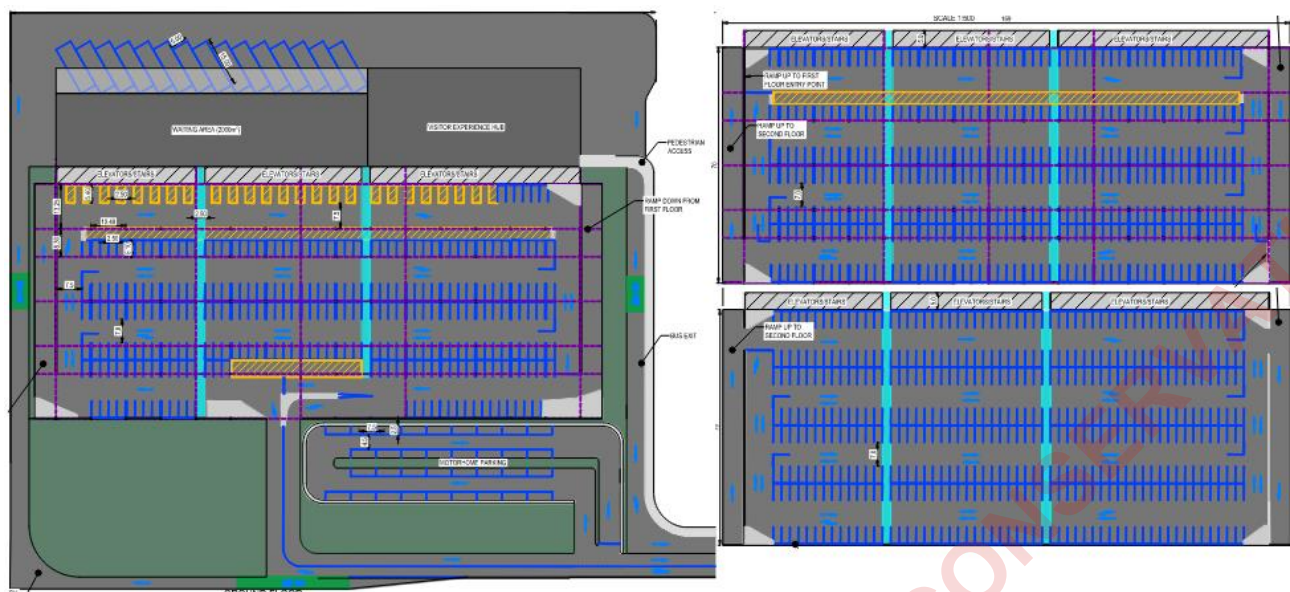


Figure 9-4: Option 4 (Three-Storey Park and Ride Site)

9.4 Cost Estimate

Cost estimates have been developed for the Park and Ride options and are summarised in Table 9-1. These figures are rounded to the nearest thousand. The cost estimates do not specifically take into account the additional time required for staff to get there or stay close by to Knobs Flat/Eglinton Reveal compared to Te Anau, but this is not anticipated to be significant in overall terms. Further details of the estimates are included in Appendix B.

Table 9-1: Park and Ride Option Cost Estimates

Park and Ride Option	Cost \$ (NZD)
Single Storey Te Anau	\$33,822,000
Single Storey Knobs Flat	\$33,822,000
Single Storey Eglinton Reveal	\$34,088,000
Two-Storey Te Anau	\$108,211,000
Two-Storey Knob's Flat	\$113,622,000
Two-Storey Eglinton Reveal	\$110,917,000
Three-Storey Te Anau	\$130,241,000
Three-Storey Knob's Flat	\$136,753,000
Three-Storey Eglinton Reveal	\$133,497,000

9.5 Safety in Design and Risk Register

A safety in design (SID) and risk workshop was held on Monday 27<sup>th</sup> November 2023. The register is in Appendix C.

9.6 Option Multi-Criteria Analysis

A multi-criteria analysis (MCA) workshop was held on Friday 16<sup>th</sup> February 2024 with MOP and Beca to assess the suitability options as detailed in Section 9.3. The MCA was based on the criteria and description summarised in Table 9-2.

Table 9-2: Initial MCA Criteria

Criteria	Description
Safety	Safety is a primary driver for this project along the entire corridor. An option that does not improve safety to the existing scenario and deliver the appropriate safety benefits will be unviable.
Enabling Works	Inputs from other project workstreams. Considers, and not limited to, 3 waters, consenting, and services/utilities.
Environmental Impacts	Impacts on private use vehicle mode share and associated carbon reduction and alignment to the United Nations Sustainability Development Goals.
Cost	Whether the option is a fundable solution will likely be determined by its indicative cost, and will also dictate funding pathways which may be easier or more difficult if key metrics cannot be achieved (CAPEX).
Accessibility	Consideration to ease of access to encourage alternative/active modes of travel to the Park and Ride facility.
Enabled Emissions	VKT emissions of private vehicles accessing the Park and Ride facility, as well as buses.
Embodied Emissions	Emissions based on the infrastructure of the Park and Ride facility and travel distance.
Stakeholders and Community	Stakeholder (not project partners) interests will need to be considered to avoid potential delays and additional costs through future stages. How the option addresses community concerns will impact on the perceived success of the project and reflect on MOP.
Visual	Visual impacts and how the Park and Ride facility fits into the existing infrastructure/environment.
Programme	To align with funding requirements, the programme may impact on the feasibility of an option. For example, an option that requires property purchase may take longer to go through the property acquisition process.

The MCA used a scoring system to show differentiation between options. The scoring system ranged between 3 and -3 in 1.0 increments to discern the benefits/disbenefits of the various options. The scoring system can be seen in Table 9-3.

Table 9-3: MCA Point Scoring System

Magnitude	Definition	Score
Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.	3
Positive	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive impacts may be in terms of new opportunities and outcomes of enhancement or improvement.	2
Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.	1
Neutral	Neutral – no discernible or predicted positive or negative impact. Counterfactual could be the do-minimum or do-nothing,	0
Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area	-1
Negative	Moderate negative impact. Impacts may be short-, medium- or long-term and are highly likely to respond to management actions.	-2
Large Negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification, or requires major commitment to extensive management strategies to mitigate the effect.	-3

The following options were assessed:

- Option 0 – Do Nothing
- Option 1 – Te Anau Single Storey
- Option 2 – Knobs Flat Single Storey
- Option 3 – Eglinton Reveal Single Storey
- Option 4 – Te Anau Two Storey
- Option 5 – Knobs Flat Two Storey
- Option 6 – Eglinton Reveal Two Storey
- Option 7 – Te Anau Three Storey
- Option 8 – Knobs Flat Three Storey
- Option 9 – Eglinton Reveal Three Storey.

9.6.1 Assuming Equal Weighting of MCA Criteria

A summary of the MCA, on the basis of all MCA criteria having equal weighting, is contained in Table 9-4.

Table 9-4: MCA with Equal Weighting to All Criteria

Criteria	Weighting	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Safety	10%	-3	3	2	2	3	2	2	3	2	2
Enabling Works	10%	0	-1	-2	-3	-1	-2	-3	-1	-2	-3
Environmental Impacts	10%	-2	2	2	1	3	2	1	3	2	1
Cost	10%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
Accessibility	10%	-2	2	1	1	2	1	1	2	1	1
Enabled Emissions	10%	-3	2	1	1	2	1	1	2	1	1
Embodied Emissions	10%	0	-1	-1	-1	-2	-2	-2	-3	-3	-3
Stakeholders and Community	10%	-3	2	1	-1	3	1	1	3	1	1
Visual	10%	0	-2	-2	-3	-1	-2	-3	-1	-2	-3
Programme	10%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
SCORE	100%	-1.30	0.50★	0.00	-0.50	0.50★	-0.30	-0.60	0.40	-0.40	-0.70

Table 9-5 provides the main reasoning to the scoring.

Table 9-5: MCA Justification of Scoring

Criteria	Justification
Safety	<p>According to NZTA's 2018– 2028 Frankton to Milford Sound Corridor Management Plan, the corridor between Te Anau and Milford Sound Piopiotahi has a medium-high to high personal risk. Personal risk is defined as the count of deaths and serious injuries (DSI) divided by distance or time travelled, indicating that the corridor has a very high safety risk and has thus Option 0 (Do Nothing) has been scored -3.</p> <p>As the safety rating of the MCA has been based on the corridor as a whole, Options 1, 4 and 7 which are based in Te Anau, have a score of 3 due to private use vehicles not having to travel the furthest along the corridor.</p> <p>Therefore, a score of 2 was given to the remaining options in Knobs Flat and Eglinton Reveal due to the need for private vehicles having to travel along the corridor to use the Park and Ride facility.</p>
Enabling Works	<p>If Park and Ride is not implemented, no enabling work is required. Similar to the safety ratings, scores were based on the location of each option due to the infrastructure present.</p> <p>Te Anau is a township and will require minimal enabling works as services such as power are already present; therefore, scoring -1 for possible disruption and additional work for Options 1, 4 and 7.</p> <p>Knobs Flat currently has a bathroom and Eglinton Camp facilities, resulting in more enabling works compared to Te Anau to provide the same service and infrastructure support, resulting in a score of -2 for Options 2, 5 and 8.</p> <p>Eglinton Reveal has no existing infrastructure and therefore requires the most enabling works compared to the other locations and scored -3 for Options 3, 6 and 9.</p>
Environmental Impacts	<p>Option 0 (Do Nothing) scored -2 due to there being a mode choice between private use vehicles and tour coaches which helps to reduce carbon emissions; however, currently does not align with the United Nations Sustainability Development Goals.</p> <p>Option 1 (Te Anau Single Storey) will ultimately support Park and Ride; however, results in a large footprint in an already developed area and a score of 2. All other options in Te Anau score 3 due to smaller footprints.</p> <p>All options in Knobs Flat score 2 due to the distance construction materials have to travel.</p> <p>All options in Eglinton Reveal score 1 due to the furthest distance construction materials have to travel.</p>
Cost	<p>Based on the cost estimates, a single-storey option is cheaper to construct compared to the multi-storey options. Options 1, 2 and 3 which are the</p>

Criteria	Justification
	<p>single storey options in Te Anau, Knobs Flat and Eglinton Reveal have scored a -1.</p> <p>There is a minimal difference between the two-storey and three-storey cost estimates, hence why the remaining six options (Option 4 – Option 9) scored a -2.</p>
Accessibility	<p>Accessibility is a fundamental part of the Park and Ride facility and has again been based on location.</p> <p>Te Anau, being a township, has amenities such a hotels and a residential population that are likely to be within the derisible 400m – 800m walking catchment, and is therefore able to be accessed via other modes of transport.</p> <p>Option 0 provides the option for alternative modes but no walkability and small companies currently require people to meet supermarkets, resulting in a score of -2.</p> <p>Knobs Flat and Eglinton Reveal will require people to drive to access the Park and Ride facility so have scored lower than a potential facility in Te Anau.</p>
Enabled Emissions	<p>Option 0 scored the worst for the Enabled Emissions criteria due to the need for all vehicles in this option required to drive the entire way to Milford Sound Piopiotahi.</p> <p>All of the options for Te Anau (Options 1, 4 and 7) scored 2 due to the opportunity to reduce the enabled emissions by the greatest amount through this stopping the greatest length of journey.</p> <p>All of the options from Knobs Flat and Eglinton Reveal require drivers to travel a small distance to reach the Park and Ride facilities at these two locations, resulting in a score of 1.</p>
Embodied Emissions	<p>Embodied emissions for single-storey design (Options 1, 2 and 3) produce the lowest carbon emissions and have scored -1.</p> <p>Two-storey designs (Options 4, 5 and 6) produce significantly higher carbon emissions due to the amount of material needed and have scored -2.</p> <p>Three-storey designs (Options 7, 8 and 9) produce the highest carbon emissions and have scored -3.</p>
Stakeholders and Community	<p>Stakeholders and the community in Te Anau want something to happen and support a Park and Ride facility, resulting in a score for Option 0 of -3.</p> <p>All of the options to implement a Park and Ride facility have stakeholder and community support, except for Option 3 at Eglinton Reveal which has a design that is likely to not feasible, resulting in a score of -1.</p> <p>All other facilities at Knobs Flat and Eglinton Reveal have a stakeholder and community score of 1 due to these locations bypassing Te Anau.</p>

Criteria	Justification
	The options that are based in Te Anau scored the best but there is a difference in the scoring of the different options in Te Anau based on the size of the Park and Ride facility, resulting in a score of 2 for a single storey facility and 3 for a two and three storey facility.
Visual	<p>Any Park and Ride facility will detract from the visual amenity of the area they are in, so all options have scored negatively. There are options for cladding / facades to be included on the two and three-storey options to match into the surrounding landscape.</p> <p>The scoring gets worse for each of the options depending on how many storeys the carpark has. The exception to this is Option 1 – Te Anau Single Storey which has a score of -2 due to the visual impact of this facility in the town centre.</p>
Programme	<p>There is the opportunity for the programme of the Park and Ride facilities which are single-storey to be staged which provides the opportunity to have a partial opening of a facility before the full facility is completed, resulting in all options that are one storey scoring -1.</p> <p>For the two or three storey facilities there is less opportunity for this to happen due to the vertical construction of the facility occurring in the same location as the bottom floor, resulting in a score or -2 for all of the two and three storey options.</p>

Option 0 scored the worst overall, with every option scoring better than Option 0 (Do Nothing) meaning that implementation of any of the designs proposed will be better than the existing condition. Option 1 (Te Anau Single Storey) and Option 4 (Te Anau Two Storey) scored the best (as denoted by the star), followed by Option 7 (Te Anau Three Storey). Overall, therefore, the MCA shows that Te Anau is the preferred location of the Park and Ride facility.

9.6.2 Safety Focussed MCA Sensitivity Test

Safety is a key project driver, and a sensitivity test has been conducted with a focus on the Safety criteria. An increased weighting of 20% has been applied, with an adjusted equal weighting for all other criteria. The results are summarised in Table 9-6.

Table 9-6: Alternative MCA with a Safety Focus

Criteria	Weighting	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Safety	20%	-3	3	2	2	3	2	2	3	2	2
Enabling Works	9%	0	-1	-2	-3	-1	-2	-3	-1	-2	-3
Environmental Impacts	9%	-2	2	2	1	3	2	1	3	2	1
Cost	9%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
Accessibility	9%	-2	2	1	1	2	1	1	2	1	1
Enabled Emissions	9%	-3	2	1	1	2	1	1	2	1	1
Embodied Emissions	9%	0	-1	-1	-1	-2	-2	-2	-3	-3	-3
Stakeholders and Community	9%	-3	2	1	-1	3	1	1	3	1	1
Visual	9%	0	-2	-2	-3	-1	-2	-3	-1	-2	-3
Programme	8%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
SCORE	100%	-1.50	0.79	0.23	-0.22	0.80★	-0.03	-0.30	0.71	-0.12	-0.39

As per Table 9-4, the results from Table 9-6 show that Option 4, closely followed by Option1 remains as the preferred option compared to the other options.

9.6.3 Environment Focussed MCA Sensitivity Test

Environmental factors such as sustainability and carbon emissions are also a major focus of the project. As a result, a sensitivity tests with an increased weighting of 20% have been applied to the Environmental Impact, Enabled Emissions and Embodied Emissions criteria, with an adjusted equal weighting for all other criteria. The results of this sensitivity test are summarised in Table 9-7.

Table 9-7: Alternative MCA with an Environmental Focus

Criteria	Weighting	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Safety	6%	-3	3	2	2	3	2	2	3	2	2
Enabling Works	6%	0	-1	-2	-3	-1	-2	-3	-1	-2	-3
Environmental Impacts	20%	-2	2	2	1	3	2	1	3	2	1
Cost	6%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
Accessibility	6%	-2	2	1	1	2	1	1	2	1	1
Enabled Emissions	20%	-3	2	1	1	2	1	1	2	1	1
Embodied Emissions	20%	0	-1	-1	-1	-2	-2	-2	-3	-3	-3
Stakeholders and Community	5%	-3	2	1	-1	3	1	1	3	1	1
Visual	6%	0	-2	-2	-3	-1	-2	-3	-1	-2	-3
Programme	5%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
SCORE	100%	-1.45	0.71 ★	0.28	-0.14	0.71 ★	-0.03	-0.35	0.51	-0.23	-0.55

As per Table 9-4 and Table 9-6, the results from Table 9-7 show that Options 1 and 4 remain as the preferred option compared to the other options.

9.6.4 Cost Focussed MCA Sensitivity Test

Whilst not being a criteria affecting the design, the capital cost of implementation is a factor to be considered. A sensitivity test has been conducted with a focus on the Cost criteria. An increased weighting of 20% has been applied, with an adjusted equal weighting for all other criteria. The results are summarised in Table 9-8.

Table 9-8: Alternative MCA with a Cost Focus

Criteria	Weighting	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Safety	9%	-3	3	2	2	3	2	2	3	2	2
Enabling Works	9%	0	-1	-2	-3	-1	-2	-3	-1	-2	-3
Environmental Impacts	9%	-2	2	2	1	3	2	1	3	2	1
Cost	20%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
Accessibility	9%	-2	2	1	1	2	1	1	2	1	1
Enabled Emissions	9%	-3	2	1	1	2	1	1	2	1	1
Embodied Emissions	9%	0	-1	-1	-1	-2	-2	-2	-3	-3	-3
Stakeholders and Community	9%	-3	2	1	-1	3	1	1	3	1	1
Visual	9%	0	-2	-2	-3	-1	-2	-3	-1	-2	-3
Programme	8%	0	-1	-1	-1	-2	-2	-2	-2	-2	-2
SCORE	100%	-1.17	0.35★	-0.10	-0.55	0.25	-0.47	-0.74	0.16	-0.56	-0.83

A score of 0.35 was produced for Option 1, closely followed by Option 4, showing that both are cost effective designs to be implemented.

**9.6.5 Recommended Option**

Based on the MCA, the recommended option for the Park and Ride facility is Option 4 (Te Anau two-storey). This option scored highly when equally rated and when sensitivity tested against the factors discussed above during the MCA. It provides the best alignment with the project objectives, while having a smaller footprint and space requirements compared to other options.

It is recommended that during the next design stage that consideration to other engineering factors such as stormwater be analysed to more accurately determine the footprint and required services.

# 10 Bus Depot Infrastructure

## 10.1 Potential Depot Location

A generic design has been developed for a bus depot on the assumption that it will be situated in a separate standalone location. The depot will complement the planned Park and Ride site infrastructure (explained in Section 9.3). It would most likely be located in Te Anau, though no consideration has been given to potential locations at this stage.

## 10.2 Design Standards

In developing the concept layout for the Bus Depot design, the following design standards were taken into consideration:

- Southland District Council and Invercargill City Council – Subdivision, Land Use, and Development Code of Practice 2023
- AS/NZS 2890.1:2004 – Parking Facilities – Off-Street Car Parking Facilities
- Milford Opportunities Project: A Masterplan for Milford Sound Piopiotahi and the Journey 2021
- Operative Southland District Plan 2018
- NZ Transport Agency Public Transport Design Guidance - Depot Charging (retrieved February 2024).

In the absence of specific parking guidelines for bus depots / facilities, consideration was given to the layouts of existing depots, such as the Wynyard Quarter Bus Depot (designed by Beca) and Ritchies Red Bus Depot in Christchurch to inform our overall design.

## 10.3 Design Philosophy

Based on the analysis presented earlier in this report, up to approximately 70 buses are required operate at peak times of the year to service the maximum demand scenario. In order allow for some buses undergoing servicing and maintenance, a contingency has been applied, with the figures rounded to equate to approximately 80 buses. The design incorporates 30 electric bus (EB) charging spaces.

In developing the concept layout for the depot, the following approach has been adopted:

- Minimise conflict between depot staff and buses by providing separate accessways.
- Provide dedicated pedestrian route from staff carpark to maintenance garage / facility.
- Provide one-way circulation to minimise conflict between buses and reduce the overall footprint.
- Provide sufficient aisle widths to enable reversing manoeuvres into EB charging stations.

This process, in addition to vehicle tracking for a 13.5m long bus, led to the following typical and minimum values used for the Bus Depot design:

- 1400m<sup>2</sup> maintenance garage.
- 4.0m x 15m bus park layout (extends up to 30m long for the stacked central parking spaces).
- 3.5m x 15m bus park layout for the EB parking spaces.
- 8m and 11m aisle widths.
- An additional ten bus parking spaces adjacent the maintenance garage.

Staff car parking has also been provided based on the following parameters:

- Minimum 7.9m aisle width.
- Minimum 3.5m lane width.
- Minimum 2.5m x 5.1m car park layout.
- 80 car parking spaces for drivers/depot staff.

10.4 Proposed Concept Design

The proposed concept design is included in Appendix D. The plan assume that buses will access the depot from the north-western corner, circulating internally in a one-way configuration. Manoeuvring within the bus parking spaces is envisages to be as follows:

- Depot Rows 1, 2 and 4 – Buses enter by driving forward and exit by reversing.
- Depot Row 3 – Buses enter by reversing and driving forward to exit.
- All EB parks are accessed by buses reversing to enter and driving forward to exit.

Buses accessing the maintenance garage would be able to drive directly into the garage or reverse if required.

The staff car park is located adjacent to the maintenance garage/facility, with a separate accessway designed to eliminate any vehicle conflicts with the buses and minimise potential pedestrian conflicts within the Bus Depot.

Vehicle tracking has been undertaken to determine the minimum aisle widths necessary for buses to successfully complete the specified movements listed above (see Figure 10-1).

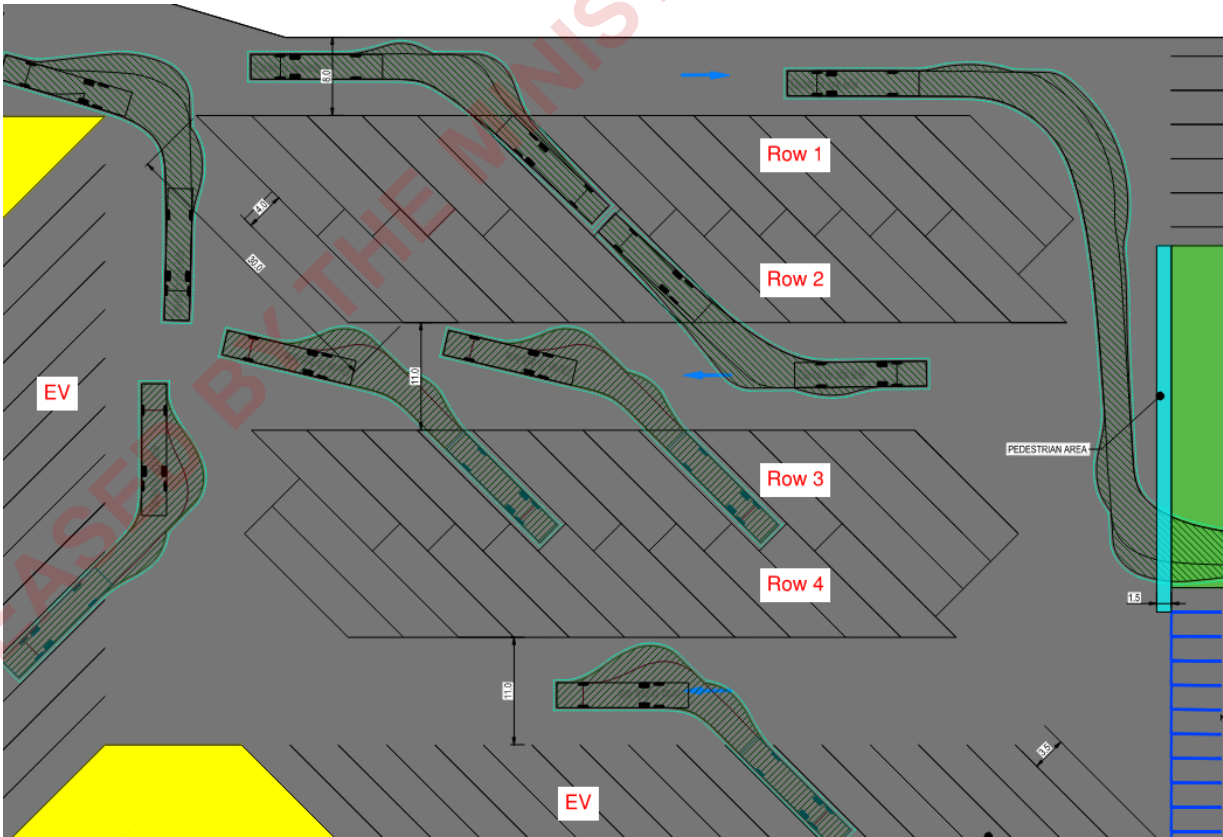


Figure 10-1: Bus Depot Vehicle Tracking

### 10.1 Cost Estimate

A cost estimate has been developed for the Bus Depot concept design which is approximately \$13,962,000. More details of the estimate are included in Appendix E.

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# 11 Milford Sound Piopiotahi Infrastructure

## 11.1 Masterplan Overview

The new bus terminal is proposed in the Masterplan to serve as a place of arrival and departure. The repurposing of the existing aerodrome taxiway, apron and terminal area for buses will allow greater connectivity to the Visitor Centre and Hotel. It will centralise Park and Ride and coach services in one area and streamline the arrival process from a visitor perspective. Covered bays that will link to the main Visitor Centre walkway will provide weather protection throughout most parts of the hub.

Should the existing aerodrome be retained, it is possible that the proposed repurposed amenities such as the bus terminal and observation points are able to be located at the existing Cleddau Village site if the existing staff accommodation is to be relocated as per the Masterplan. If the existing staff accommodation is to be retained, the existing bus parking at the cruise ship terminal is likely to have to remain to service bus demand whether it be from Park and Ride or from tourism operators.

## 11.2 Park and Ride Operations

It has been assumed that buses will be able to drop off and pick up passengers from the Milford Sound Piopiotahi Cruise Boat Terminal. If needing to stop for a period of time e.g. to pick up returning cruises, buses are able to park at the bus layover area before proceeding to the Cruise Boat Terminal. Provisions for shuttles to transport passengers from the Bus Terminal to the Cruise Boat Terminal has not been included in this assessment.

Based on the forecasted demand for Park and Ride, and the assumptions stated in Section 9.6.5, an electric bus (EB) would be unlikely to be able to complete a return trip from the Park and Ride site to Milford Sound Piopiotahi. It has been assumed therefore that due to the steep nature of the road, particularly eastbound towards the Homer Tunnel, an EB is likely to use over 50% of its charge.

Fast charging EB stations are recommended at Milford Sound Piopiotahi at the proposed bus layover area to provide a “top up” charge for buses waiting to collect returning passengers. Depending on the facility provided, this is not anticipated to have a significant impact on the required bus fleet size.

## 12 Pedestrian Modelling Analysis

### 12.1 Methodology and Assumptions

A secondary model was created to assess pedestrian level of service (LoS) of the proposed options detailed in Section 9.3 and at Milford Sound Piopiotahi based on the demand generated by the scenario tests identified in Section 5.5.1.

The pedestrian model has been developed referencing *Auckland Transport's Public Transport Interchange Design Guidelines 2013* which states that the success of an interchange will be determined by bus operations, safety, seating provided and its ability to accommodate pedestrian movement efficiently. An interchange is defined as being a location where customers transfer from one mode of transport to another or between two services of the same mode, or additionally, it may be a place where users join or leave the public transport system by foot (and also by bicycle, motorcycle, or private car, though this is not a consideration for this study). For the purposes of this project, a Park and Ride facility has been considered as an interchange.

For platforms, the corresponding LoS is shown below in Table 12-1.

Table 12-1: Platform Level of Service

Level of Service	Area (sq. meters)	
Danger Level	3.59 people per m <sup>2</sup>	
Jam Capacity	2.15 people per m <sup>2</sup>	
Desirable Max	1.08 people per m <sup>2</sup>	

The summer cruise boat timetable between 8am and 6pm (which has in the order of 53 boats operating per day currently) was used to determine the daily profile of cruise boat departures at an assumed utilisation of 80% capacity. These boat departures were analysed in 15-minute increments to determine the number of people at waiting area to board the cruise boat at Milford Sound Piopiotahi or the bus at both the Park and Ride location options, as well as at Milford Sound Piopiotahi. This equates to 7,100 people using cruise boats per day which is greater than the 6000 visitor per day scenario; therefore, the subsequent analysis is considered conservative.

The following assumptions have been made for the Park and Ride facility:

- Only Park and Ride users are to utilise the waiting area and dedicated visitors of the Visitor Experience Hub have not been accounted for (it is acknowledged that this assumes everything is centred on the boat terminal whereas there is also a visitor centre and transport centre at the existing airport site shown in the Masterplan).
- All Park and Ride options have a waiting area of approximately 2000m<sup>2</sup>. This area has been extrapolated using the area for the existing Christchurch Bus Interchange. This has been assumed to include similar internal infrastructure; however, has the opportunity to provide extra seating if needed. It is assumed that only Park and Ride users will utilise the facility and not tour bus users.
- Cruise boat boarding and alighting areas have been combined as per the existing Christchurch Bus Interchange layout.
- Cruise boat alighters have been assumed to return to the Park and Ride facility after a nine hour trip to get to Te Anau, and a seven hour trip to get to Knobs Flat and Eglinton Reveal,

as per Section 5.4. Departure profiles have been based on data referenced in Section 5.5.1.

The following assumptions have been made for the Milford Sound Piopiotahi Cruise Boat terminal:

- As part of the Masterplan, the proposed Cruise Boat Terminal is proposed to be reconfigured and reduced to an area of approximately 550m<sup>2</sup> and it has been assumed that half of this area will be used as the waiting area. It assumes everything remains centred on the boat terminal and buses are continue to drop people off at the Cruise Boat Terminal.
- At Milford Sound Piopiotahi, it is unknown if cruise boat boarders and alighters will have separated areas, and therefore crowd modelling was completed assuming segregation and a combined scenario.
- All pedestrians after alighting cruise boats are assumed to utilise the waiting area for their mode of transport; however, it should be noted that for private vehicle users, it is unlikely that they will use the waiting area due to their private vehicles being readily available.

Additionally, sensitivity testing was also conducted to assess the effects of a delayed bus or cruise boat departure by 15-minutes and 30-minutes at the Park and Ride facility. Instead of assessing a 30-minute delay scenario, two 15-minute delay scenarios were assessed:

- 15-minute arrival delay.
- 15-minute departure delay.

## 12.2 Park and Ride Options

Pedestrian LoS analysis has been completed based on departure volumes referenced in Sections 4 and 5. For 25% of the proposed waiting area (2000m<sup>2</sup>), combined boarding and alighting analysis was conducted for the 0-minute delay, 15-minute delay and 30-minute delays departure scenarios. The results shows that even with delay scenarios, the pedestrian LoS fell within desirable limits. Therefore, even with a reduced waiting area, there is a low risk of pedestrian crowding. As the crowd modelling has been completed based on the concept design drawings, it is recommended that the design be refined to prevent Danger Level being achieved for the 30-minute delay scenario.

## 12.3 Milford Sound Piopiotahi

At Milford Sound Piopiotahi, Jam Capacity for all cruise boat users (taking into consideration both Park and Ride bus and tour bus users) is exceeded with separated boarding and alighting platform for the 0-minute scenario; however, Danger Level is reached in addition to Jam Capacity for the 15-minute arrival and 15-minute departure delay scenarios for both boarders and alighters. If boarders and alighters are not to be segregated, Jam Capacity is achieved occasionally; however, Danger Level is only achieved where there are five or more boats departing at once. The analysis results are shown in Figure 12-1, Figure 12-2, and Figure 12-3.

In order to not reach Danger Level for any delay scenarios, the segregated arrival and departure terminals need to be 500m<sup>2</sup>, or alternatively, the combined Cruise Boat Terminal area is required to be 450m<sup>2</sup>.

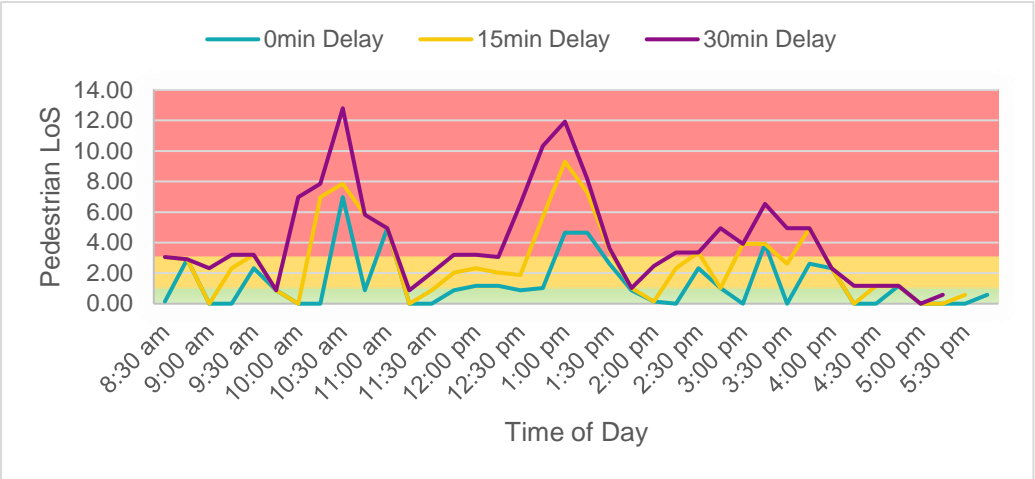


Figure 12-1: Milford Sound Piopiotahi Boarders

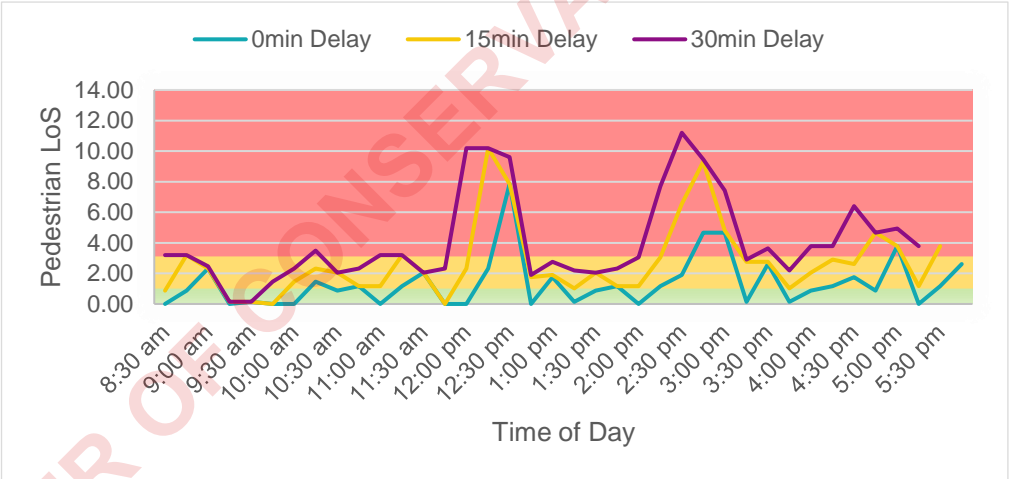


Figure 12-2: Milford Sound Piopiotahi Alighters

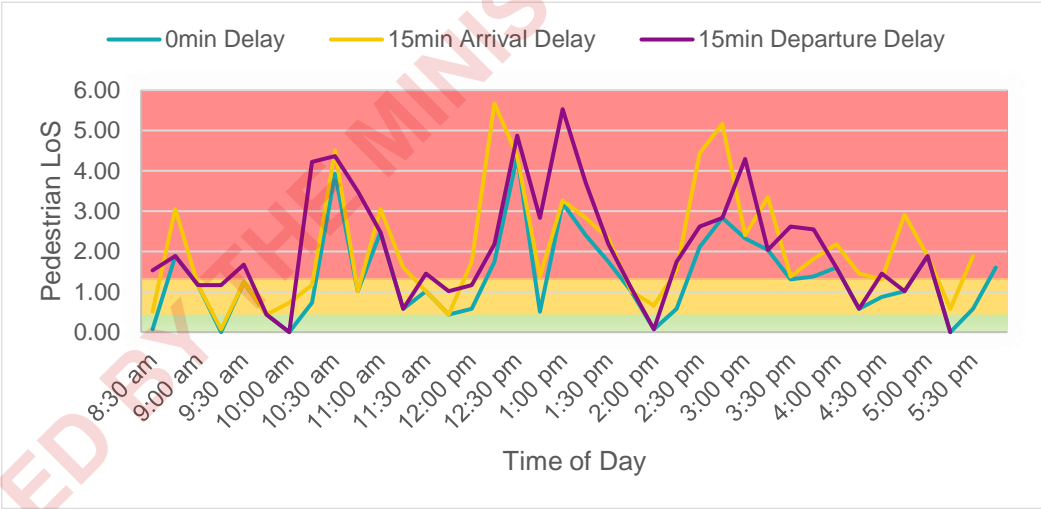


Figure 12-3: Milford Sound Piopiotahi Combined

## 13 Embodied Carbon Assessment

### 13.1 Assessment Methodology

In order to assess the potential embodied carbon impacts of the various Park and Ride concept design options, a high level carbon footprint assessment was undertaken.

The assessment undertaken covered modules A1 to A5 and module B4 of the EN 15804+A2:2019 standard published by EPD International AB. This combination of models is a cradle-to-gate scope with the inclusion of replacements throughout the service life (50 years) of the Park and Ride site infrastructure, covering all emissions up to and including construction for both the initial construction and all replacements.

A 5% materiality threshold was selected for the assessment. It should also be noted that as-built embodied emissions have many factors that may significantly affect the emissions profile, including choice of suppliers and deviations from the cost estimate.

### 13.2 Assessment Results

The results from the carbon assessments are summarised in Table 13-1 for the following concept design options defined earlier in the report:

- Option 1: Single-storey – Te Anau and Knobs Flat
- Option 2: Single-storey – Eglinton Reveal
- Option 3: Two-storey Park and Ride – Te Anau / Eglinton Valley / Knobs Flat
- Option 4: Three-storey Park and Ride – Te Anau / Eglinton Valley / Knobs Flat.

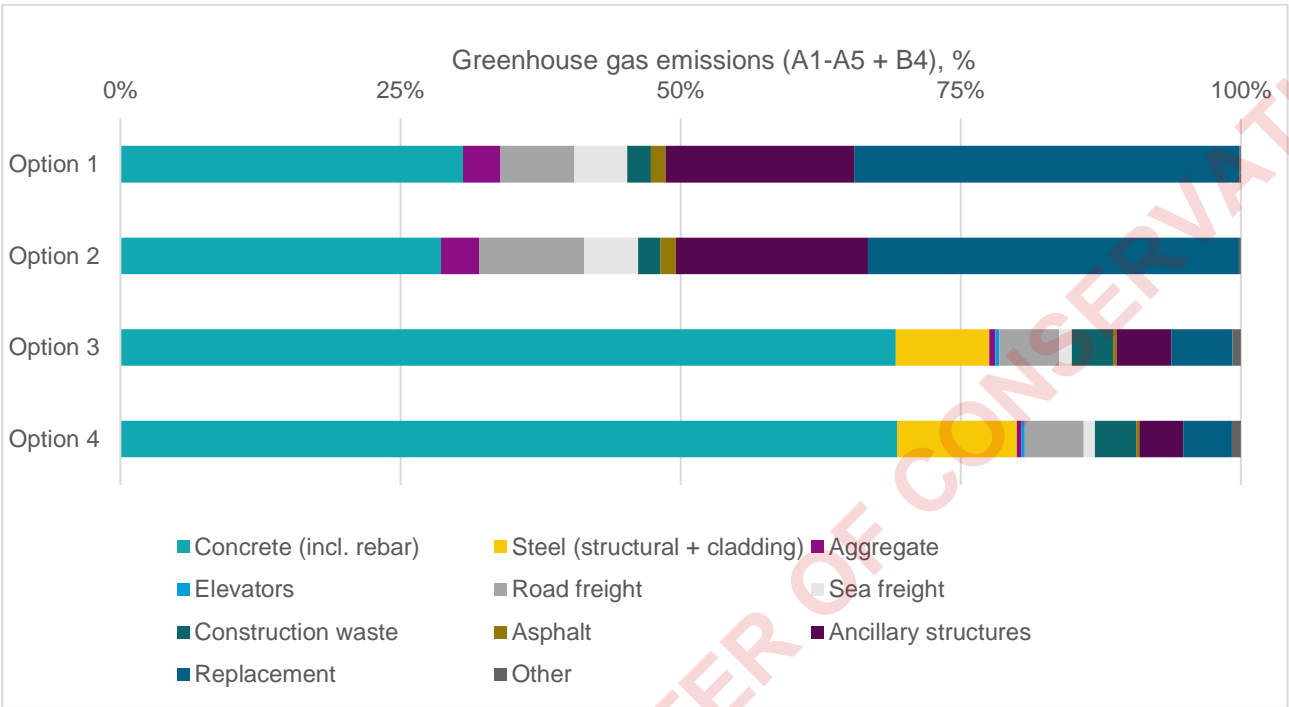
Table 13-1: Embodied Carbon Assessment Results (tCO<sub>2</sub>e)

Emissions Source	Option 1	Option 2	Option 3	Option 4
<b>Module A1-A3</b>				
Concrete (incl. reinforcement)	1,277	1,170	9,937	12,426
Steel (Structural & cladding)	0	0	1,197	1,917
Asphalt	56	56	43	47
Aggregates	139	138	78	79
Elevators	0	0	49	52
Plastics	7	7	3	3
Ancillary structures	701	701	701	701
<b>Module A4</b>				
Road freight	275	383	767	939
Sea freight	197	197	164	181
<b>Module A5: Construction waste</b>	88	82	530	662
<b>Module B4: Replacement (over lifetime)</b>	1,435	1,352	889	921
<b>Total Emissions:</b>	<b>4,175</b>	<b>4,087</b>	<b>14,358</b>	<b>17,929</b>
kgCO <sub>2</sub> e / m <sup>2</sup>	80	78	418	454
tCO <sub>2</sub> e / \$M	99	132	70	94

One of the main findings of the analysis is that the use of concrete (including reinforcement) would likely be the most significant material in terms of embodied emissions for all four options; only exceeded by lifetime replacements for Options 1 and 2 due to the concrete lifetime being only 25

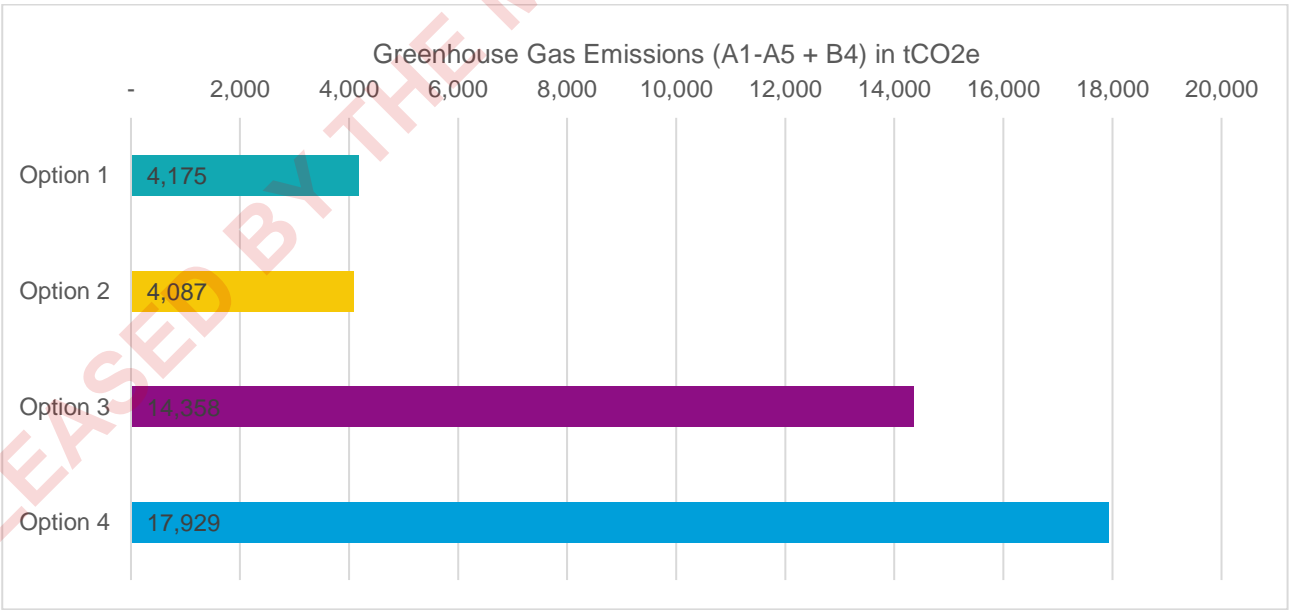
years, necessitating a full replacement alongside multiple replacements of asphalt throughout the 50-year period. These findings are further illustrated in Figure 13-1.

Figure 13-1: Percentage Contribution of Emission Sources and Materials



With regard to absolute emissions Figure 13-2 shows that Options 1 and 2 are similar from an embodied emissions standpoint, while Option 3 is more than three times the embodied emissions of Options 1 and 2. Option 4 has an absolute emission of roughly 25% more than Option 3.

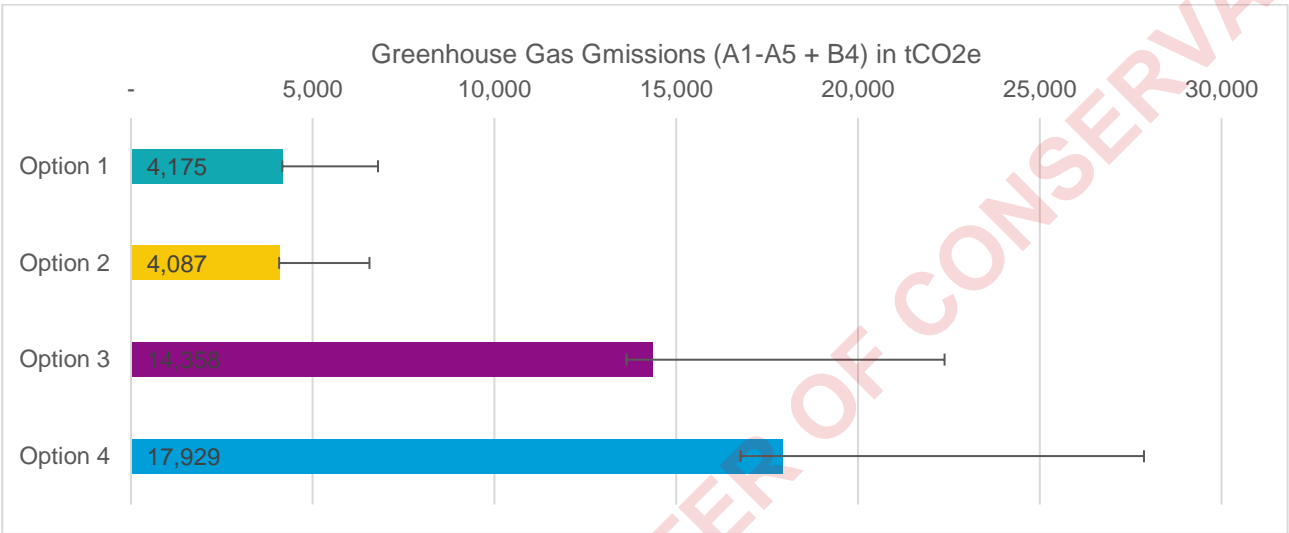
Figure 13-2: Absolute Emissions



### 13.3 Sensitivity Analysis

Due to the variability of embodied emissions within steel in particular, this section illustrates the likely best and worst-case scenarios for selection of steel suppliers from an embodied emissions perspective. This analysis is intended to illustrate the significance and importance of supplier engagement and assessments for materials with high variability and large quantities for each option, in this case, reinforcement steel and other steel articles.

Figure 13-3: Sensitivity of Steel Suppliers



As can be seen in Figure 13-3 above, the difference between the lowest and highest embodied emissions steel alone has the potential to skew the embodied emissions of the concept designs by more than 50%. It is therefore recommended to procure Environmental Product Declarations (EPDs) from prospective steel suppliers to ensure the final procurement decision does not result in a high embodied emissions intensity steel.

### 13.4 Decarbonisation Opportunities

This section covers the main opportunities to reduce carbon use. It considers materials from an embodied emissions perspective for the four options in order from largest emissions contribution to lowest.

#### 13.4.1 Use of Reinforcement Steel

As concrete represents the largest volume of materials going into the constructions, reinforcement steel likely holds the most significant opportunity for decarbonisation, especially for Options 3 and 4.

For concrete with high proportions of steel reinforcing, the rebar often makes up close to 50% of embodied emissions of the concrete. Choosing rebar suppliers with high recycled content in their rebar is the best way to minimise the impact of the concrete overall. Due to the high recycling rates of steel, 85-90% recycled content rebar is readily available.

#### 13.4.2 Use of Steel (Structural and Cladding)

Steel is a high emissions intensity product in its nature; reducing quantities of steel in designs can therefore often reduce the embodied emissions of the construction. For required steel elements, the best option to reduce embodied emissions is to not over-dimension major steel elements and

choosing suppliers with high proportions of recycled content which are currently easily available in New Zealand.

### 13.4.3 Use of Concrete

#### 13.4.3.1 Low-carbon Concrete

Due to the quantities of concrete involved in options 3 and 4, low carbon concrete would produce a significant reduction in embodied emissions as this would affect a majority of the materials going into the construction. This is however limited significantly by supply and comes at an increased cost.

Options in New Zealand are predominantly based on using fly ash from coal-fired thermal energy to displace cement content in the concrete. Due to coal currently being progressively replaced with lower emissions alternatives, the supply of fly-ash is fairly low, creating high demand and supply constraints.

#### 13.4.3.2 Suppliers

Beyond procuring low-carbon concrete, choosing the correct supplier can have a large impact on cement in general. Some suppliers can deliver up to 25% lower embodied emissions concrete in some cases. This is however dependent on not adding significant transport emissions, meaning that local suppliers likely are more emissions efficient even if the concrete's embodied emissions are higher than other national alternatives; noting that utilising sea freight over road freight, while much less commonly practiced could potentially mitigate the difference to an extent.

#### 13.4.3.3 Construction and Specifications

Due to cement being the highest carbon element of concrete (barring reinforcement), avoiding over-dimensioning the concrete strength for builds is quite important. Stronger concrete than dimensioned for in the designs is often used in practice to reduce curing times which unfortunately means a higher proportion of cement in the concrete than designed for. To avoid this, it is strongly recommended to set clear expectations with the construction suppliers even if this may come at slightly higher costs due to adding a few days on-site.

#### 13.4.3.4 Aggregates

Due to aggregates being inherently low emissions per tonne, the biggest emissions savings opportunities come from procuring from local suppliers. This is due to the large volumes of aggregates producing high freight emissions when transported over long distances, especially if done so via road.

## 13.5 Main Findings

The embodied carbon assessment should be read in conjunction with the enabled transport emissions described in Section 6.11, especially as the difference in enabled emissions have a larger magnitude of emissions than that embodied in the different construction options.

The embodied carbon assessment results should however be used in the decision making of which options to choose and in considerations for decarbonisation measures. This includes both initiatives that reduce the embodied emissions of the proposed concept designs, but also initiatives that avoid accidental increases to embodied emissions through material procurement decisions.

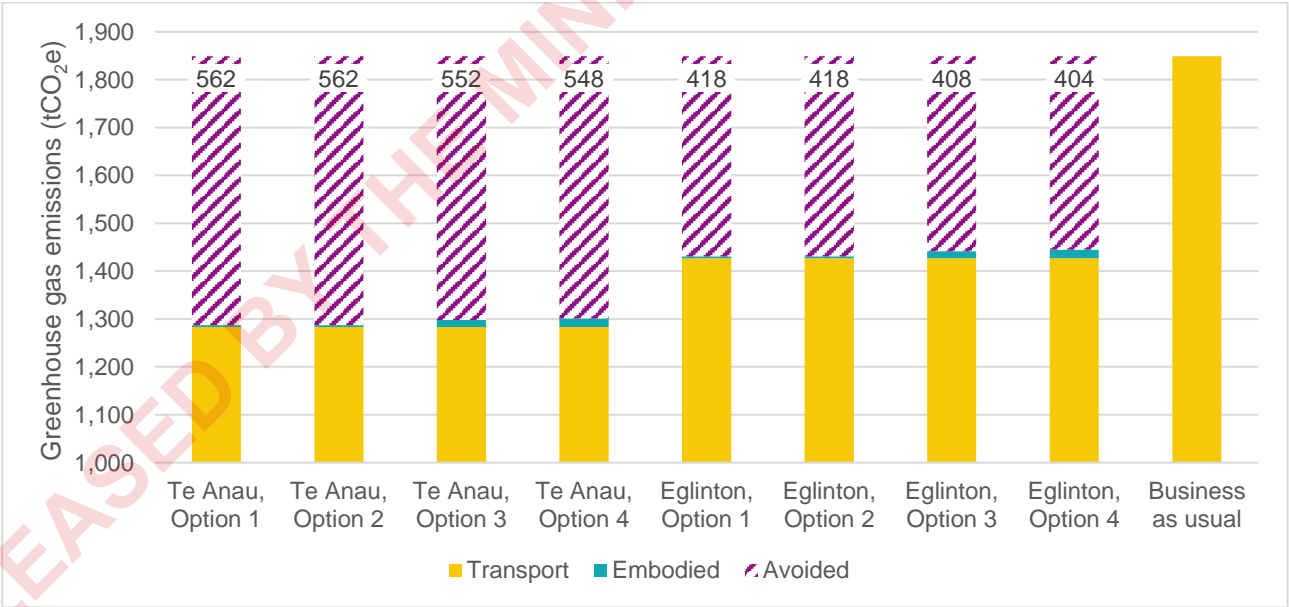
Figure 13-4 shows the avoided emissions relative to the modelled business-as-usual scenario, based in a 50-year assessment period. This splits the contributing emissions of the remaining transport emissions and the embodied emissions of the Park and Ride site construction (including renewals for the 50-year design life).

Emphasis should be put on the error-margins of the embodied emissions calculations related to reinforcing steel as the potential for significantly increasing the carbon footprint of the park and ride solutions by over 50% relies on a single procurement decision.

Initiatives for decarbonising these materials are listed in Section 13.4, from which the following points summarise the most impactful and important decarbonisation opportunities:

- Reinforcing steel does not have alternatives but should be procured from a supplier that has the highest possible recycled steel content as this is the major driver for the emissions intensity of rebar.
- Concrete is largely best procured from local sources as the road freight emissions impact the savings of procuring lower carbon concrete from far away. This is especially true as the savings from low-carbon concrete generally cannot be expected to go beyond a 25% carbon reduction, meaning the margin from added freight is quite low.
- Concrete strength should be given a high level of importance as practically, procuring higher strength concrete than specified (and necessitated) in the designs can produce a relatively high increase in embodied emissions without providing a functional benefit to the structures.
- Environmental Product Declarations should be sought from the suppliers chosen to procure the materials making up the emissions hotspots of the chosen option. This will give more confidence in the actual embodied emissions as this carbon footprint has been made with assumed emissions intensities which likely diverge from the chosen suppliers upon construction.

Figure 13-4: Projected Transport Emissions (Embodied and Avoided Emissions Relative to BAU) (truncated y-axis).



# 14 Conclusions and Recommendations

## 14.1 Conclusions

### 14.1.1 Potential Demand for a Park and Ride and Hop On Hop Off Bus Service

Forecasts of demand for a Park and Ride bus service to Milford Sound Piopiotahi indicate that up to approximately 2,700 users per day if a site was provided in Te Anau. This forecast is based on an assumed 6,000 visitors per day to Milford Sound Piopiotahi. It assumes that Park and Ride is compulsory for international visitors and that parking spaces are reduced by approximately 60% at Milford Sound Piopiotahi, as proposed in the Milford Sound Masterplan.

The level of demand for a Park and Ride service is forecast to be almost half of the number of visitors to Milford Sound Piopiotahi. The majority of the remaining visitors are likely to travel by tour bus, with a small proportion of visitors (only New Zealand nationals) being forecast to travel to Milford Sound Piopiotahi by car.

Locating the Park and Ride facility at Knobs Flat or Eglinton Reveal is likely to attract a similar level of Park and Ride demand (up to approximately 2,600 users per day).

The modelling indicates that demand for Park and Ride would be significantly lower if use of the service is not made compulsory for international visitors.

An additional 1,000 people per day are anticipated to travel to intermediate nodes for other purposes (tramping, etc.) along the Milford Road corridor. A large proportion of these could be attracted to a Hop On Hop Off bus service.

### 14.1.2 Bus Operational Implications

In order to cater for this level of demand, up to 18 buses per hour would need to operate the Park and Ride and Hop On Hop Off services at peak times. This translates to a fleet size of up to 70 buses being in operation at peak times of the year.

The annual operating cost to provide this level of service is estimated to be up to \$15 million, depending on the vehicle type and Park and Ride site location. Some of the operating cost could potentially be recovered by charging users of the service.

The capital costs of the bus fleet is dependent on what vehicle technology is adopted. Assuming buses cost \$600,000 per vehicle (the typical cost of a diesel bus currently), the capital cost of a new conventional (diesel) fleet of buses would be up to approximately \$46million. A fleet of electric buses could potentially cost nearly double this.

Given the seasonal nature of demand, it is possible that some of the vehicles used could be older vehicles.

Staff requirements to operate the Park and Ride service will depend on a number of factors. Based on the proposed timetable, it is estimated that up to approximately 230 drivers could be needed at peak times of the year. A significant number of the staff requirement is likely to be seasonal however.

### 14.1.3 Carbon/VKT Implications

The operation of a Park and Ride service could reduce the total vehicle kilometres travelled (VKT) on the transport network, and also can help reduce carbon consumption. Up to a 44% reduction in VKT is estimated if a Park and Ride site is provided at Te Anau. The reduction would be up to 35% if the Park and Ride site is provided at Knobs Flat or Eglinton Reveal.

Like the VKT impacts, carbon emissions (measures as CO<sub>2</sub>-e kilo-tonnes) are estimated to reduce by the greatest amount if a Park and Ride site is provided at Te Anau (by up to 31%). Locating the Park and Ride facility at Knobs Flat or Eglinton Reveal is likely to reduce carbon emissions by up to 23%.

### 14.2 Infrastructure Required

A number of alternative concept layouts for a Park and Ride facility and an associated bus depot have been developed for the three potential Park and Ride locations considered (Te Anau, Knobs Flat and Eglinton Reveal).

Single level and multi-storey (two and three level) Park and Ride site options were developed and costed. The carbon implications of each option was also considered. Significant additional supporting infrastructure would be required at Knobs Flat and Eglinton Reveal.

### 14.3 Recommended Option

A multi criteria analysis of the site location and Park and Ride site layout options has been undertaken. This indicated that a two-storey level Park and Ride site at Te Anau is most likely to deliver the aims of MOP. This preferred option was confirmed by a number of sensitivity tests.

### 14.4 Implementation of the Recommended Option

In view of the significant cost associated with the Park and Ride facility which could be required, it is likely that Park and Ride would be implemented in a phased way. This could include both the infrastructure and level of service provided.

Further consideration needs to be given to how bookings for a Park and Ride service would be managed.

### 14.5 Risks and Opportunities

There are a number of risks and opportunities associated with the recommended option. The key risks include:

- The large number of buses needed to operate a Park and Ride service, and the significant capital and operational cost which is likely to be incurred to operate a Park and Ride service.
- Recruitment of the large number of drivers needed to operate a Park and Ride service, particularly as the need for drivers will likely be seasonal.
- The large scale of Park and Ride facility that is likely to be needed.
- The opposition that could arise to making use of Park and Ride compulsory to international visitors.
- The opposition that could arise if reductions are made to the availability of car parking provision at Milford Sound Piopiotahi.

The key opportunities include:

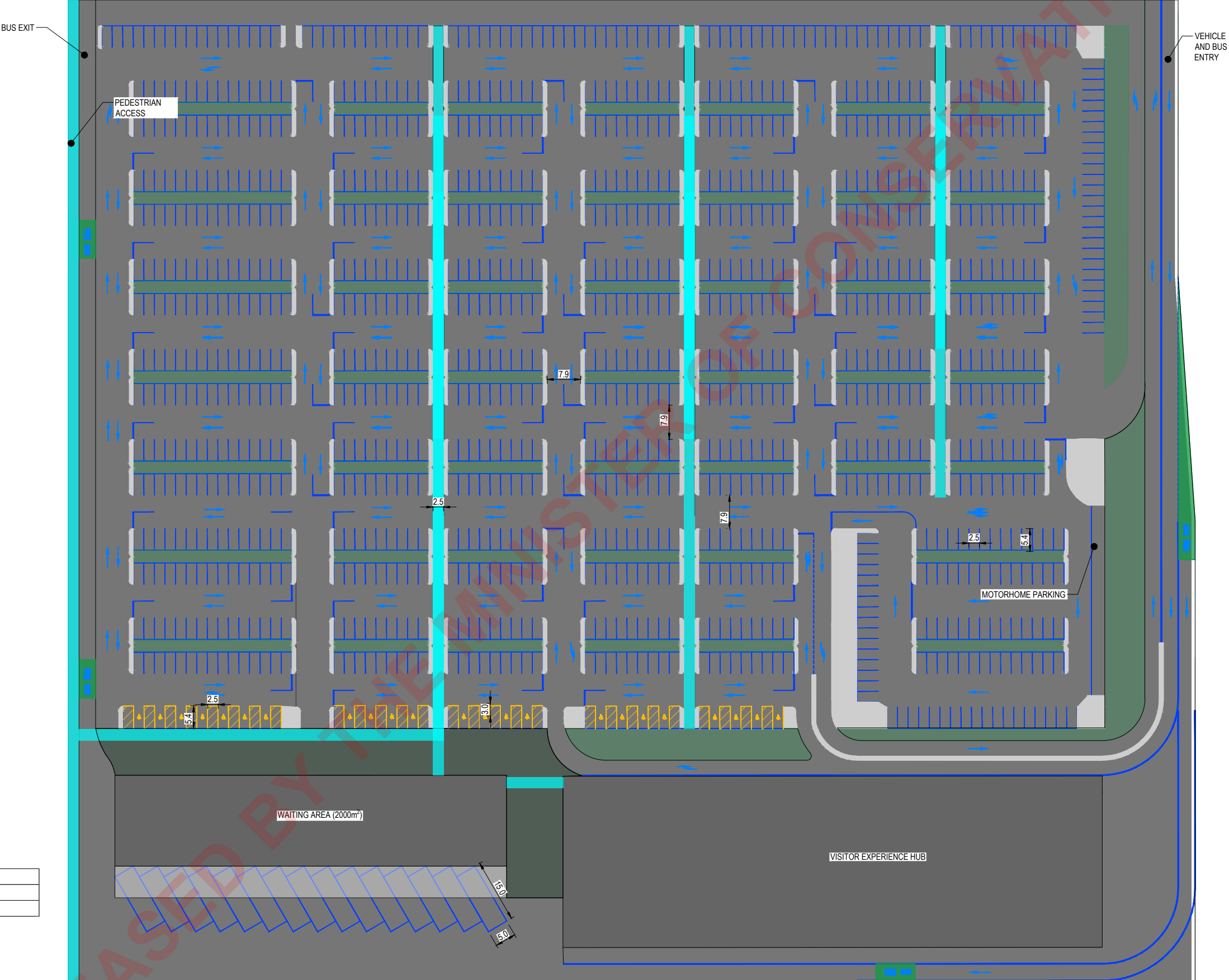
- The significant impact a Park and Ride service could have on car use and road safety due to mode shift to buses.
- The significant reduction in VKT (approximately 44% from Te Anau and up to 31% for Knobs Flat/Eglinton Reveal) and enabled carbon a Park and Ride service could help deliver.

- Demonstrating how Park and Ride can make a positive contribution to transport efficiency and the overall visitor experience for users of the Milford Road corridor.

RELEASED BY THE MINISTER OF CONSERVATION

# A

## Appendix A – Park and Ride Concept Design Options



NUMBER OF CAR PARKS:	APPROX. 1000
NUMBER OF BUS BAYS:	15
FOOTPRINT:	56,000m <sup>2</sup>

- LEGEND:**
- RAIN GARDEN/GRASSED AREA
  - BUS ONLY
  - CONCRETED AREAS
  - PEDESTRIAN AREAS

PARK AND RIDE  
SCALE 1:500

**CONCEPT DESIGN**  
NOT FOR CONSTRUCTION

A	CONCEPT DESIGN	JN	JM	SR	23.02.24
No.	Revision	By	Chk	Appd	Date

Original Scale (A1)	Design	J.MARSH	23.02.24	Approved For Construction*
AS SHOWN	Drawn	J.NORTHCOAT	31.01.24	
Reduced Scale (A3)	Design Checker	N.MOHOTTIGE	23.02.24	Date
HALF SHOWN	Design Checker	N.MOHOTTIGE	23.02.24	Date



Client: DEPARTMENT OF CONSERVATION

Project: MILFORD TRANSPORT SYSTEM ASSESSMENT

Title: PARK AND RIDE LAYOUT TE ANAU

Discipline	TRANSPORTATION
Drawing No.	3823954-TA-01
Rev.	A



PARK AND RIDE  
SCALE 1:750

LEGEND:

- RAIN GARDEN/GRASSED AREA
- BUS ONLY
- CONCRETED AREAS
- PEDESTRIAN AREAS

NUMBER OF CAR PARKS:	APPROX. 1000
NUMBER OF BUS BAYS:	15
FOOTPRINT:	55,078m <sup>2</sup>

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	JN	JM	SR	22.02.24

Original Scale (A1)	Design	J.NORTHCOT	22.02.24	Approved For Construction*
AS SHOWN	Drawn	J.NORTHCOT	22.02.24	
Reduced Scale (A3)	Dwg Verifier	N.MOHOTTIGE	22.02.24	
HALF SHOWN	Dwg Check	N.MOHOTTIGE	22.02.24	



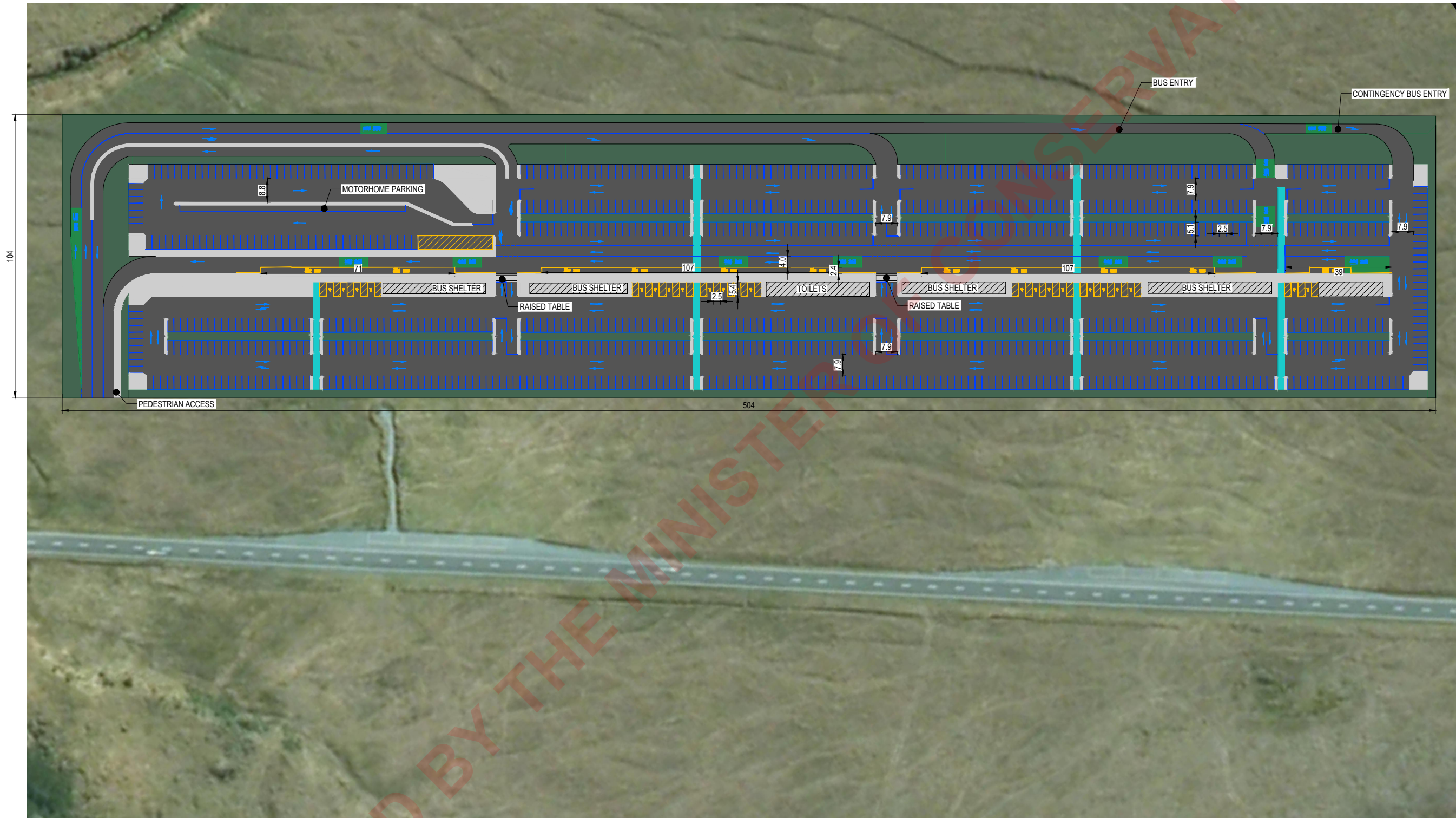
Client:	DEPARTMENT OF CONSERVATION
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Project:	MILFORD TRANSPORT SYSTEM ASSESSMENT
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Title:	PARK AND RIDE LAYOUT KNOBS FLAT
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Discipline:	TRANSPORTATION
Drawing No.	3823954-TA-02
Rev.	A

CONCEPT DESIGN  
NOT FOR CONSTRUCTION



NUMBER OF CAR PARKS:	APPROX. 1000
NUMBER OF BUS BAYS:	10 (NOT INCLUDING CONTINGENCY BAY)
FOOTPRINT:	52,250m <sup>2</sup>

LEGEND:

- RAIN GARDEN/GRASSED AREA
- BUS ONLY
- CONCRETED AREAS
- PEDESTRIAN AREAS

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	JM	JM	SR	23.02.24

Original Scale (A1) AS SHOWN	Design J.MARSH 23.02.24	Approved For Construction*
Reduced Scale (A3) HALF SHOWN	Drawn J.MARSH 23.02.24	
	Design Checker N.MOHOTTIGE 23.02.24	
	Date	

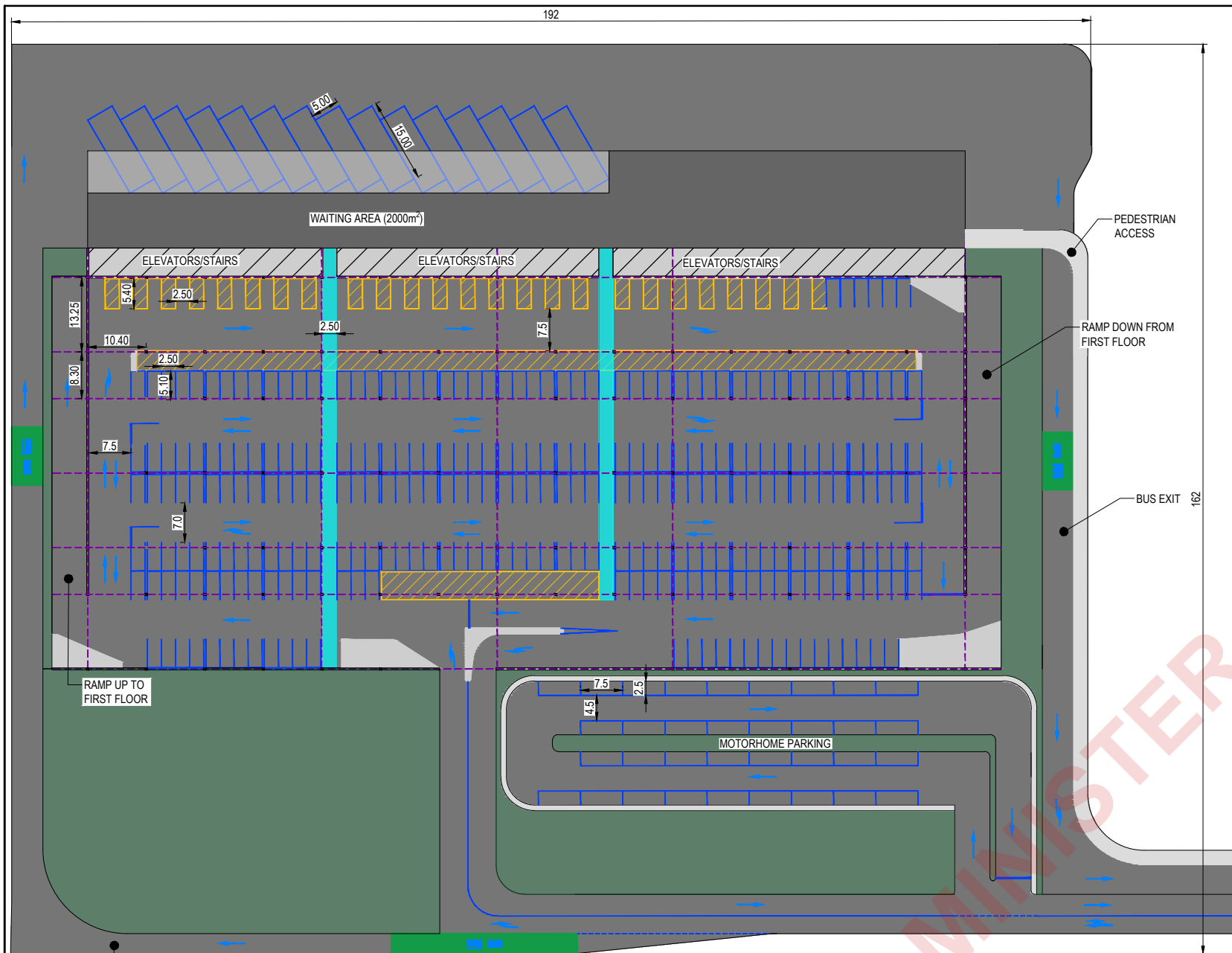


Client: DEPARTMENT OF CONSERVATION

Project: MILFORD TRANSPORT SYSTEM ASSESSMENT

Title: PARK AND RIDE LAYOUT EGLINTON REVEAL

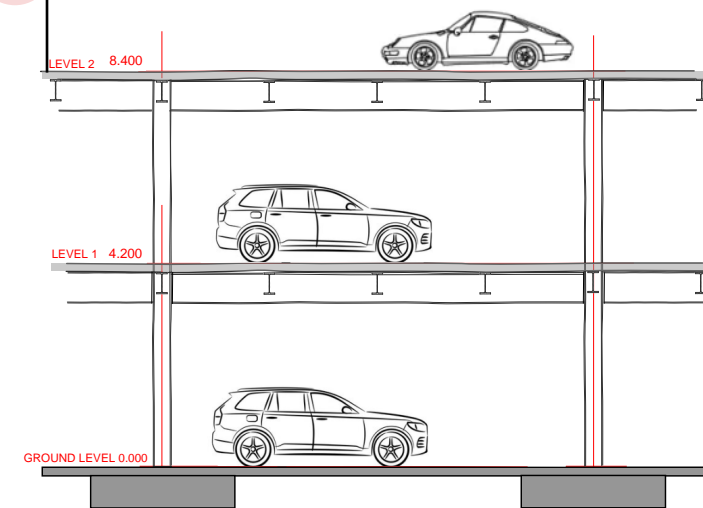
Discipline	TRANSPORTATION
Drawing No.	3823954-TA-03
Rev.	A



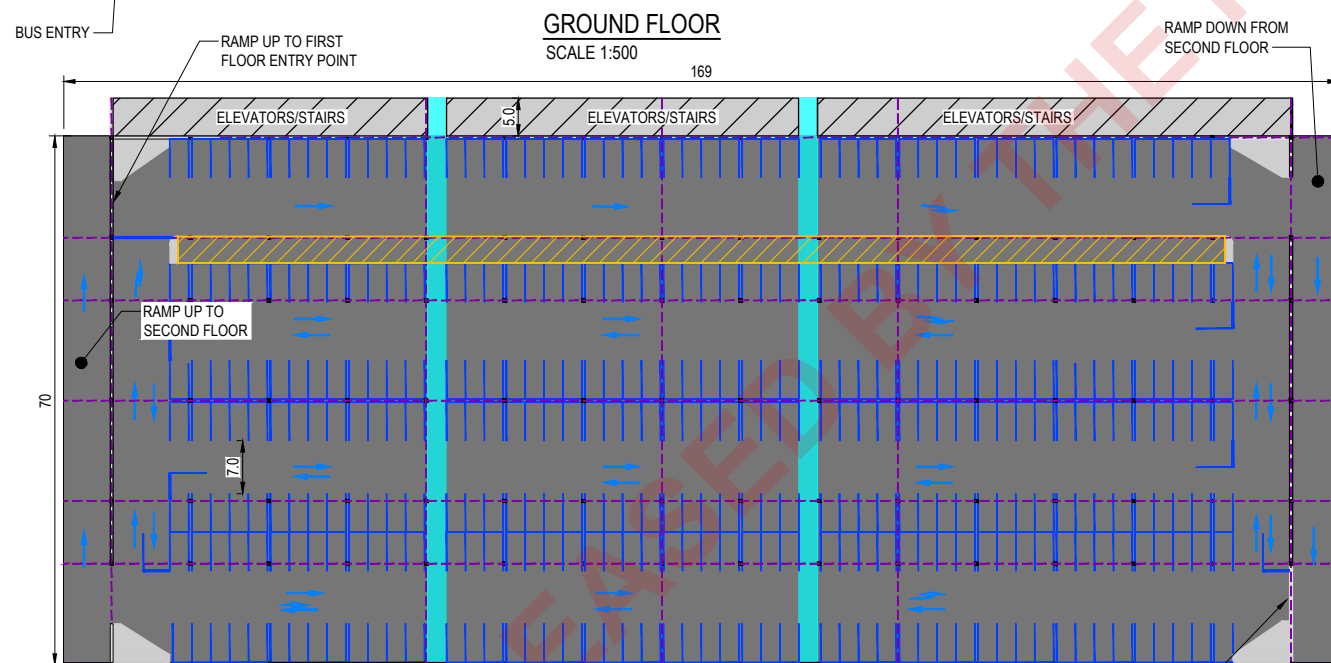
- LEGEND:**
- RAIN GARDEN/GRASSED AREA
  - BUS ONLY
  - CONCRETED AREAS
  - PEDESTRIAN AREAS
  - STRUCTURAL BRACING LINE
  - 0.4m x 0.4m COLUMN

NUMBER OF CAR PARKS:	APPROX. 335 - GROUND FLOOR APPROX. 364 - FIRST FLOOR APPROX. 432 - SECOND FLOOR TOTAL: APPROX. 1131 PARKS
NUMBER OF BUS BAYS:	15
FOOTPRINT:	31,058m² - GROUND FLOOR 12,400m² - FIRST FLOOR 12,400m² - SECOND FLOOR TOTAL: 55,858m²

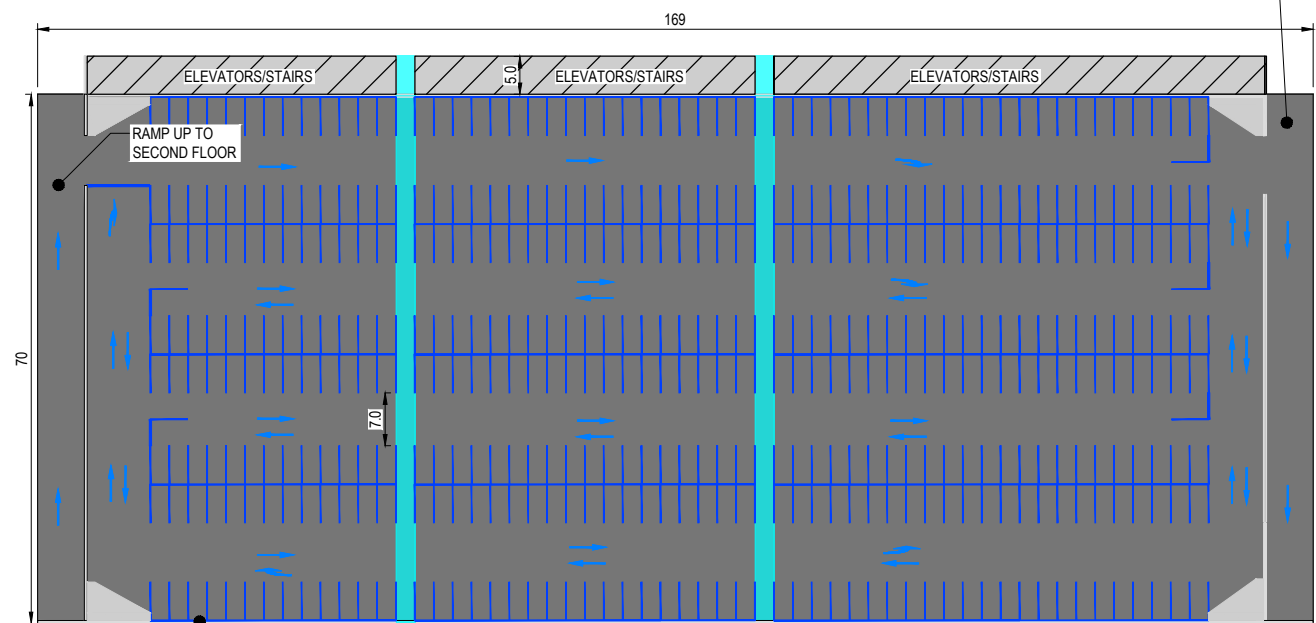
TOP OF ELEVATOR 12.000



TYPICAL SECTION  
NTS



FIRST FLOOR  
SCALE 1:500



SECOND FLOOR  
SCALE 1:500

**CONCEPT DESIGN**  
**NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	JM	JM	SR	23.02.24

Original Scale (A1)	Design	J.MARSH	23.02.24	Approved For Construction*
AS SHOWN	Drawn	J.MARSH	31.01.24	
Reduced Scale (A3)	Design Check	N.MOHOTTIGE	23.02.24	Date
HALF SHOWN	Draw Check	N.MOHOTTIGE	23.02.24	

\* Refer to Revision 1 for Original Signature

RAMP DOWN FROM SECOND FLOOR ENTRY POINT



Client: Department of Conservation  
Project: MILFORD TRANSPORT SYSTEM ASSESSMENT

Title: PARK AND RIDE LAYOUT  
THREE-STOREY  
NO VISITOR EXPERIENCE HUB

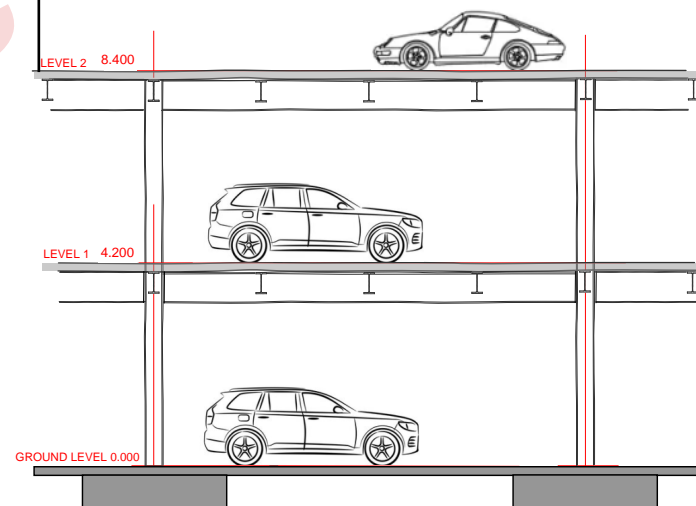
Discipline: TRANSPORTATION  
Drawing No.: 3823954-TA-06  
Rev.: A

LEGEND:

- RAIN GARDEN/GRASSED AREA
- BUS ONLY
- CONCRETED AREAS
- PEDESTRIAN AREAS
- STRUCTURAL BRACING LINE
- 0.4m x 0.4m COLUMN

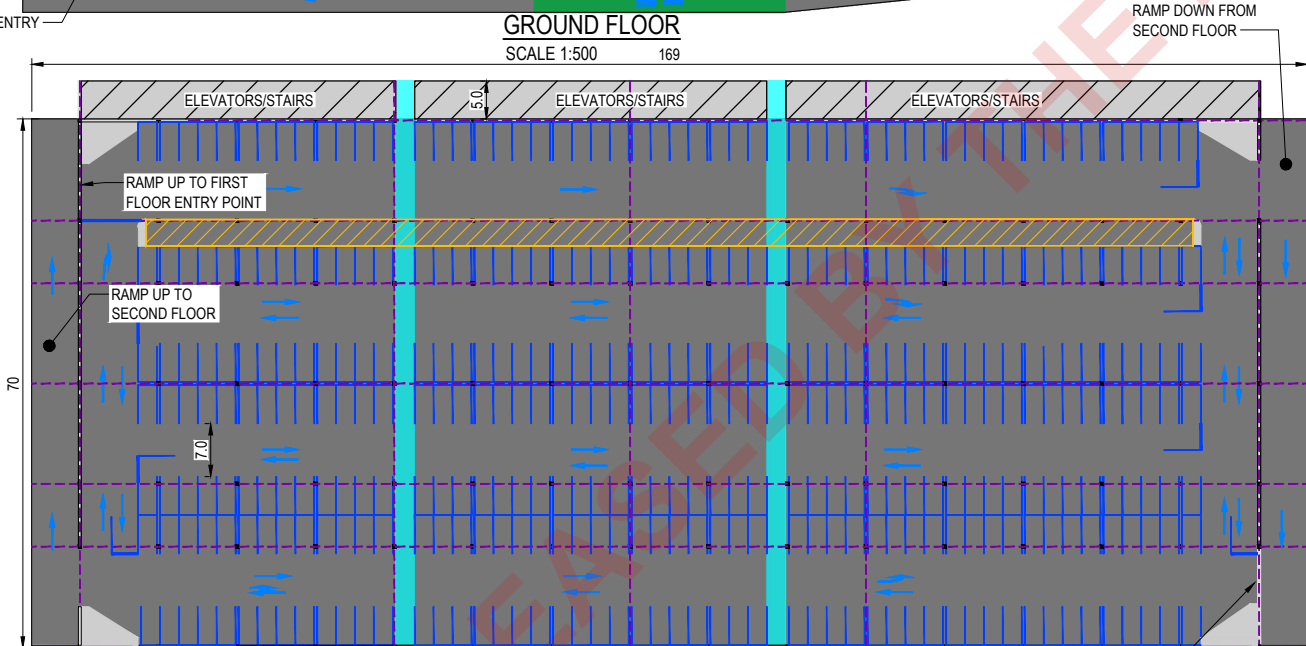
NUMBER OF CAR PARKS:	APPROX. 335 - GROUND FLOOR APPROX. 364 - FIRST FLOOR APPROX. 432 - SECOND FLOOR TOTAL: APPROX. 1131 PARKS
NUMBER OF BUS BAYS:	15
FOOTPRINT:	31,058m <sup>2</sup> - GROUND FLOOR 12,400m <sup>2</sup> - FIRST FLOOR 12,400m <sup>2</sup> - SECOND FLOOR TOTAL: 55800m <sup>2</sup>

TOP OF ELEVATOR 12.000



TYPICAL SECTION  
NTS

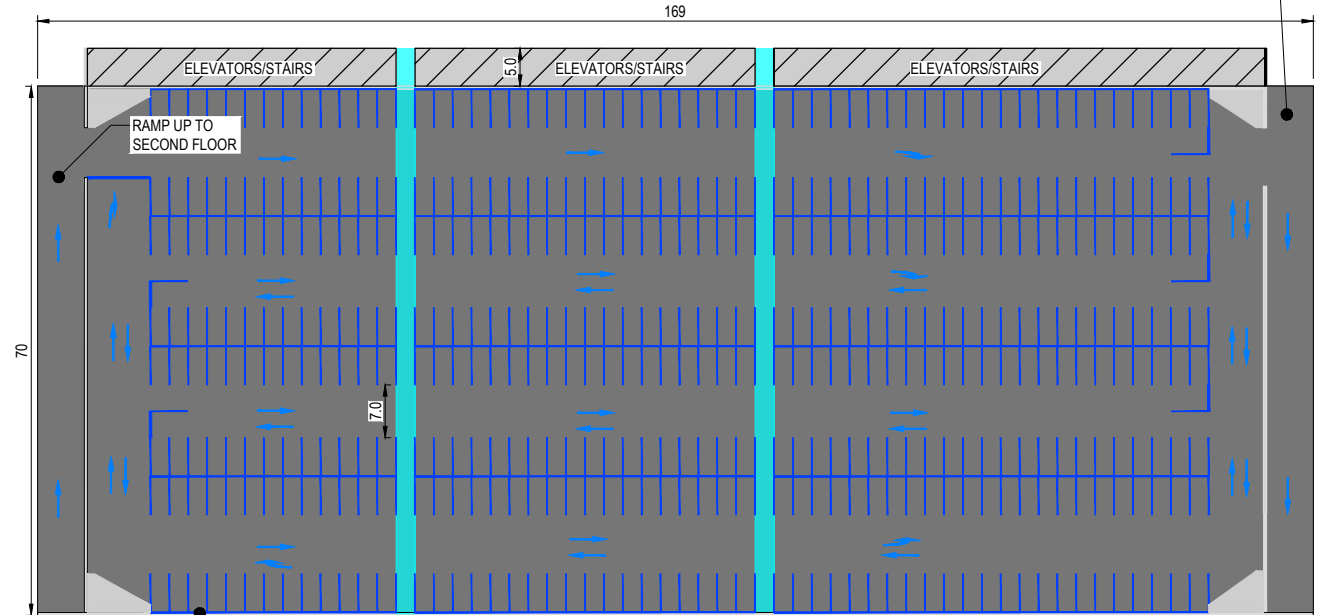
GROUND FLOOR  
SCALE 1:500



FIRST FLOOR  
SCALE 1:500



SECOND FLOOR  
SCALE 1:500



**CONCEPT DESIGN**  
**NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	JM	JM	SR	23.02.24
HALF SHOWN					

Original Scale (A1)	Design Drawn	J.MARSH	23.02.24	Approved For Construction*
Reduced Scale (A3)	Design Verifier	N.MOHOTTIGE	23.02.24	Date
* Refer to Revision 1 for Original Signature				

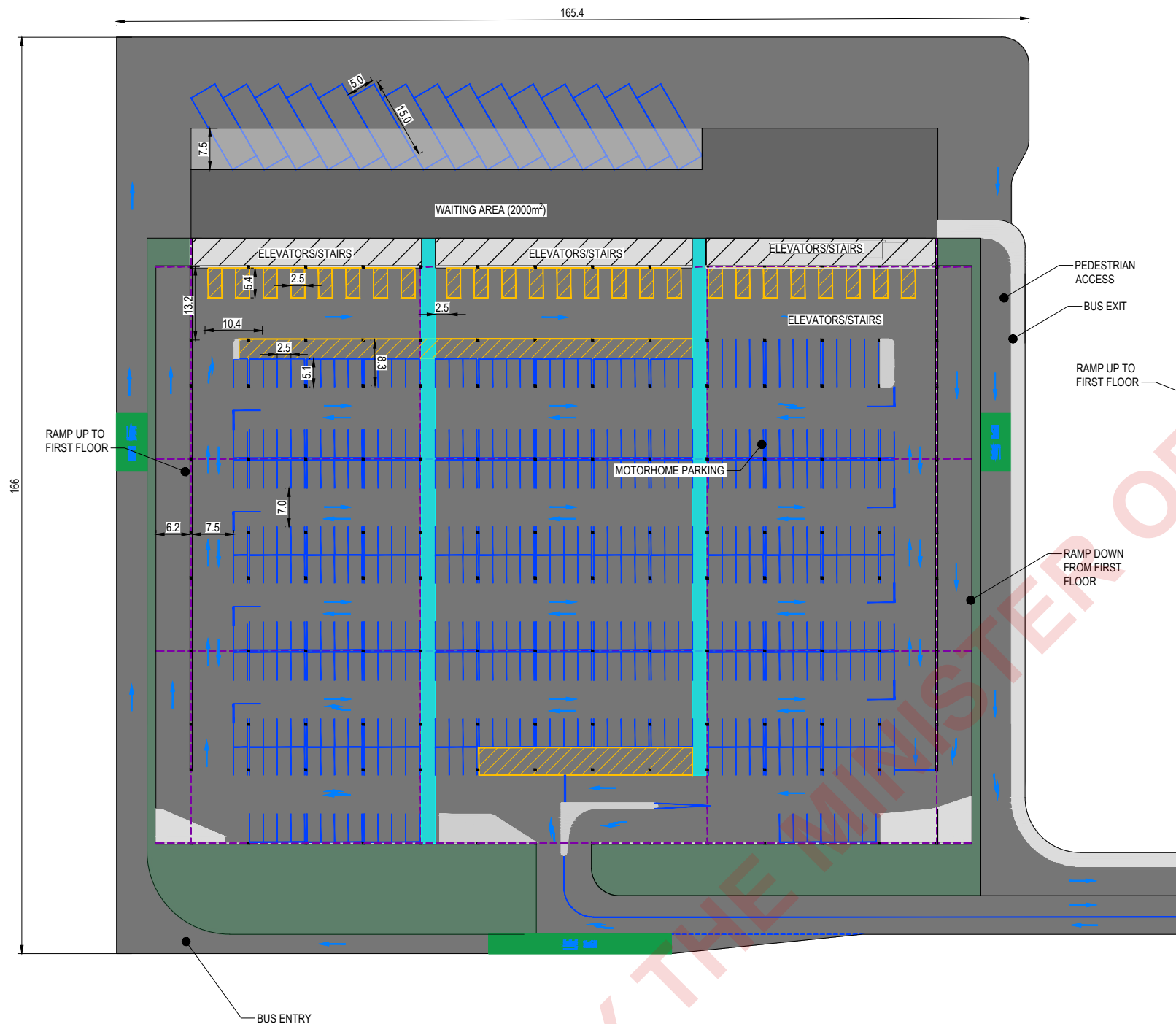
RAMP DOWN FROM SECOND FLOOR ENTRY POINT



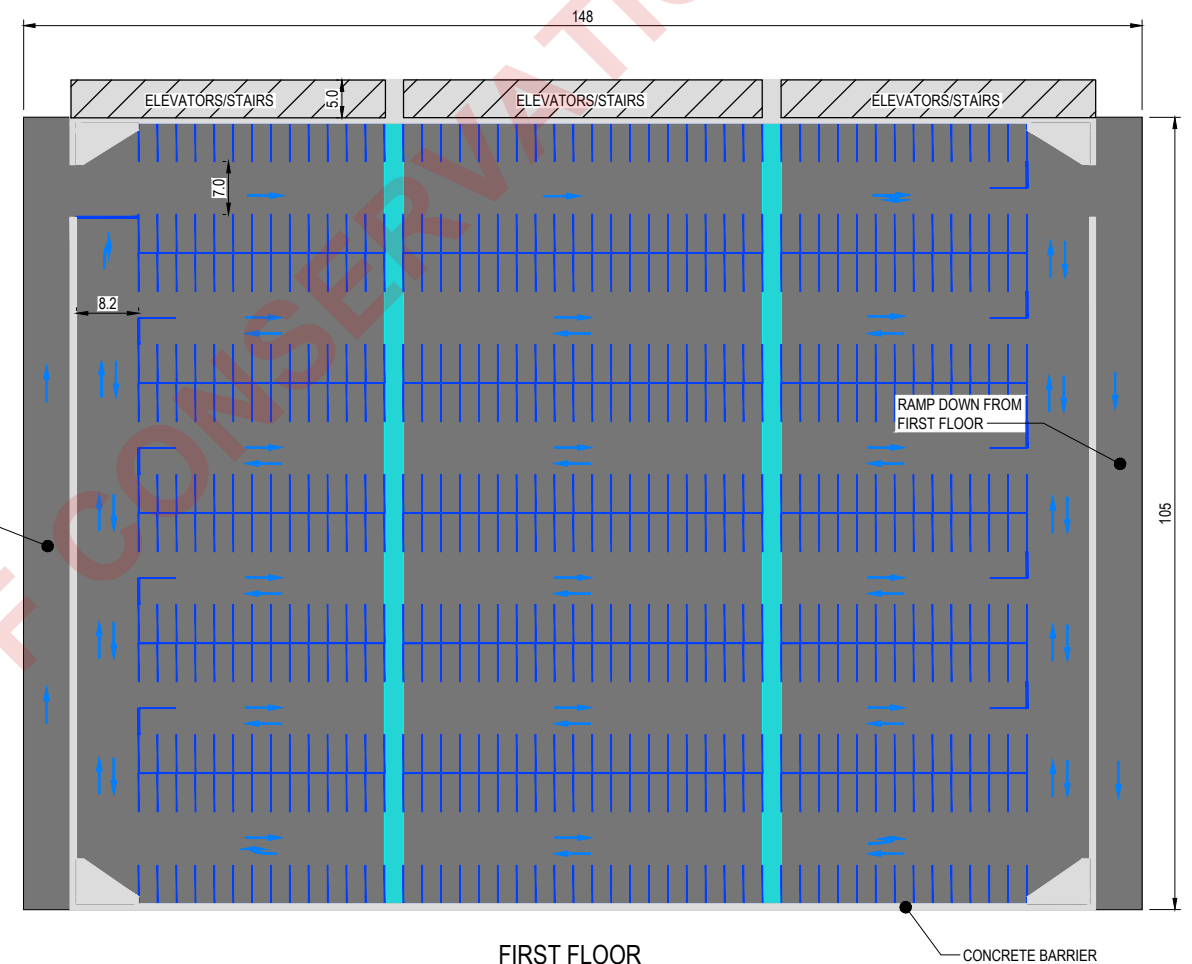
Project: MILFORD TRANSPORT SYSTEM ASSESSMENT

Title: PARK AND RIDE LAYOUT THREE-STOREY

Discipline	TRANSPORTATION
Drawing No.	3823954-TA-05
Rev.	A



GROUND FLOOR  
SCALE 1:500



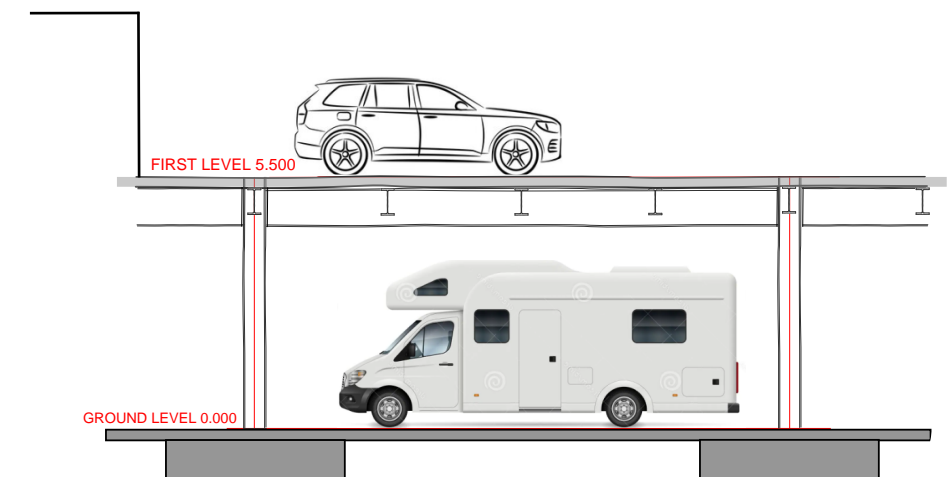
FIRST FLOOR  
SCALE 1:500

LEGEND:

- RAIN GARDEN/GRASSED AREA
- BUS ONLY
- CONCRETED AREAS
- PEDESTRIAN AREAS
- STRUCTURAL BRACING LINE
- 0.4m x 0.4m COLUMN

NUMBER OF CAR PARKS:	APPROX. 440 - GROUND FLOOR APPROX. 540 - FIRST FLOOR TOTAL: APPROX. 980 PARKS
NUMBER OF BUS BAYS:	15
FOOTPRINT (NOT INCLUDING VISITOR EXPERIENCE HUB):	27,615m² - GROUND FLOOR 15,500m² - FIRST FLOOR TOTAL: 43,115m²

TOP OF ELEVATOR 9.100



TYPICAL SECTION  
NTS

CONCEPT DESIGN  
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	JM	JM	SR	23.02.24

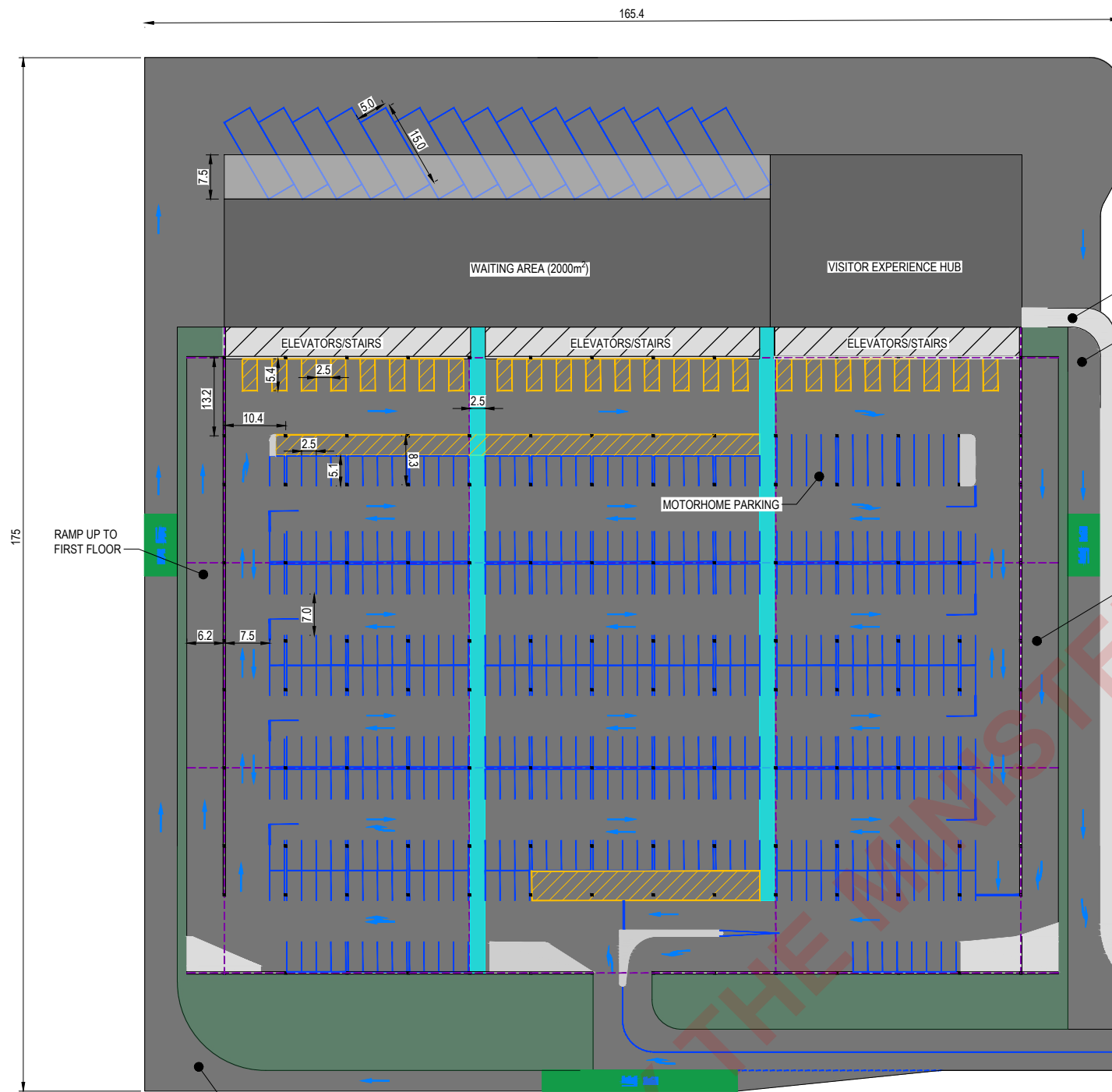
Original Scale (A1)	Design	J.MARSH	23.02.24	Approved For Construction*
AS SHOWN	Drawn	J.MARSH	23.02.24	
Reduced Scale (A3)	Design Checker	N.MOHOTTIGE	23.02.24	Date
HALF SHOWN	Drawn	N.MOHOTTIGE	23.02.24	



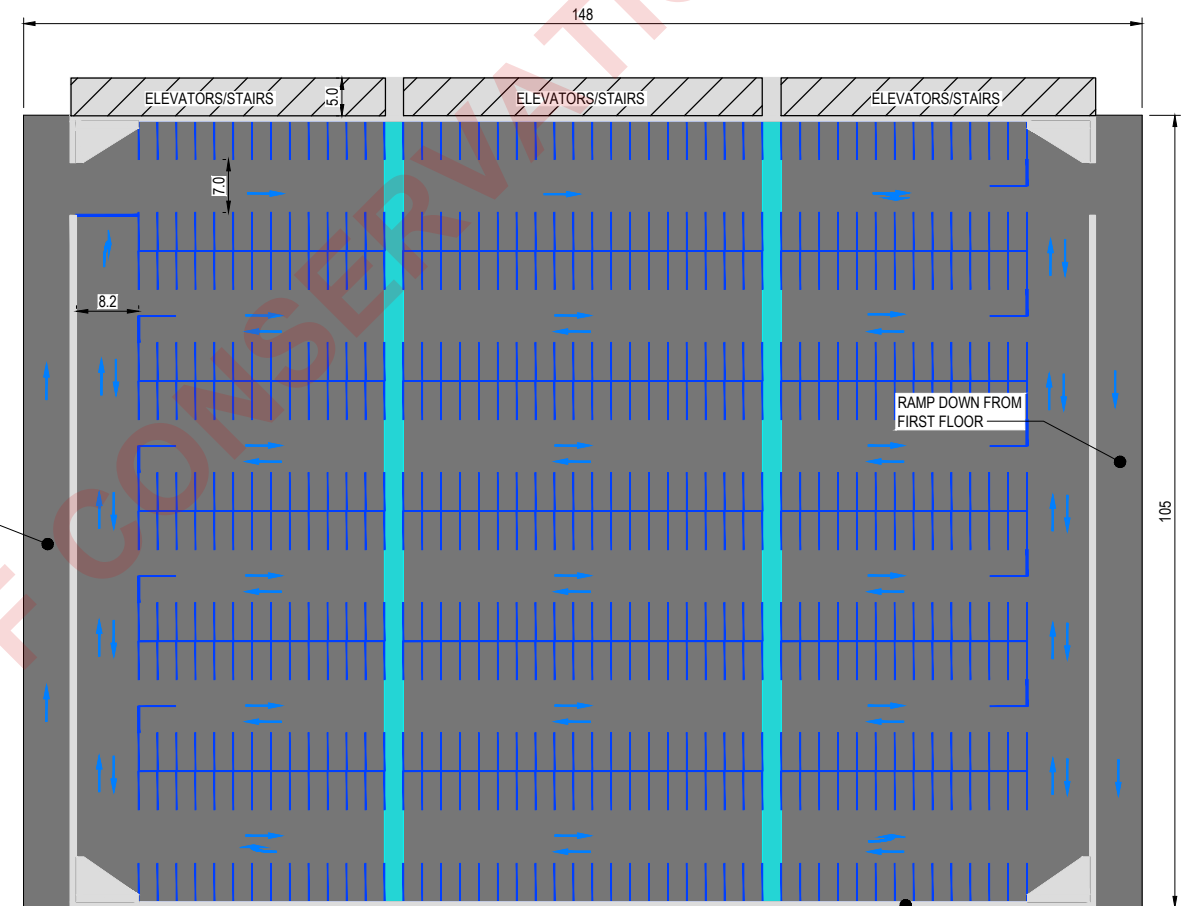
Client:	MILFORD TRANSPORT SYSTEM ASSESSMENT
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Title:	PARK AND RIDE LAYOUT MULTI-STOREY NO VISITOR EXPERIENCE HUB
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Discipline:	TRANSPORTATION
Drawing No.	3823954-TA-04
Rev.	A



GROUND FLOOR  
SCALE 1:500



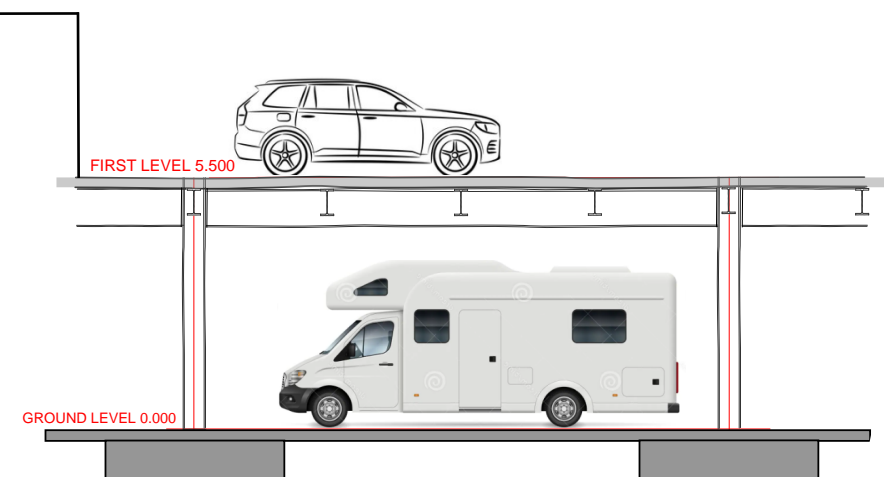
FIRST FLOOR  
SCALE 1:500

LEGEND:

- RAIN GARDEN/GRASSED AREA
- BUS ONLY
- CONCRETED AREAS
- PEDESTRIAN AREAS
- STRUCTURAL BRACING LINE
- 0.4m x 0.4m COLUMN

NUMBER OF CAR PARKS:	APPROX. 440 - GROUND FLOOR APPROX. 540 - FIRST FLOOR TOTAL: APPROX. 980 PARKS
NUMBER OF BUS BAYS:	15
FOOTPRINT (NOT INCLUDING VISITOR EXPERIENCE HUB):	27,615m² - GROUND FLOOR 15,500m² - FIRST FLOOR TOTAL: 43,376m²

TOP OF ELEVATOR 9.100



TYPICAL SECTION  
NTS

CONCEPT DESIGN  
NOT FOR CONSTRUCTION

Original Scale (A1)	Design	J.MARSH	31.01.24	Approved For Construction*
AS SHOWN	Drawn	J.MARSH	23.02.24	
Reduced Scale (A3)	Design Checker	N.MOHOTTIGE	23.02.24	Date
HALF SHOWN	Design Checker	N.MOHOTTIGE	23.02.24	Date
				* Refer to Revision 1 for Original Signature

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	JM	JM	SR	23.02.24



Client: MILFORD TRANSPORT SYSTEM ASSESSMENT

Title: PARK AND RIDE LAYOUT MULTI-STOREY

Discipline: TRANSPORTATION  
Drawing No.: 3823954-TA-03  
Rev: A

# B

## Appendix B – Park and Ride Cost Estimate

Code	Description	Quantity	Unit	Rate	Total
	<b><u>Milford Park and Ride - TE ANAU and Knobs Flat</u></b>				
	<b>8/03/2024</b>				
	Drawing No 3823954-TA-01				
	Estimated by Robin Garrett				
	Verify by Jason Luo				
	GFA:	52,100	m2		
E03	Ground Investigation				0
E04	Environmental Compliance				135,000
E05	Demolition and Site Clearance				409,000
E06	Earthworks				756,000
E07	Stormwater Drainage				403,000
E08	Pavement and Surfacing				0
E08	Sidewalk				8,486,000
E09	Retaining Walls				0
E10	Traffic Services				203,000
E11	Services / Utilities/ toilets				2,007,000
E12	Rail Track				0
E13	Fuel Lines and Tanks				0
E14	Landscaping				1,840,820
E15	Traffic/Airfield Management and Coordination				50,000
E16	Temporary Works				0
E17	Miscellaneous Work (Fences, Gates, etc)				612,000
E18	Sewer and Water Main Renovation and Ancillary Works				0
E19	Simple Building Works Incidental to Civil Engineering Works				2,146,000
	<b>Subtotal Physical Works</b>				<b>17,048,000</b>
E20	Preliminaries & General (20%)				3,410,000
E21	Margin (15%)				3,069,000
E22	Design Development Contingency (15%)				3,530,000
E23	Escalation (Excl.)				Excl.

Code	Description	Quantity	Unit	Rate	Total
	<b>Subtotal (Inc. On-Costs)</b>				<b>27,056,820</b>
E24	Professional Fees and Consents (15%)				4,059,000
E25	Construction Contingency (10%)				2,706,000
	<b>Total (P50)</b>				<b>33,821,820</b>
E26	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>33,821,820</b>
	<u>Basis of estimate:</u> Basis of Design R0.1.docx - Concept Design Report Milford Transport System Assessment 3823954-TA 1 A				
	<u>Notes</u> This is a concept level (class 4) estimate as outlined by AACE International. We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate. If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared. A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development. This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary. This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project. All works are priced in \$NZD No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate				

Code	Description	Quantity	Unit	Rate	Total
	<p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><b><u>General Assumptions</u></b></p> <p>We have assumed that there is no building on site and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done on a single and does not allow for multiple establishments.</p> <p>Allowance has been made for subsoil drainage with a perforated pipe enclosed in a bidum wrapping.</p> <p>Have allowed for standard bus shelters and does not allow for any green gardens.</p> <p>Allowance has been made for lighting water and access items and are indicated in the bill</p> <p>No allowance for the edge of the car park</p> <p>Assumed 150Kg/m3 of 30Mpa concrete</p> <p>Assumed a 110 Dia perforated sub soil drainage in herring bone formation</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services No details</p> <p>No Allowance for street furniture eg waste bins and benches</p> <p>No allowance made for the perimeter edge on the top and first floor</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p>No allowance made for side railing (Various designs)</p> <p>Assumed a single access with boom gate</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p> <p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

Code	Description	Quantity	Unit	Rate	Total
<b>E05</b> Demolition and Site Clearance					
	<b>Site clearance</b>				
	<u>Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)</u>				
E05.1	Site clearance including tipping to the nearest tipping site (50km radius) 0-100mm	3,796	m3	55.00	208,780
E05.2	Site clearance assumed stockpile onsite 100-300mm	7,592	m3	25.00	189,800
E05.3	Remove existing trees 10 No assumption	10	No.	1,000	10,000
E05.4	Rounding	1	Sum	420.00	420
	<b>Subtotal</b>				<b>409,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E06</b>	Earthworks				
E06.1	Cut to waste	7,815	m3	50.00	390,750
E06.2	Cut to fill	18,235	m3	20.00	364,700
E06.3	Rounding	1	Sum	550.00	550
	<b>Subtotal</b>				<b>756,000</b>

# Estimate Details - Te Anau LV2

Code	Description	Quantity	Unit	Rate	Total
<b>E07</b>	<b>Stormwater Drainage</b>				
E07.1	Square with retro grid 350x350mm	500	m	138.00	69,000.83
E07.2	2000mm x 1000mm x 900mm Catch pit including drain pipe of 2000mm long	21	No	4,000.00	84,000.00
E07.3	1050mm dia manhole with scruffy dome, 3000mm deep to invert level including lid cover and access hole	21	No	8,000.00	168,000.00
E07.4	Subsoil drainage 110mm Dia perforated poly ethylene pipe . including a bidum wrapping	822	m	80.00	65,760
E07.5	Exit assembly unit	2	No	8,000	16,000
E07.6	Rounding	1	Sum	239.17	239
	<b>Subtotal</b>				<b>403,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E08</b>	<b>Pavement and Surfacing</b>				
	<b>Pavement and Surfacing</b>				
	<u>Carriageway</u>				
E08.1	Sawcut existing pavement surfacing		m		0
E08.2	Subgrade preparation and testing		m2		0
E08.3	Subgrade Improvement Layer		m3		0
E08.4	[ADD PAVEMENT TYPE]				
E08.5	APXX sub-base - XXmm thick		m3		0
E08.6	Geotextile fabric - Grade 3 membrane seal		m2		0
E08.7	APXX basecourse - XXmm thick		m3		0
E08.8	Extra over (ITEM 5.06) for Cement Modification		m3		0
E08.9	Two coat grade 3/5 chipseal - XXmm thick		m2		0
E08.10	Extra value over for (XX SMA10 etc.) Raised Speed Platform - XXmm thick		m2		0
	<u>Traffic Islands</u>				
E08.11	Traffic island Infill - Coloured concrete XXMPa		m2		0
E08.12	Rounding	1	Sum	0.00	0
E08.13	<b>Subtotal</b>				<b>0</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E08</b>	Sidewalk				
E08 .1	Allowance for Asphalt surfacing	37,956	m2	200.00	7,591,149
E08 .2	Concrete foot Path	5,963	m2	150.00	894,450
E08 .3	Rounding	1	Sum	400.85	401
	<b>Subtotal</b>				<b>8,486,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E10</b>	<b>Traffic Services</b>				
	<b>Pavement markings and markers</b>				
E10.1	White road marking, 100mm wide line, continuous	5,800	m	7	40,600
E10.2	White arrows	162	no	150	24,300
E10.3	Blue paint walkway	551	m2	80	44,080
E10.4	NSAAT yellow road marking, 100mm wide line	300	m	7	2,100
E10.5	Green road marking for buses 10m wide	895	m2	80	71,602
E10.6	Bus lane' symbol	14	no	350.00	4,900
E10.7	Bus Stop' symbol	12	no	400.00	4,800
E10.8	Disable' symbol	22	no	250.00	5,500
E10.9	Allowance for signage	1	Sum	5,000.00	5,000
E10.10	Rounding	1	Sum	117.60	118
	<b>Subtotal</b>				<b>203,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E11</b>	Services / Utilities/ toilets				
	<b>Water service</b>				
E11.1	Fire hydrant	8	No.	4,240	33,920
E11.2					
E11.3	Street lights Double Luminaire	20	No.	12,000.00	240,000
E11.4	Assumed EV charging port - 10% of 980 No. of parking	1	Sum	1,732,500.00	1,732,500
E11.5	Rounding	1	Sum	580.00	580
	<b>Subtotal</b>				<b>2,007,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E14</b>	<b>Landscaping</b>				
	<b>Garden bed</b>				
E14.1	Typical garden bed with 150mm cultivated sub grade, 400mm screened top soil and 75mm mulch	8,331	m2	180	1,499,580
	<b>Planting and landscape finishes</b>				
E14.2	Mixed groundcover planting to garden beds	8,331	m2	40	333,240
E14.3	Indigionious Trees including mulch and drainage stem for the roots	20	No	400.00	8,000
E14.4	Round		Sum		0
	<b>Subtotal</b>				<b>1,840,820</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E17</b> Miscellaneous Work (Fences, Gates, etc)					
E17.1	Fencing around perimeter	928	m	120.00	111,360
E17.2	Pay Booths	20	No.	25,000.00	500,000
E17.3	Rounding	1	Sum	640.00	640
	<b>Subtotal</b>				<b>612,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	Simple Building Works Incidental to Civil Engineering Works				
E19.1	Bus Driver Portacom Room	119	m2	500.00	59,680
E19.2	Bus Shelter	678	m2	2,500.00	1,695,725
E19.3	Toilets	3	no.	130,000.00	390,000
E19.4	Rounding	1	Sum	595.00	595
	<b>Subtotal</b>				<b>2,146,000</b>

Code	Description	Quantity	Unit	Rate	Total
	<b><u>Milford - Eglinton Valley</u></b>				
	<b>8/03/2024</b>				
	Drawing No 3823954-TA-02 A				
	Estimated by Robin Garrett				
	Verify by Jason Luo				
	GFA:	52,250	m2		
E03	Ground Investigation				0
E04	Environmental Compliance				120,000
E05	Demolition and Site Clearance				486,000
E06	Earthworks				797,000
E07	Stormwater Drainage				389,640
E08	Sidewalk				8,262,000
E09	Retaining Walls				0
E10	Traffic Services				199,000
E11	Services / Utilities				1,950,000
E12	Rail Track				0
E13	Fuel Lines and Tanks				0
E14	Landscaping				2,167,000
E15	Traffic/Airfield Management and Coordination				20,000
E16	Temporary Works				0
E17	Miscellaneous Work (Fences, Gates, etc)				646,000
E18	Sewer and Water Main Renovation and Ancillary Works				0
E19	Simple Building Works Incidental to Civil Engineering Works				2,146,000
	<b>Subtotal Physical Works</b>				<b>17,183,000</b>
E20	Preliminaries & General (20%)				3,437,000
E21	Margin (15%)				3,093,000
E22	Design Development Contingency (15%)				3,557,000
E23	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>27,269,640</b>

Code	Description	Quantity	Unit	Rate	Total
E24	Professional Fees and Consents (15%)				4,091,000
E25	Construction Contingency (10%)				2,727,000
	<b>Total (P50)</b>				<b>34,087,640</b>
E26	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>34,087,640</b>
	<b><u>Clarifications, Notes and Assumptions</u></b>  <u>Basis of estimate:</u> Basis of Design R0.1.docx - Concept Design Report Milford Transport System Assessment 3823954-TA 2 A  <u>Notes</u> This is a concept level (class 4) estimate as outlined by AACE International.  We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.  If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.  A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.  This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.  This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.  All works are priced in \$NZD  No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate				

Code	Description	Quantity	Unit	Rate	Total
	<p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><b><u>General Assumptions</u></b></p> <p>We have assumed that there is no building on site and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done on a single and does not allow for multiple establishments.</p> <p>Allowance has been made for subsoil drainage with a perforated pipe enclosed in a bitum wrapping.</p> <p>Have allowed for standard bus shelters and does not allow for any green gardens.</p> <p>Allowance has been made for lighting water and access items and are indicated in the bill</p> <p>No allowance for the edge of the car park</p> <p>Assumed 150Kg/m3 of 30Mpa concrete</p> <p>Assumed a 110 Dia perforated sub soil drainage in herring bone formation</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services No details</p> <p>No Allowance for street furniture eg waste bins and benches</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p>No allowance made for the perimeter edge on the top and first floor</p> <p>No allowance made for side railing (Various designs)</p> <p>Assumed a single access with boom gate</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p> <p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				



Code	Description	Quantity	Unit	Rate	Total
E03	Ground Investigation				
	<u>Trial pits</u>		No.		
	<u>Site tests and observations</u>				
E03.1	Rounding	1	Sum	0.00	0
E03.2	<b>Subtotal</b>				<b>0</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E05    Demolition and Site Clearance</b>					
	<b>Site clearance</b>				
	<b>Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)</b>				
E05.1	Site clearance including tipping to the nearest tipping site (50km radius) 0-100mm	5,225	m3	55	287,375
E05.2	Site clearance assumed stockpile onsite 100-300mm	7,521	m3	25.00	188,025
E05.3	Remove existing trees	10	No.	1,000	10,000
E05.4	Rounding	1	Sum	600.00	600
	<b>Subtotal</b>				<b>486,000</b>



Code	Description	Quantity	Unit	Rate	Total
<b>E06</b> Earthworks					
E06.1	Cut to waste	7,838	m3	55.00	431,090
E06.2	Cut to fill	18,288	m3	20.00	365,760
E06.3	Rounding	1	Sum	150.00	150
	<b>Subtotal</b>				<b>797,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E07</b>	<b>Stormwater Drainage</b>				
	<b>Stormwater</b>				
E07.1	Square with retro grid 350x350mm <u>Manholes</u>	500	m	138.00	69,000
E07.2	1050mm dia manhole with scruffy dome, 3000mm deep to invert level including lid cover and access hole <u>Catchpits</u>	15	no	8,000	120,000
E07.3	2000mm x 1000mm x 900mm Catch pit including drain pipe of 2000mm long	26	no	4,000	104,000
E07.4	Subsoil drainage 110mm Dia perforated poly ethylene pipe . including a bidum wrapping	1,008	m	80.00	80,640
E07.5	Exit assembly unit	2	No	8,000	16,000
E07.6	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>389,640</b>



Code	Description	Quantity	Unit	Rate	Total
E08	Sidewalk				
E08.1	Carpark Asphalt 75mm thick	37,602	m2	200.00	7,520,256
E08.2	Concrete foot Path	4,941	m2	150.00	741,150
E08.3	Rounding	1	Sum	593.61	594
	Subtotal				8,262,000

# Estimate Details - Milford Eglinton LV2

Code	Description	Quantity	Unit	Rate	Total
<b>E10</b>	<b>Traffic Services</b>				
	<b>Pavement markings and markers</b>				
E10.1	100mm wide white road marking, 1m stripe, 1 m gap	89	m	7.00	621
E10.2	White road marking, 100mm wide line, continuous	2,016	m	7.00	14,112
E10.3	Blue paint walkway	691	m2	80.00	55,280
E10.4	Green road marking for buses 10m wide	675	m2	80.00	54,000
E10.5	NSAAT yellow road marking, 100mm wide line	1,223	m	7	8,561
E10.6	Bus Stop' symbol.	11	no	400.00	4,400
E10.7	Bus Lane' symbol	12	no	350.00	4,200
E10.8	Disable' Symbol	20	no	250.00	5,000
E10.9	White arrows	88	no	150.00	13,200
E10.10	Double Arrow	3	no	368.00	1,104
E10.11	Pakring line	4,660	m	7.00	32,620
E10.12	Allowance for signage	1	Sum	5,000.00	5,000
E10.13	Rounding	1	Sum	902.03	902
	<b>Subtotal</b>				<b>199,000</b>



Code	Description	Quantity	Unit	Rate	Total
<b>E11 Services / Utilities</b>					
E11.1	EV charge bay	1	Sum	1,750,000.00	1,750,000
E11.2	Street lights Double Luminaire	20	no.	10,000.00	200,000
E11.3	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>1,950,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E14</b>	<b>Landscaping</b>				
	<b>Garden bed</b>				
E14.1	Typical garden bed with 150mm cultivated sub grade, 400mm screened top soil and 75mm mulch	9,813	m2	180	1,766,340
	<b>Planting and landscape finishes</b>				
E14.2	Mixed groundcover planting to garden beds	9,813	m2	40	392,520
E14.3	Indigionious Trees including mulch and drainage stem for the roots	20	No	400.00	8,000
E14.4	Rounding	1	Sum	140.00	140
	<b>Subtotal</b>				<b>2,167,000</b>



Code	Description	Quantity	Unit	Rate	Total
<b>E17</b> Miscellaneous Work (Fences, Gates, etc)					
E17.1	Fencing around perimeter	1,216	m	120.00	145,920
E17.2	Pay Booths	20	No.	25,000.00	500,000
E17.3	Rounding	1	Sum	80.00	80
	<b>Subtotal</b>				<b>646,000</b>



Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	Simple Building Works Incidental to Civil Engineering Works				
E19.1	Bus Driver Portacom Room	119	m2	500.00	59,680
E19.2	Bus Shelter	678	m2	2,500.00	1,695,725
E19.3	Toilets	3	no.	130,000.00	390,000
E19.4	Rounding	1	Sum	595.00	595
	<b>Subtotal</b>				<b>2,146,000</b>

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<b>Milford Transportation System</b> Concept Design Estimate Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau <b>8/03/2024</b> Drawing No 3823954-TA-03 Rev A  GFA: 34,352 m2				
E1	Site Preparation				722,000
E2	Substructure				13,073,000
E3	Frame				5,113,000
E4	Structural Walls				793,000
E5	Upper Floors				7,781,000
E6	Roof				388,000
E7	Exterior Walls and Exterior Finish				2,815,000
E8	Windows and Exterior Doors				40,000
E9	Stairs and Balustrades				596,000
E10	Interior Walls				35,000
E11	Interior Doors				0
E12	Floor Finishes				417,000
E13	Wall Finishes				54,000
E14	Ceiling Finishes				648,000
E15	Fittings and Fixtures				285,000
E16	Sanitary Plumbing				0
E17	Heating and Ventilation Services				259,000
E18	Fire Services				1,318,000
E19	Electrical Services				5,057,000
E20	Vertical and Horizontal Transportation				646,000
E21	Special Services				1,001,000
E22	Drainage				1,609,000
E23	External Works				4,127,000

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E24	Sundries				10,251,000
	<b>Subtotal (Physical Works)</b>				<b>57,028,000</b>
E25	Preliminaries & General (20%)	0.20			11,405,600
E26	Margin (10%)	0.10			6,843,360
E27	Design Development Contingency (15%)	0.15			11,291,544
E28	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>86,568,504</b>
E29	Professional Fees (15%)	0.15			12,985,276
E30	Construction Contingency (10%)	0.10			8,656,850
	<b>Total (P50)</b>				<b>108,210,630</b>
E31	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>108,210,630</b>
	<u>Clarifications, Notes and Assumptions</u>				
	<u>Basis of estimate:</u> Milford Transport System Assessment 3823954-TA-03 Rev A - Park and Ride Layout Multi-Storey				
	<u>Notes</u> This is a concept level (class 4) estimate as outlined by AACE International.  We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p> <p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><u>General Assumptions</u></p> <p>We have assumed that there is no building on site, no demolition work required and that the ground is suitable for general clearing only</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done once and does not allow for multiple establishments</p> <p>We assumed the utilities connection is available from external to the site footprint (within 50m).</p> <p>Allowance has been made for lighting water and access items and are indicated in the estimate</p> <p>Assumed temporary drainage for stormboss and dirty water diversions</p> <p>Assumed excavated material tip offsite within 50km radius from site</p> <p>Assumed no piling required to the building</p> <p>Assumed 610UB125 beam to upper level floor beam</p> <p>Assumed corrosion protection is required to structural steel</p> <p>Assumed 175kg/m3 of reinforcing in 30Mpa base foundations, ground beams and columns</p> <p>Assumed 30kg/m2 of reinforcing in 20Mpa slab on grade</p> <p>Assumed 600mm Double T suspended slab</p> <p>Asphalt areas are: DG10 Asphalt 35mm thk Chipseal Grade 5 seal membrane 150mm thk AP40 250mm thk AP65 subbase</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services</p> <p>Assumed no allowance for parking management system</p> <p>Allowed 1 No. plant room</p> <p>Allowed 10% of the total parking capacity for electric vehicle charging ports.</p> <p>Assumed 3 No. of 3000mm x 3000mm passenger lift</p> <p>Assumed 1 No. of 3000mm x 3000mm stairwell</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>Assumed 150mm precast wall to stairwell</p> <p>Assumed partial roof covering to top floor to stairwell and passenger lift area</p> <p>Assumed painting to underside of Double T slab including support beams</p> <p>Assumed 12 No. of CCTV to each level of multi-storey parking</p> <p>Excluded pedestrian walkway down the ramp</p> <p>We have assumed the enclosed waiting area building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC</p> <p>We have assumed that no rain garden will be installed on the roof of the bus shelter area.</p> <p>We have assumed 50% rain garden and 50% grass area contribute to the overall footprint of the 'rain garden/grassed area'.</p> <p>We have excluded any construction and fixtures related to the future Visitor Experience Hub.</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space  
 for a future Visitor Experience Hub  
 Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E1</b>	<b>Site Preparation</b>				
	<u>Site clearance</u>				
	<i>All works assumed disposal off site</i>				
E1.1	Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)	32,162	m2	20.00	643,245
E1.2	Remove existing trees	10	No.	1,000.00	10,000
E1.3	Allowance for temporary drainage and other measures (Stormboss and dirty water diversions)	295	m	230.00	67,917
E1.4	Rounding	1	Sum	838.70	839
	<b>Subtotal</b>				<b>722,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E2</b>	<b>Substructure</b>				
E2.1	<u>Excavation</u> Excavate to levels and backfill (500mm allowance)	16,082	m3	60.00	964,920
E2.2	<u>Isolated base foundations, including excavation, concrete, formwork and reinforcement</u> Assumed concrete bases for 400mm x 400mm concrete columns - 1200mm(w) x 1200mm(l) x 800mm(d) including reinforcing and formwork	140	No.	2,650.00	371,000
E2.3	<u>Strip foundations, including excavation, concrete, formwork and reinforcement</u> Assumed 1200mm(w) x 800mm(d) 30Mpa concrete ground beam	2,819	m	1,900.00	5,356,100
E2.4	<u>Cast in situ concrete floor including reinforcing and tie in dowles ground floor</u> Assumed 200mm thick Insitu concrete slab with 20Mpa including base course, backfilling etc	16,176	m2	390.00	6,308,640
E2.5	Allowance to form lift pits	1	Sum	72,000.00	72,000
E2.6	Rounding	1	Sum	340.00	340
	<b>Subtotal</b>				<b>13,073,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with space  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E3</b>	<b>Frame</b>				
	<u>Concrete columns, including reinforcement, formwork and fairface finish</u>				
E3.1	400mm(w) x 400mm(l) x 5500mm(h) Insitu concrete columns, including reinforcement (Assumed 175kg/m3) formwork, and fairface finish	140	No.	3,150.00	441,000
E3.2	Extra over allowance for ramp support	1	Sum	200,000.00	200,000
	<u>Structural Steel in Beams</u>				
E3.3	Assumed 610UB125 Beam	352,277	kg	6.00	2,113,662
E3.4	Allowance for cleats and connections (15%)	52,842	kg	15.00	792,623
E3.5	Allowance for intumescent paint	5,891	m2	150.00	883,650
E3.6	Extra value for topcoat corrosive protection to steel columns	5,891	m2	100.00	589,100
E3.7	Allowance for frame at elevator and stairwell area to support roof (refer also Structural Walls)	174	m2	270.00	46,980
E3.8	Allowance for lift shaft frame	1	Sum	45,000.00	45,000
E3.9	Rounding	1	Sum	984.75	985
	<b>Subtotal</b>				<b>5,113,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with space  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E4</b>	<b>Structural Walls</b>				
	<u>Precast Concrete</u>				
	<i>Supply and install 150 thick non structural precast panel, including all unloading, distribution, erection, temporary works, grouting etc.</i>				
E4.1	150mm thick precast wall to lift shaft	330	m2	550.00	181,500
E4.2	150mm thick precast wall to stairwell	111	m2	550.00	61,050
E4.3	150mm thick precast wall to lift & stair lobby	1,000	m2	550.00	550,000
E4.4	Rounding	1	sum	450.00	450
	<b>Subtotal</b>				<b>793,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E5</b>	<b>Upper Floors</b>				
	<u>Supply &amp; install floor slab including topping</u>				
E5.1	600mm Double T including 90mm reinforced topping	15,297	m2	290.00	4,436,130
E5.2	Allowance to create 1:80 fall to L1 slab	15,297	m2	18.00	275,346
E5.3	Trafficable membrane to L1 slab	15,297	m2	140.00	2,141,580
E5.4	Seismic joints in floor with cover plate	135	m	600.00	80,808
E5.5	Kerbs, up-stands, islands, raised pavements and the like	32,351	m2	5.00	161,755
	<u>Ramp, including reinforcement, formwork and approved finish</u>				
E5.6	200mm 30Mpa insitu concrete ramp	879	m2	750.00	659,445
E5.7	Extra over for crane 30Ton single post for ramp	1	Sum	25,000.00	25,000
E5.8	Rounding	1	Sum	936.00	936
	<b>Subtotal</b>				<b>7,781,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E6</b>	<b>Roof</b>				
	<u>Roof covering and associated flashings</u>				
E6.1	Supply and install membrane roofing fixed to concrete substrate including all necessary flashings				
E6.2	Elevator and stairwell	196	m2	340.00	66,640
	<u>Eaves gutters</u>				
E6.3	250mm box Coloursteel gutters to perimeter of slabs	506	m	220.00	111,340
E6.4	Folded colorsteel flashing to gutter	506	m	120.00	60,731
E6.5	Rainwater heads	10	No.	450.00	4,500
E6.6	Leaf guard to roof all gutters	506	m	230.00	116,401
	<u>Downpipes</u>				
E6.7	Assumed 175mm PVC downpipes from Level 1 (5.5m high) to Ground including painting and necessary brackets etc	55	m	190.00	10,450
E6.8	Paint downpipes	55	m	40.00	2,200
E6.9	Connection to stormwater system	10	No.	1,500.00	15,000
E6.10	Rounding	1	Sum	738.70	739
	<b>Subtotal</b>				<b>388,000</b>

Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E6	Roof (Continued)				
E6.11	Rounding	1	sum		
	Subtotal				388,000



**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E7 Exterior Walls and Exterior Finish					
	<u>Perforated cladding</u>				
E7.1	Assumed 7.5m high perforated cladding to perimeter of carpark	4,021	m2	700.00	2,814,700
E7.2	Rounding	1	Sum	300.00	300
	<b>Subtotal</b>				<b>2,815,000</b>



**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E8	Windows and Exterior Doors				
E8.1	Allowance for fire rated door to lift & stair lobby	8	No.	5,000.00	40,000
E8.2	Rounding	1	Sum	0.00	0
	Subtotal				40,000

## Estimate Details

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**Details:** Park and Ride Layout G+1 with space  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E9</b>	<b>Stairs and Balustrades</b>				
E9.1	<u>Precast concrete stairs including balustrade/handrails and selected finish</u> 200mm(w) x 1000mm(l) x 150mm(h), including handrails	9	m2	1,100.00	10,142
E9.2	<u>Crash Protection / Handrails</u> Vehicle crash rail including handrail	689	m	850.00	585,718
E9.3	Rounding	1	Sum	140.00	140
	<b>Subtotal</b>				<b>596,000</b>



**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E10 Interior Walls					
	<u>Timber framed partitions, including wih 9mm fibre cement board</u>				
E10.1	Allowance for riser cupboards	1	Sum	35,000.00	35,000
E10.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>35,000</b>

## Estimate Details

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**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E12</b>	<b>Floor Finishes</b>				
	<u>Kerbing and channelling</u>				
E12.1	Assumed 350mm wide Insitu kerb and channel to the edge of ramp	304	m	252.00	76,658
	<u>Line Markings</u>				
E12.2	Allowance for line marking	32,351	m2	10.00	323,510
E12.3	Allowance for pedestrian walkway	1,065	m2	15.00	15,974
E12.4	Rounding	1	Sum	857.80	858
	<b>Subtotal</b>				<b>417,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E13</b>	<b>Wall Finishes</b>				
E13.1	Prepare and cement finish to internal lift core and stairs precast walls	495	m2	40.00	19,800
E13.2	Paint finishes to lift and stairs precast walls	441	m2	40.00	17,640
E13.3	Wall finishes to lift lobby - L1	396	m2	40.00	15,840
E13.4	Rounding	1	Sum	720.00	720
	<b>Subtotal</b>				<b>54,000</b>



**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E14</b>	<b>Ceiling Finishes</b>				
E14.1	Paint finishes to underside of double T slab	16,175	m2	40.00	647,017
E14.2	Rounding	1	Sum	982.80	983
	<b>Subtotal</b>				<b>648,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E15</b>	<b>Fittings and Fixtures</b>				
E15.1	Vehicle stops	980	No.	250.00	245,000
E15.2	Allowance for waste bins, bollards etc	1	Sum	20,000.00	20,000
E15.3	Allowance for wayfinding signage	1	Sum	20,000.00	20,000
E15.4	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>285,000</b>



**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E16 Sanitary Plumbing					
E16.1	Included under Sundries (waiting area)	1	Sum	Incl.	0
E16.2	Rounding	1	Sum	0.00	0
	Subtotal				0

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with space  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E17 Heating and Ventilation Services</b>					
E17.1	Allowance for extraction system to ground floor	1	Sum	235,000.00	235,000
E17.2	Allowance for BWIC - 5%	5.00	%	2,350.00	11,750
E17.3	Allowance for seismic restraint - 5%	5.00	%	2,350.00	11,750
E17.4	Rounding	1	Sum	500.00	500
	<b>Subtotal</b>				<b>259,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E18</b>	<b>Fire Services</b>				
	<u>Hydrant Water Supply</u>				
E18.1	150mm dia pipe in trench; including all excavation, disposal, backfill, marker tape testing, commissioning etc.	1	Sum	11,000.00	11,000
E18.2	Hydrant points	2	No.	10,000.00	20,000
	<u>Fire Sprinkler System</u>				
E18.3	Sprinkler system throughout building	16,175	m2	45.00	727,894
	<u>Fire Alarms</u>				
E18.4	Alarms	16,175	m2	20.00	323,509
	<u>Works to Sprinkler Valve House</u>				
E18.5	Fire Hydrant Inlet	1	Sum	15,000.00	15,000
E18.6	Fire Sprinkler Inlet	1	Sum	15,000.00	15,000
E18.7	Sprinkler Valve Set	1	Sum	20,000.00	20,000
E18.8	Fire Alarm Panel	1	Sum	20,000.00	20,000
E18.9	Connection to fire main within fire sprinkler valve house	1	Sum	20,000.00	20,000
E18.10	Graphics for alarm system	1	Sum	25,000.00	25,000
E18.11	Allowance for BWIC - 5%	5.00	%	11,974.03	59,870
E18.12	Allowance for seismic restraint - 5%	5.00	%	11,974.03	59,870
E18.13	Rounding	1	Sum	856.76	857
	<b>Subtotal</b>				<b>1,318,000</b>

## Estimate Details

**Project:** 381 - Transport  
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for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	<b>Electrical Services</b>				
	<u>Electrical</u>				
E19.1	Carpark electrical services	32,351	m2	65.00	2,102,815
E19.2	External street lighting	10,821	m2	65.00	703,365
E19.3	Allowance for BWIC - 5%	5.00	%	21,028.15	105,141
E19.4	Allowance for seismic restraint - 5%	5.00	%	21,028.15	105,141
E19.5	Allowance for plant room - includes walls, finishes and all service related works	1	Sum	80,000.00	80,000
E19.6	Assumed EV charging port - 10% of 980 No. of parking	98	No.	20,000.00	1,960,000
E19.7	Rounding	1	Sum	538.50	539
	<b>Subtotal</b>				<b>5,057,000</b>

## Estimate Details

**Project:** 381 - Transport  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E20</b>	Vertical and Horizontal Transportation				
	<b><u>Passenger Lift</u></b>				
E20.1	Assumed 3000mm x 3000m inclusive of lift sump	3	No.	205,000.00	615,000
E20.2	Allowance for BWIC - 5%	0.05	%	615,000.00	30,750
E20.3	Rounding	1	Sum	250.00	250
	<b>Subtotal</b>				<b>646,000</b>

## Estimate Details

**Project:** 381 - Transport  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E21</b>	Special Services				
	<b><u>Security services</u></b>				
E21.1	Allowance for CCTV	1	Sum	192,000.00	192,000
E21.2	Allowance for comms reticulation to carpark	32,351	m2	25.00	808,775
E21.3	Rounding	1	Sum	225.00	225
	<b>Subtotal</b>				<b>1,001,000</b>

Estimate Details

**Project:** 381 - Transport  
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for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E22	Drainage				
E22.1	Allowance for stormwater and sanitary drainage	32,163	m2	50.00	1,608,150
E22.2	Rounding	1	Sum	850.00	850
	Subtotal				1,609,000

## Estimate Details

**Project:** 381 - Transport  
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for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E23</b>	<b>External Works</b>				
	<u>Grading, seeding and planting</u>				
E23.1	Grassed area outside of parking structure	1,090	m2	5.00	5,450
	<u>Rain garden</u>				
E23.2	Rain garden outside of parking structure	1,090	m2	1,500.00	1,635,000
	<u>Trees</u>				
E23.3	Allowance for planting trees	Incl.	No.		0
	<u>Pavement/Surfacing</u>				
E23.4	Allowance for Asphalt surfacing	10,821	m2	200.00	2,164,140
E23.5	Allowance for external line marking	10,821	m2	10.00	108,209
E23.6	Kerbs, up-stands, islands, raised pavements and the like	10,821	m2	5.00	54,104
	<u>Paths, terraces, walkway and paved areas</u>				
E23.7	Allowance for pedestrian pavement	1,065	m2	150.00	159,738
E23.8	Rounding	1	Sum	358.52	359
	<b>Subtotal</b>				<b>4,127,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with space  
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Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E24</b>	<b>Sundries</b>				
	<u>Canopies</u>				
E24.1	Allowance for non-glazed canopies to bus parking area inclusive of structural column and roofing (no rain garden allowed to roof)	700	m2	1,500.00	1,050,360
	<u>Waiting area building</u>				
E24.2	Enclosed building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC	2,000	m2	4,599	9,200,000
E24.3					0
E24.4	Rounding	1	Sum	640.00	640
	<b>Subtotal</b>				<b>10,251,000</b>

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<b>Milford Transportation System</b> Concept Design Estimate Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat <b>8/03/2024</b> Drawing No 3823954-TA-04 Rev A  GFA: 34,352 m2				
E1	Site Preparation				722,000
E2	Substructure				13,073,000
E3	Frame				5,113,000
E4	Structural Walls				793,000
E5	Upper Floors				7,781,000
E6	Roof				388,000
E7	Exterior Walls and Exterior Finish				2,815,000
E8	Windows and Exterior Doors				40,000
E9	Stairs and Balustrades				596,000
E10	Interior Walls				35,000
E11	Interior Doors				0
E12	Floor Finishes				417,000
E13	Wall Finishes				54,000
E14	Ceiling Finishes				648,000
E15	Fittings and Fixtures				285,000
E16	Sanitary Plumbing				0
E17	Heating and Ventilation Services				259,000
E18	Fire Services				1,318,000
E19	Electrical Services				5,057,000
E20	Vertical and Horizontal Transportation				646,000
E21	Special Services				1,001,000
E22	Drainage				1,609,000
E23	External Works				4,127,000

# Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E24	Sundries				10,251,000
E25	Extra over logistic allowances to Knob Flat - 5%	0.050			2,851,400
	<b>Subtotal (Physical Works)</b>				<b>59,880,000</b>
E26	Preliminaries & General (20%)	0.20			11,976,000
E27	Margin (10%)	0.10			7,185,600
E28	Design Development Contingency (15%)	0.15			11,856,240
E29	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>90,897,240</b>
E30	Professional Fees (15%)	0.15			13,634,586
E31	Construction Contingency (10%)	0.10			9,089,724
	<b>Total (P50)</b>				<b>113,621,550</b>
E32	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>113,621,550</b>
	<u>Clarifications, Notes and Assumptions</u>				
	<u>Basis of estimate:</u>				
	Milford Transport System Assessment 3823954-TA-04 Rev A - Park and Ride Layout Multi-Storey No Visitor Experience Hub				
	<u>Notes</u>				
	This is a concept level (class 4) estimate as outlined by AACE International.				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.</p> <p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p> <p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p>				

## Estimate Summary



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><u>General Assumptions</u></p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>We have assumed that there is no building on site, no demolition work required and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done once and does not allow for multiple establishments</p> <p>We assumed the utilities connection is available from external to the site footprint (within 50m).</p> <p>Allowance has been made for lighting water and access items and are indicated in the estimate</p> <p>Assumed temporary drainage for stormboss and dirty water diversions</p> <p>Assumed excavated material tip off-site within 50km radius from site</p> <p>Assumed no piling required to the building</p> <p>Assumed 610UB125 beam to upper level floor beam</p> <p>Assumed corrosion protection is required to structural steel</p> <p>Assumed 175kg/m3 of reinforcing in 30Mpa base foundations, ground beams and columns</p> <p>Assumed 30kg/m2 of reinforcing in 20Mpa slab on grade</p> <p>Assumed 600mm Double T suspended slab</p> <p>Asphalt areas are: DG10 Asphalt 35mm thk Chipseal Grade 5 seal membrane 150mm thk AP40 250mm thk AP65 sub-base</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services</p> <p>Assumed no allowance for parking management system</p> <p>Allowed 1 No. plant room</p> <p>Allowed 10% of the total parking capacity for electric vehicle charging ports.</p>				

## Estimate Summary



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>Assumed 3 No. of 3000mm x 3000mm passenger lift</p> <p>Assumed 1 No. of 3000mm x 3000mm stairwell</p> <p>Assumed 150mm precast wall to stairwell</p> <p>Assumed partial roof covering to top floor to stairwell and passenger lift area</p> <p>Assumed painting to underside of Double T slab including support beams</p> <p>Assumed 12 No. of CCTV to each level of multi-storey parking</p> <p>Excluded pedestrian walkway down the ramp</p> <p>We have assumed the enclosed waiting area building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC</p> <p>We have assumed that no rain garden will be installed on the roof of the bus shelter area.</p> <p>We have assumed 50% rain garden and 50% grass area contribute to the overall footprint of the 'rain garden/grassed area'.</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E1</b>	<b>Site Preparation</b>				
	<u>Site clearance</u>				
	<i>All works assumed disposal off site</i>				
E1.1	Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)	32,162	m2	20.00	643,245
E1.2	Remove existing trees	10	No.	1,000.00	10,000
E1.3	Allowance for temporary drainage and other measures (Stormboss and dirty water diversions)	295	m	230.00	67,917
E1.4	Rounding	1	Sum	838.70	839
	<b>Subtotal</b>				<b>722,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E2</b>	<b>Substructure</b>				
E2.1	<u>Excavation</u> Excavate to levels and backfill (500mm allowance)	16,082	m3	60.00	964,920
E2.2	<u>Isolated base foundations, including excavation, concrete, formwork and reinforcement</u> Assumed concrete bases for 400mm x 400mm concrete columns - 1200mm(w) x 1200mm(l) x 800mm(d) including reinforcing and formwork	140	No.	2,650.00	371,000
E2.3	<u>Strip foundations, including excavation, concrete, formwork and reinforcement</u> Assumed 1200mm(w) x 800mm(d) 30Mpa concrete ground beam	2,819	m	1,900.00	5,356,100
E2.4	<u>Cast in situ concrete floor including reinforcing and tie in dowles ground floor</u> Assumed 200mm thick Insitu concrete slab with 20Mpa including base course, backfilling etc	16,176	m2	390.00	6,308,640
E2.5	Allowance to form lift pits	1	Sum	72,000.00	72,000
E2.6	Rounding	1	Sum	340.00	340
	<b>Subtotal</b>				<b>13,073,000</b>

# Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E3</b>	<b>Frame</b>				
	<u>Concrete columns, including reinforcement, formwork and fairface finish</u>				
E3.1	400mm(w) x 400mm(l) x 5500mm(h) Insitu concrete columns, including reinforcement (Assumed 175kg/m3) formwork, and fairface finish	140	No.	3,150.00	441,000
E3.2	Extra over allowance for ramp support	1	Sum	200,000.00	200,000
	<u>Structural Steel in Beams</u>				
E3.3	Assumed 610UB125 Beam	352,277	kg	6.00	2,113,662
E3.4	Allowance for cleats and connections (15%)	52,842	kg	15.00	792,623
E3.5	Allowance for intumescent paint	5,891	m2	150.00	883,650
E3.6	Extra value for topcoat corrosive protection to steel columns	5,891	m2	100.00	589,100
E3.7	Allowance for frame at elevator and stairwell area to support roof (refer also Structural Walls)	174	m2	270.00	46,980
E3.8	Allowance for lift shaft frame	1	Sum	45,000.00	45,000
E3.9	Rounding	1	Sum	984.75	985
	<b>Subtotal</b>				<b>5,113,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E4</b>	<b>Structural Walls</b>				
	<u>Precast Concrete</u>				
	<i>Supply and install 150 thick non structural precast panel, including all unloading, distribution, erection, temporary works, grouting etc.</i>				
E4.1	150mm thick precast wall to lift shaft	330	m2	550.00	181,500
E4.2	150mm thick precast wall to stairwell	111	m2	550.00	61,050
E4.3	150mm thick precast wall to lift & stair lobby	1,000	m2	550.00	550,000
E4.4	Rounding	1	sum	450.00	450
	<b>Subtotal</b>				<b>793,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E5</b>	<b>Upper Floors</b>				
	<u>Supply &amp; install floor slab including topping</u>				
E5.1	600mm Double T including 90mm reinforced topping	15,297	m2	290.00	4,436,130
E5.2	Allowance to create 1:80 fall to L1 slab	15,297	m2	18.00	275,346
E5.3	Trafficable membrane to L1 slab	15,297	m2	140.00	2,141,580
E5.4	Seismic joints in floor with cover plate	135	m	600.00	80,808
E5.5	Kerbs, up-stands, islands, raised pavements and the like	32,351	m2	5.00	161,755
	<u>Ramp, including reinforcement, formwork and approved finish</u>				
E5.6	200mm 30Mpa insitu concrete ramp	879	m2	750.00	659,445
E5.7	Extra over for crane 30Ton single post for ramp	1	Sum	25,000.00	25,000
E5.8	Rounding	1	Sum	936.00	936
	<b>Subtotal</b>				<b>7,781,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E6</b>	<b>Roof</b>				
	<u>Roof covering and associated flashings</u>				
E6.1	Supply and install membrane roofing fixed to concrete substrate including all necessary flashings				
E6.2	Elevator and stairwell	196	m2	340.00	66,640
	<u>Eaves gutters</u>				
E6.3	250mm box Coloursteel gutters to perimeter of slabs	506	m	220	111,340
E6.4	Folded colorsteel flashing to gutter	506	m	120.00	60,731
E6.5	Rainwater heads	10	No.	450.00	4,500
E6.6	Leaf guard to roof all gutters	506	m	230.00	116,401
	<u>Downpipes</u>				
E6.7	Assumed 175mm PVC downpipes from Level 1 (5.5m high) to Ground including painting and necessary brackets etc	55	m	190.00	10,450
E6.8	Paint downpipes	55	m	40.00	2,200
E6.9	Connection to stormwater system	10	No.	1,500.00	15,000
E6.10	Rounding	1	Sum	738.70	739
	<b>Subtotal</b>				<b>388,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E7</b>	Exterior Walls and Exterior Finish				
	<u>Perforated cladding</u>				
E7.1	Assumed 7.5m high perforated cladding to perimeter of carpark	4,021	m2	700.00	2,814,700
E7.2	Rounding	1	Sum	300.00	300
	<b>Subtotal</b>				<b>2,815,000</b>



**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E8 Windows and Exterior Doors					
E8.1	Allowance for fire rated door to lift & stair lobby	8	No.	5,000.00	40,000
E8.2	Rounding	1	Sum	0.00	0
	Subtotal				40,000

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E9</b>	<b>Stairs and Balustrades</b>				
E9.1	<u>Precast concrete stairs including balustrade/handrails and selected finish</u> 200mm(w) x 1000mm(l) x 150mm(h), including handrails	9	m2	1,100.00	10,142
E9.2	<u>Crash Protection / Handrails</u> Vehicle crash rail including handrail	689	m	850.00	585,718
E9.3	Rounding	1	Sum	140.00	140
	<b>Subtotal</b>				<b>596,000</b>



**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E10 Interior Walls					
	<u>Timber framed partitions, including wih 9mm fibre cement board</u>				
E10.1	Allowance for riser cupboards	1	Sum	35,000.00	35,000
E10.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>35,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E12</b>	<b>Floor Finishes</b>				
	<u>Kerbing and channelling</u>				
E12.1	Assumed 350mm wide Insitu kerb and channel to the edge of ramp	304	m	252.00	76,658
	<u>Line Markings</u>				
E12.2	Allowance for line marking	32,351	m2	10.00	323,510
E12.3	Allowance for pedestrian walkway	1,065	m2	15.00	15,974
E12.4	Rounding	1	Sum	857.80	858
	<b>Subtotal</b>				<b>417,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E13</b>	<b>Wall Finishes</b>				
E13.1	Prepare and cement finish to internal lift core and stairs precast walls	495	m2	40.00	19,800
E13.2	Paint finishes to lift and stairs precast walls	441	m2	40.00	17,640
E13.3	Wall finishes to lift lobby - L1	396	m2	40.00	15,840
E13.4	Rounding	1	Sum	720.00	720
	<b>Subtotal</b>				<b>54,000</b>

# Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E14 Ceiling Finishes</b>					
E14.1	Paint finishes to underside of double T slab	16,175	m2	40.00	647,017
E14.2	Rounding	1	Sum	982.80	983
	<b>Subtotal</b>				<b>648,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E15</b>	<b>Fittings and Fixtures</b>				
E15.1	Vehicle stops	980	No.	250.00	245,000
E15.2	Allowance for waste bins, bollards etc	1	Sum	20,000.00	20,000
E15.3	Allowance for wayfinding signage	1	Sum	20,000.00	20,000
E15.4	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>285,000</b>



**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E16 Sanitary Plumbing					
E16.1	Included under Sundries (waiting area)	1	Sum	Incl.	0
E16.2	Rounding	1	Sum	0.00	0
	Subtotal				0

# Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E17 Heating and Ventilation Services</b>					
E17.1	Allowance for extraction system to ground floor	1	Sum	235,000.00	235,000
E17.2	Allowance for BWIC - 5%	5.00	%	2,350.00	11,750
E17.3	Allowance for seismic restraint - 5%	5.00	%	2,350.00	11,750
E17.4	Rounding	1	Sum	500.00	500
	<b>Subtotal</b>				<b>259,000</b>

# Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E18 Fire Services</b>					
	<u>Hydrant Water Supply</u>				
E18.1	150mm dia pipe in trench; including all excavation, disposal, backfill, marker tape testing, commissioning etc.	1	Sum	11,000.00	11,000
E18.2	Hydrant points	2	No.	10,000.00	20,000
	<u>Fire Sprinkler System</u>				
E18.3	Sprinkler system throughout building	16,175	m2	45.00	727,894
	<u>Fire Alarms</u>				
E18.4	Alarms	16,175	m2	20.00	323,509
	<u>Works to Sprinkler Valve House</u>				
E18.5	Fire Hydrant Inlet	1	Sum	15,000.00	15,000
E18.6	Fire Sprinkler Inlet	1	Sum	15,000.00	15,000
E18.7	Sprinkler Valve Set	1	Sum	20,000.00	20,000
E18.8	Fire Alarm Panel	1	Sum	20,000.00	20,000
E18.9	Connection to fire main within fire sprinkler valve house	1	Sum	20,000.00	20,000
E18.10	Graphics for alarm system	1	Sum	25,000.00	25,000
E18.11	Allowance for BWIC - 5%	5.00	%	11,974.03	59,870
E18.12	Allowance for seismic restraint - 5%	5.00	%	11,974.03	59,870
E18.13	Rounding	1	Sum	856.76	857
	<b>Subtotal</b>				<b>1,318,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	<b>Electrical Services</b>				
	<u>Electrical</u>				
E19.1	Carpark electrical services	32,351	m2	65.00	2,102,815
E19.2	External street lighting	10,821	m2	65.00	703,365
E19.3	Allowance for BWIC - 5%	5.00	%	21,028.15	105,141
E19.4	Allowance for seismic restraint - 5%	5.00	%	21,028.15	105,141
E19.5	Allowance for plant room - includes walls, finishes and all service related works	1	Sum	80,000.00	80,000
E19.6	Assumed EV charging port - 10% of 980 No. of parking	98	No.	20,000.00	1,960,000
E19.7	Rounding	1	Sum	538.50	539
	<b>Subtotal</b>				<b>5,057,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E20</b>	Vertical and Horizontal Transportation				
	<b><u>Passenger Lift</u></b>				
E20.1	Assumed 3000mm x 3000m inclusive of lift sump	3	No.	205,000.00	615,000
E20.2	Allowance for BWIC - 5%	0.05	%	615,000.00	30,750
E20.3	Rounding	1	Sum	250.00	250
	<b>Subtotal</b>				<b>646,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E21</b>	Special Services				
	<u>Data services</u>				
E21.1	Allowance for CCTV	1	Sum	192,000.00	192,000
E21.2	Allowance for comms reticulation to carpark	32,351	m2	25.00	808,775
E21.3	Rounding	1	Sum	225.00	225
	<b>Subtotal</b>				<b>1,001,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E22</b>	<b>Drainage</b>				
E22.1	Allowance for stormwater and sanitary drainage	32,163	m2	50.00	1,608,150
E22.2	Rounding	1	Sum	850.00	850
	<b>Subtotal</b>				<b>1,609,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E23</b>	<b>External Works</b>				
	<u>Grading, seeding and planting</u>				
E23.1	Grassed area outside of parking structure	1,090	m2	5.00	5,450
	<u>Rain garden</u>				
E23.2	Rain garden outside of parking structure	1,090	m2	1,500.00	1,635,000
	<u>Trees</u>				
E23.3	Allowance for planting trees	Incl.	No.		0
	<u>Pavement/Surfacing</u>				
E23.4	Allowance for Asphalt surfacing	10,821	m2	200.00	2,164,140
E23.5	Allowance for external line marking	10,821	m2	10.00	108,209
E23.6	Kerbs, up-stands, islands, raised pavements and the like	10,821	m2	5.00	54,104
	<u>Paths, terraces, walkway and paved areas</u>				
E23.7	Allowance for pedestrian pavement	1,065	m2	150.00	159,738
E23.8	Rounding	1	Sum	358.52	359
	<b>Subtotal</b>				<b>4,127,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E24</b>	<b>Sundries</b>				
	<u>Canopies</u>				
E24.1	Allowance for canopies to bus parking area inclusive of structural column and roofing (no rain garden allowed to roof)	700	m2	1,500.00	1,050,360
	<u>Waiting area building</u>				
E24.2	Enclosed building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC	2,000	m2	4,599	9,200,000
E24.3					
E24.4	Rounding	1	Sum	640.00	640
	<b>Subtotal</b>				<b>10,251,000</b>

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<b>Milford Transportation System</b> Concept Design Estimate Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal <b>8/03/2024</b> Drawing No 3823954-TA-04 Rev A  GFA: 34,352 m2				
E1	Site Preparation				722,000
E2	Substructure				13,073,000
E3	Frame				5,113,000
E4	Structural Walls				793,000
E5	Upper Floors				7,781,000
E6	Roof				388,000
E7	Exterior Walls and Exterior Finish				2,815,000
E8	Windows and Exterior Doors				40,000
E9	Stairs and Balustrades				596,000
E10	Interior Walls				35,000
E11	Interior Doors				0
E12	Floor Finishes				417,000
E13	Wall Finishes				54,000
E14	Ceiling Finishes				648,000
E15	Fittings and Fixtures				285,000
E16	Sanitary Plumbing				0
E17	Heating and Ventilation Services				259,000
E18	Fire Services				1,318,000
E19	Electrical Services				5,057,000
E20	Vertical and Horizontal Transportation				646,000
E21	Special Services				1,001,000
E22	Drainage				1,609,000
E23	External Works				4,127,000

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E24	Sundries				10,251,000
E25	Extra over logistic allowances to Eglinton Reveal - 2.5%	0.025			1,425,700
	<b>Subtotal (Physical Works)</b>				<b>58,454,000</b>
E26	Preliminaries & General (20%)	0.20			11,690,800
E27	Margin (10%)	0.10			7,014,480
E28	Design Development Contingency (15%)	0.15			11,573,892
E29	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>88,732,872</b>
E30	Professional Fees (15%)	0.15			13,309,931
E31	Construction Contingency (10%)	0.10			8,873,287
	<b>Total (P50)</b>				<b>110,916,090</b>
E32	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>110,916,090</b>
	<u>Clarifications, Notes and Assumptions</u>				
	<u>Basis of estimate:</u>				
	Milford Transport System Assessment 3823954-TA-04 Rev A - Park and Ride Layout Multi-Storey No Visitor Experience Hub				
	<u>Notes</u>				
	This is a concept level (class 4) estimate as outlined by AACE International.				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.</p> <p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p> <p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p>				

## Estimate Summary

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**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><u>General Assumptions</u></p>				

## Estimate Summary

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>We have assumed that there is no building on site, no demolition work required and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done once and does not allow for multiple establishments</p> <p>We assumed the utilities connection is available from external to the site footprint (within 50m).</p> <p>Allowance has been made for lighting water and access items and are indicated in the estimate</p> <p>Assumed temporary drainage for stormboss and dirty water diversions</p> <p>Assumed excavated material tip off-site within 50km radius from site</p> <p>Assumed no piling required to the building</p> <p>Assumed 610UB125 beam to upper level floor beam</p> <p>Assumed corrosion protection is required to structural steel</p> <p>Assumed 175kg/m3 of reinforcing in 30Mpa base foundations, ground beams and columns</p> <p>Assumed 30kg/m2 of reinforcing in 20Mpa slab on grade</p> <p>Assumed 600mm Double T suspended slab</p> <p>Asphalt areas are: DG10 Asphalt 35mm thk Chipseal Grade 5 seal membrane 150mm thk AP40 250mm thk AP65 sub-base</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services</p> <p>Assumed no allowance for parking management system</p> <p>Allowed 1 No. plant room</p> <p>Allowed 10% of the total parking capacity for electric vehicle charging ports.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>Assumed 3 No. of 3000mm x 3000mm passenger lift</p> <p>Assumed 1 No. of 3000mm x 3000mm stairwell</p> <p>Assumed 150mm precast wall to stairwell</p> <p>Assumed partial roof covering to top floor to stairwell and passenger lift area</p> <p>Assumed painting to underside of Double T slab including support beams</p> <p>Assumed 12 No. of CCTV to each level of multi-storey parking</p> <p>Excluded pedestrian walkway down the ramp</p> <p>We have assumed the enclosed waiting area building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC</p> <p>We have assumed that no rain garden will be installed on the roof of the bus shelter area.</p> <p>We have assumed 50% rain garden and 50% grass area contribute to the overall footprint of the 'rain garden/grassed area'.</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

## Estimate Details

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 space for a future Visitor Experience  
 Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E1</b>	<b>Site Preparation</b>				
	<u>Site clearance</u>				
	<i>All works assumed disposal off site</i>				
E1.1	Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)	32,162	m2	20.00	643,245
E1.2	Remove existing trees	10	No.	1,000.00	10,000
E1.3	Allowance for temporary drainage and other measures (Stormboss and dirty water diversions)	295	m	230.00	67,917
E1.4	Rounding	1	Sum	838.70	839
	<b>Subtotal</b>				<b>722,000</b>

## Estimate Details

**Project:** 381 - Transport  
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Code	Description	Quantity	Unit	Rate	Total
<b>E2</b>	<b>Substructure</b>				
E2.1	<u>Excavation</u> Excavate to levels and backfill (500mm allowance)	16,082	m3	60.00	964,920
E2.2	<u>Isolated base foundations, including excavation, concrete, formwork and reinforcement</u> Assumed concrete bases for 400mm x 400mm concrete columns - 1200mm(w) x 1200mm(l) x 800mm(d) including reinforcing and formwork	140	No.	2,650.00	371,000
E2.3	<u>Strip foundations, including excavation, concrete, formwork and reinforcement</u> Assumed 1200mm(w) x 800mm(d) 30Mpa concrete ground beam	2,819	m	1,900.00	5,356,100
E2.4	<u>Cast in situ concrete floor including reinforcing and tie in dowles ground floor</u> Assumed 200mm thick Insitu concrete slab with 20Mpa including base course, backfilling etc	16,176	m2	390.00	6,308,640
E2.5	Allowance to form lift pits	1	Sum	72,000.00	72,000
E2.6	Rounding	1	Sum	340.00	340
	<b>Subtotal</b>				<b>13,073,000</b>

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**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E3</b>	<b>Frame</b>				
	<u>Concrete columns, including reinforcement, formwork and fairface finish</u>				
E3.1	400mm(w) x 400mm(l) x 5500mm(h) Insitu concrete columns, including reinforcement (Assumed 175kg/m3) formwork, and fairface finish	140	No.	3,150.00	441,000
E3.2	Extra over allowance for ramp support	1	Sum	200,000.00	200,000
	<u>Structural Steel in Beams</u>				
E3.3	Assumed 610UB125 Beam	352,277	kg	6.00	2,113,662
E3.4	Allowance for cleats and connections (15%)	52,842	kg	15.00	792,623
E3.5	Allowance for intumescent paint	5,891	m2	150.00	883,650
E3.6	Extra value for topcoat corrosive protection to steel columns	5,891	m2	100.00	589,100
E3.7	Allowance for frame at elevator and stairwell area to support roof (refer also Structural Walls)	174	m2	270.00	46,980
E3.8	Allowance for lift shaft frame	1	Sum	45,000.00	45,000
E3.9	Rounding	1	Sum	984.75	985
	<b>Subtotal</b>				<b>5,113,000</b>

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**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E4</b>	<b>Structural Walls</b>				
	<u>Precast Concrete</u>				
	<i>Supply and install 150 thick non structural precast panel, including all unloading, distribution, erection, temporary works, grouting etc.</i>				
E4.1	150mm thick precast wall to lift shaft	330	m2	550.00	181,500
E4.2	150mm thick precast wall to stairwell	111	m2	550.00	61,050
E4.3	150mm thick precast wall to lift & stair lobby	1,000	m2	550.00	550,000
E4.4	Rounding	1	sum	450.00	450
	<b>Subtotal</b>				<b>793,000</b>

## Estimate Details

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Code	Description	Quantity	Unit	Rate	Total
<b>E5</b>	<b>Upper Floors</b>				
	<u>Supply &amp; install floor slab including topping</u>				
E5.1	600mm Double T including 90mm reinforced topping	15,297	m2	290.00	4,436,130
E5.2	Allowance to create 1:80 fall to L1 slab	15,297	m2	18.00	275,346
E5.3	Trafficable membrane to L1 slab	15,297	m2	140.00	2,141,580
E5.4	Seismic joints in floor with cover plate	135	m	600.00	80,808
E5.5	Kerbs, up-stands, islands, raised pavements and the like	32,351	m2	5.00	161,755
	<u>Ramp, including reinforcement, formwork and approved finish</u>				
E5.6	200mm 30Mpa insitu concrete ramp	879	m2	750.00	659,445
E5.7	Extra over for crane 30Ton single post for ramp	1	Sum	25,000.00	25,000
E5.8	Rounding	1	Sum	936.00	936
	<b>Subtotal</b>				<b>7,781,000</b>

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**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E6</b>	<b>Roof</b>				
	<u>Roof covering and associated flashings</u>				
E6.1	Supply and install membrane roofing fixed to concrete substrate including all necessary flashings				
E6.2	Elevator and stairwell	196	m2	340.00	66,640
	<u>Eaves gutters</u>				
E6.3	250mm box Coloursteel gutters to perimeter of slabs	506	m	220	111,340
E6.4	Folded colorsteel flashing to gutter	506	m	120.00	60,731
E6.5	Rainwater heads	10	No.	450.00	4,500
E6.6	Leaf guard to roof all gutters	506	m	230.00	116,401
	<u>Downpipes</u>				
E6.7	Assumed 175mm PVC downpipes from Level 1 (5.5m high) to Ground including painting and necessary brackets etc	55	m	190.00	10,450
E6.8	Paint downpipes	55	m	40.00	2,200
E6.9	Connection to stormwater system	10	No.	1,500.00	15,000
E6.10	Rounding	1	Sum	738.70	739
	<b>Subtotal</b>				<b>388,000</b>

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Code	Description	Quantity	Unit	Rate	Total
<b>E7</b>	Exterior Walls and Exterior Finish				
	<u>Perforated cladding</u>				
E7.1	Assumed 7.5m high perforated cladding to perimeter of carpark	4,021	m2	700.00	2,814,700
E7.2	Rounding	1	Sum	300.00	300
	<b>Subtotal</b>				<b>2,815,000</b>



**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E8 Windows and Exterior Doors					
E8.1	Allowance for fire rated door to lift & stair lobby	8	No.	5,000.00	40,000
E8.2	Rounding	1	Sum	0.00	0
	Subtotal				40,000

# Estimate Details

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**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E9</b>	<b>Stairs and Balustrades</b>				
E9.1	<u>Precast concrete stairs including balustrade/handrails and selected finish</u> 200mm(w) x 1000mm(l) x 150mm(h), including handrails	9	m2	1,100.00	10,142
E9.2	<u>Crash Protection / Handrails</u> Vehicle crash rail including handrail	689	m	850.00	585,718
E9.3	Rounding	1	Sum	140.00	140
	<b>Subtotal</b>				<b>596,000</b>

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Code	Description	Quantity	Unit	Rate	Total
<b>E10</b>	Interior Walls				
	<u>Timber framed partitions, including wih 9mm fibre cement board</u>				
E10.1	Allowance for riser cupboards	1	Sum	35,000.00	35,000
E10.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>35,000</b>

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Code	Description	Quantity	Unit	Rate	Total
<b>E12</b>	<b>Floor Finishes</b>				
	<u>Kerbing and channelling</u>				
E12.1	Assumed 350mm wide Insitu kerb and channel to the edge of ramp	304	m	252.00	76,658
	<u>Line Markings</u>				
E12.2	Allowance for line marking	32,351	m2	10.00	323,510
E12.3	Allowance for pedestrian walkway	1,065	m2	15.00	15,974
E12.4	Rounding	1	Sum	857.80	858
	<b>Subtotal</b>				<b>417,000</b>

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Code	Description	Quantity	Unit	Rate	Total
<b>E13</b>	<b>Wall Finishes</b>				
E13.1	Prepare and cement finish to internal lift core and stairs precast walls	495	m2	40.00	19,800
E13.2	Paint finishes to lift and stairs precast walls	441	m2	40.00	17,640
E13.3	Wall finishes to lift lobby - L1	396	m2	40.00	15,840
E13.4	Rounding	1	Sum	720.00	720
	<b>Subtotal</b>				<b>54,000</b>



**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E14 Ceiling Finishes					
E14.1	Paint finishes to underside of double T slab	16,175	m2	40.00	647,017
E14.2	Rounding	1	Sum	982.80	983
	Subtotal				648,000

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Code	Description	Quantity	Unit	Rate	Total
<b>E15</b>	<b>Fittings and Fixtures</b>				
E15.1	Vehicle stops	980	No.	250.00	245,000
E15.2	Allowance for waste bins, bollards etc	1	Sum	20,000.00	20,000
E15.3	Allowance for wayfinding signage	1	Sum	20,000.00	20,000
E15.4	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>285,000</b>



**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E16 Sanitary Plumbing					
E16.1	Included under Sundries (waiting area)	1	Sum	Incl.	0
E16.2	Rounding	1	Sum	0.00	0
	Subtotal				0

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Code	Description	Quantity	Unit	Rate	Total
<b>E17</b>	Heating and Ventilation Services				
E17.1	Allowance for extraction system to ground floor	1	Sum	235,000.00	235,000
E17.2	Allowance for BWIC - 5%	5.00	%	2,350.00	11,750
E17.3	Allowance for seismic restraint - 5%	5.00	%	2,350.00	11,750
E17.4	Rounding	1	Sum	500.00	500
	<b>Subtotal</b>				<b>259,000</b>

# Estimate Details

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Code	Description	Quantity	Unit	Rate	Total
<b>E18 Fire Services</b>					
	<u>Hydrant Water Supply</u>				
E18.1	150mm dia pipe in trench; including all excavation, disposal, backfill, marker tape testing, commissioning etc.	1	Sum	11,000.00	11,000
E18.2	Hydrant points	2	No.	10,000.00	20,000
	<u>Fire Sprinkler System</u>				
E18.3	Sprinkler system throughout building	16,175	m2	45.00	727,894
	<u>Fire Alarms</u>				
E18.4	Alarms	16,175	m2	20.00	323,509
	<u>Works to Sprinkler Valve House</u>				
E18.5	Fire Hydrant Inlet	1	Sum	15,000.00	15,000
E18.6	Fire Sprinkler Inlet	1	Sum	15,000.00	15,000
E18.7	Sprinkler Valve Set	1	Sum	20,000.00	20,000
E18.8	Fire Alarm Panel	1	Sum	20,000.00	20,000
E18.9	Connection to fire main within fire sprinkler valve house	1	Sum	20,000.00	20,000
E18.10	Graphics for alarm system	1	Sum	25,000.00	25,000
E18.11	Allowance for BWIC - 5%	5.00	%	11,974.03	59,870
E18.12	Allowance for seismic restraint - 5%	5.00	%	11,974.03	59,870
E18.13	Rounding	1	Sum	856.76	857
	<b>Subtotal</b>				<b>1,318,000</b>

## Estimate Details

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Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	<b>Electrical Services</b>				
	<u>Electrical</u>				
E19.1	Carpark electrical services	32,351	m2	65.00	2,102,815
E19.2	External street lighting	10,821	m2	65.00	703,365
E19.3	Allowance for BWIC - 5%	5.00	%	21,028.15	105,141
E19.4	Allowance for seismic restraint - 5%	5.00	%	21,028.15	105,141
E19.5	Allowance for plant room - includes walls, finishes and all service related works	1	Sum	80,000.00	80,000
E19.6	Assumed EV charging port - 10% of 980 No. of parking	98	No.	20,000.00	1,960,000
E19.7	Rounding	1	Sum	538.50	539
	<b>Subtotal</b>				<b>5,057,000</b>

# Estimate Details

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Code	Description	Quantity	Unit	Rate	Total
<b>E20</b> Vertical and Horizontal Transportation					
	<b><u>Passenger Lift</u></b>				
E20.1	Assumed 3000mm x 3000m inclusive of lift sump	3	No.	205,000.00	615,000
E20.2	Allowance for BWIC - 5%	0.05	%	615,000.00	30,750
E20.3	Rounding	1	Sum	250.00	250
	<b>Subtotal</b>				<b>646,000</b>

## Estimate Details

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Code	Description	Quantity	Unit	Rate	Total
<b>E21</b>	Special Services				
	<u>Data services</u>				
E21.1	Allowance for CCTV	1	Sum	192,000.00	192,000
E21.2	Allowance for comms reticulation to carpark	32,351	m2	25.00	808,775
E21.3	Rounding	1	Sum	225.00	225
	<b>Subtotal</b>				<b>1,001,000</b>



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Code	Description	Quantity	Unit	Rate	Total
E22 Drainage					
E22.1	Allowance for stormwater and sanitary drainage	32,163	m2	50.00	1,608,150
E22.2	Rounding	1	Sum	850.00	850
	Subtotal				1,609,000

## Estimate Details

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Code	Description	Quantity	Unit	Rate	Total
<b>E23</b>	<b>External Works</b>				
	<u>Grading, seeding and planting</u>				
E23.1	Grassed area outside of parking structure	1,090	m2	5.00	5,450
	<u>Rain garden</u>				
E23.2	Rain garden outside of parking structure	1,090	m2	1,500.00	1,635,000
	<u>Trees</u>				
E23.3	Allowance for planting trees	Incl.	No.		0
	<u>Pavement/Surfacing</u>				
E23.4	Allowance for Asphalt surfacing	10,821	m2	200.00	2,164,140
E23.5	Allowance for external line marking	10,821	m2	10.00	108,209
E23.6	Kerbs, up-stands, islands, raised pavements and the like	10,821	m2	5.00	54,104
	<u>Paths, terraces, walkway and paved areas</u>				
E23.7	Allowance for pedestrian pavement	1,065	m2	150.00	159,738
E23.8	Rounding	1	Sum	358.52	359
	<b>Subtotal</b>				<b>4,127,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+1 with no space for a future Visitor Experience Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E24</b>	<b>Sundries</b>				
	<u>Canopies</u>				
E24.1	Allowance for canopies to bus parking area inclusive of structural column and roofing (no rain garden allowed to roof)	700	m2	1,500.00	1,050,360
	<u>Waiting area building</u>				
E24.2	Enclosed building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC	2,000	m2	4,599	9,200,000
E24.3					
E24.4	Rounding	1	Sum	640.00	640
	<b>Subtotal</b>				<b>10,251,000</b>

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<b>Milford Transportation System</b> Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau <b>8/03/2024</b> Drawing No 3823954-TA-05 Rev A  GFA: 39,490 m2				
E1	Site Preparation				780,000
E2	Substructure				11,921,000
E3	Frame				7,731,000
E4	Structural Walls				1,046,000
E5	Upper Floors				10,340,000
E6	Roof				652,000
E7	Exterior Walls and Exterior Finish				3,687,000
E8	Windows and Exterior Doors				60,000
E9	Stairs and Balustrades				1,022,000
E10	Interior Walls				50,000
E11	Interior Doors				0
E12	Floor Finishes				506,000
E13	Wall Finishes				65,000
E14	Ceiling Finishes				1,000,000
E15	Fittings and Fixtures				323,000
E16	Sanitary Plumbing				0
E17	Heating and Ventilation Services				541,000
E18	Fire Services				1,959,000
E19	Electrical Services				5,882,000
E20	Vertical and Horizontal Transportation				725,000
E21	Special Services				1,226,000
E22	Drainage				1,746,000
E23	External Works				7,050,000
E24	Sundries				10,326,000

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<b>Subtotal Physical Works</b>				<b>68,638,000</b>
E25	Preliminaries & General (20%)	0.20			13,727,600
E26	Margin (10%)	0.10			8,236,560
E27	Design Development Contingency (15%)	0.15			13,590,324
E28	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>104,192,484</b>
E29	Professional Fees and Consents (15%)	0.15			15,628,873
E30	Construction Contingency (10%)	0.10			10,419,248
	<b>Total (P50)</b>				<b>130,240,605</b>
E31	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>130,240,605</b>
	<u>Clarifications, Notes and Assumptions</u>				
	<u>Basis of estimate:</u>				
	Milford Transport System Assessment 3823954-TA-05 Rev A - Park and Ride Layout Three-Storey				
	<u>Notes</u>				
	This is a concept level (class 4) estimate as outlined by AACE International.				
	We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.				

## Estimate Summary

<b>Project:</b> 381 - Transport	<b>Details:</b> Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau
<b>Building:</b> 3823954 - Milford Transportation System	

Code	Description	Quantity	Unit	Rate	Total
	<p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p> <p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><u>General Assumptions</u></p> <p>We have assumed that there is no building on site, no demolition work required and that the ground is suitable for general clearing only</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done once and does not allow for multiple establishments</p> <p>We assumed the utilities connection is available from external to the site footprint (within 50m).</p> <p>Allowance has been made for lighting water and access items and are indicated in the estimate</p> <p>Assumed temporary drainage for stormboss and dirty water diversions</p> <p>Assumed excavated material tip offsite within 50km radius from site</p> <p>Assumed no piling required to the building</p> <p>Assumed 610UB125 beam to upper level floor beam</p> <p>Assumed corrosion protection is required to structural steel</p> <p>Assumed 175kg/m3 of reinforcing in 30Mpa base foundations, ground beams and columns</p> <p>Assumed 30kg/m2 of reinforcing in 20Mpa slab on grade</p> <p>Assumed 600mm Double T suspended slab</p> <p>Asphalt areas are: DG10 Asphalt 35mm thk Chipseal Grade 5 seal membrane 150mm thk AP40 250mm thk AP65 subbase</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services</p> <p>Assumed no allowance for parking management system</p> <p>Allowed 1 No. plant room</p> <p>Allowed 10% of the total parking capacity for electric vehicle charging ports.</p> <p>Assumed 3 No. of 3000mm x 3000mm passenger lift</p> <p>Assumed 1 No. of 3000mm x 3000mm stairwell</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>Assumed 150mm precast wall to stairwell</p> <p>Assumed partial roof covering to top floor to stairwell and passenger lift area</p> <p>Assumed painting to underside of Double T slab including support beams</p> <p>Assumed 12 No. of CCTV to each level of multi-storey parking</p> <p>Excluded pedestrian walkway down the ramp</p> <p>We have assumed the enclosed waiting area building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC</p> <p>We have assumed that no rain garden will be installed on the roof of the bus shelter area.</p> <p>We have assumed 50% rain garden and 50% grass area contribute to the overall footprint of the 'rain garden/grassed area'.</p> <p>We have excluded any construction and fixtures related to the future Visitor Experience Hub.</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
	<p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E1</b>	<b>Site Preparation</b>				
	<b><u>Site clearance</u></b>				
	<i>All works assumed disposal off site</i>				
E1.1	Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)	34,917	m2	20.00	698,346
E1.2	Assumed to remove existing trees	10	No.	1,000.00	10,000
E1.3	Allowance for temporary drainage and other measures (Stormboss and dirty water diversions)	312	m	230.00	71,650
E1.4	Rounding	1	Sum	4.60	5
	<b>Subtotal</b>				<b>780,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E2</b>	<b>Substructure</b>				
E2.1	<u>Excavation</u> Excavate to levels and backfill (500mm allowance)	17,459	m3	60.00	1,047,540
E2.2	<u>Isolated base foundations, including excavation, concrete, formwork and reinforcement</u> Assumed concrete bases for 400mm x 400mm concrete columns - 1500mm(w) x 1500mm(l) x 800mm(d) including reinforcing and formwork	112	No.	3,900.00	436,800
E2.3	<u>Strip foundations, including excavation, concrete, formwork and reinforcement</u> Assumed 1500mm(w) x 800mm(d) 30Mpa concrete ground beam	2,197	m	2,500.00	5,491,850
E2.4	<u>Concrete in floor slabs on grade, including excavation, concrete, formwork and reinforcement</u> Assumed 200mm thick Insitu concrete slab with 20Mpa including base course, backfilling etc	12,495	m2	390.00	4,873,163
E2.5	Allowance to form lift pits	1	Sum	71,000.00	71,000
E2.6	Rounding	1	Sum	646.90	647
	<b>Subtotal</b>				<b>11,921,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E3</b>	<b>Frame</b>				
	<u>Concrete columns, including reinforcement, formwork and fairface finish</u>				
E3.1	400mm(w) x 400mm(l) x 8400mm(h) concrete reinforced column	112	No.	3,150.00	352,800
E3.2	Extra over allowance for ramp support	1	Sum	337,000	337,000
	<u>Structural Steel in Beams</u>				
E3.3	Assumed 610UB125 Beam	549,184	kg	6.00	3,295,104
E3.4	Allowance for cleats and connections (15%)	82,378	kg	15.00	1,235,664
E3.5	Allowance for intumescent paint	9,613	m2	150.00	1,441,950
E3.6	Extra value for topcoat corrosive protection to steel columns	9,613	m2	100.00	961,300
E3.7	Allowance for frame at elevator and stairwell area to support roof (refer also Structural Walls)	174	m2	270.00	47,107
E3.8	Allowance for lift shaft frame	1	Sum	60,000.00	60,000
E3.9	Rounding	1	Sum	75.10	75
	<b>Subtotal</b>				<b>7,731,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E4</b>	<b>Structural Walls</b>				
	<u>Precast Concrete</u>				
	<i>Supply and install 150 thick non structural precast panel, including all unloading, distribution, erection, temporary works, grouting etc.</i>				
E4.1	150mm thick precast wall to lift shaft	439	m2	550.00	241,450
E4.2	150mm thick precast wall to stairwell	145	m2	550.00	79,750
E4.3	150mm thick precast wall to lift & stair lobby	1,317	m2	550.00	724,350
E4.4	Rounding	1	Sum	450.00	450
	<b>Subtotal</b>				<b>1,046,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E5</b>	<b>Upper Floors</b>				
	<u>Supply &amp; install floor slab including topping</u>				
E5.1	600mm double T including 90mm reinforced topping	23,879	m2	290.00	6,924,910
E5.2	Allowance to create 1:80 fall to L1 & L2 slab	23,879	m2	18.00	429,822
E5.3	Trafficable membrane to top slab	12,503	m2	140.00	1,750,420
E5.4	Seismic joints in floor with cover plate	309	m	600.00	185,190
E5.5	Kerbs, up-stands, islands, raised pavements and the like	37,490	m2	5.00	187,450
	<u>Extra over ramp, including reinforment, formwork and approved finish</u>				
E5.6	Allowances for '200mm 30Mpa concrete ramp	1,116	m2	750.00	837,000
E5.7	Extra over for crane 30Ton single post for ramp	1	Sum	25,000.00	25,000
E5.8	Rounding	1	Sum	208.00	208
	<b>Subtotal</b>				<b>10,340,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E6</b>	<b>Roof</b>				
	<u>Roof covering and associated flashings</u>				
E6.1	Supply and install membrane roofing fixed to concrete substrate including all necessary flashings				
E6.2	Elevator and stairwell	197	m2	340.00	66,980
	<u>Eaves gutters</u>				
E6.3	250mm box Coloursteel gutters to perimeter of slabs	954	m	220	209,880
E6.4	Folded colorsteel flashing to gutter	954	m	120.00	114,480
E6.5	Rainwater heads	10	No.	450.00	4,500
E6.6	Leaf guard to roof all gutters	954	m	230.00	219,420
	<u>Downpipes</u>				
E6.7	Assumed 175mm PVC downpipes from Level 2 (9.1m high) to Ground including painting and necessary brackets etc	91	m	190.00	17,290
E6.8	Paint downpipes	91	m	40.00	3,640
E6.9	Connection to stormwater system	10	No.	1,500.00	15,000
E6.10	Rounding	1	Sum	810.00	810
	<b>Subtotal</b>				<b>652,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E7</b>	Exterior Walls and Exterior Finish				
	<u>Perforated cladding</u>				
E7.1	Assumed 10.4m high perforated cladding to perimeter of carpark	5,267	m2	700.00	3,686,900
E7.2	Rounding	1	Sum	100.00	100
	<b>Subtotal</b>				<b>3,687,000</b>



**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E8 Windows and Exterior Doors</b>					
E8.1	Allowance for fire rated door to lift & stair lobby	12	No.	5,000.00	60,000
E8.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>60,000</b>

# Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E9</b>	<b>Stairs and Balustrades</b>				
E9.1	<u>Precast concrete stairs including balustrade/handrails and selected finish</u> 200mm(w) x 1000mm(l) x 150mm(h), including handrails	18	m2	1,100.00	19,932
E9.2	<u>Crash Protection / Handrails</u> Vehicle crash rail including handrail	1,178	m	850.00	1,001,156
E9.3	Rounding	1	Sum	912.50	913
	<b>Subtotal</b>				<b>1,022,000</b>



**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E10 Interior Walls					
	<u>Timber framed partitions, including wih 9mm fibre cement board</u>				
E10.1	Allowance for riser cupboards	1	Sum	50,000.00	50,000
E10.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>50,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E12</b>	<b>Floor Finishes</b>				
	<u>Kerbing and channelling</u>				
E12.1	Assumed 350mm wide Insitu kerb and channel to the edge of ramp	450	m	252.00	113,476
	<u>Line Markings</u>				
E12.2	Allowance for line marking	37,490	m2	10.00	374,900
E12.3	Allowance for pedestrian walkway	1,174	m2	15.00	17,614
E12.4	Rounding	1	Sum	10.05	10
	<b>Subtotal</b>				<b>506,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E13</b>	<b>Wall Finishes</b>				
E13.1	Prepare and cement finish to internal lift core and stairs precast walls	638	m2	40.00	25,520
E13.2	Wall finishes to lift and stairs precast walls	583	m2	40.00	23,320
E13.3	Wall finishes to lift lobby - L2	396	m2	40.00	15,840
E13.4	Rounding	1	Sum	320.00	320
	<b>Subtotal</b>				<b>65,000</b>



**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E14 Ceiling Finishes					
E14.1	Paint finishes to underside of double T slab	24,995	m2	40.00	999,800
E14.2	Rounding	1	Sum	200.00	200
	Subtotal				1,000,000

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E15</b>	<b>Fittings and Fixtures</b>				
E15.1	Vehicle stops	1,131	No.	250.00	282,750
E15.2	Allowance for waste bins, bollards etc	1	Sum	20,000.00	20,000
E15.3	Allowance for wayfinding signage	1	Sum	20,000.00	20,000
E15.4	Rounding	1	Sum	250.00	250
	<b>Subtotal</b>				<b>323,000</b>



**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E16</b>	<b>Sanitary Plumbing</b>				
E16.1	Included under Sundries (waiting area)	1	Sum	Incl.	0
E16.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>0</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E17</b>	Heating and Ventilation Services				
E17.1	Allowance for extraction system to ground floor	1	Sum	491,000.00	491,000
E17.2	Allowance for BWIC - 5%	5.00	%	4,910.00	24,550
E17.3	Allowance for seismic restraint - 5%	5.00	%	4,910.00	24,550
E17.4	Rounding	1	Sum	900.00	900
	<b>Subtotal</b>				<b>541,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
 for a future Visitor Experience Hub  
 Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E18</b>	<b>Fire Services</b>				
	<u>Hydrant Water Supply</u>				
E18.1	150mm dia pipe in trench; including all excavation, disposal, backfill, marker tape testing, commissioning etc.	1	Sum	11,000.00	11,000
E18.2	Hydrant points	3	No.	10,000.00	30,000
	<u>Fire Sprinkler System</u>				
E18.3	Sprinkler system throughout building	24,987	m2	45.00	1,124,415
	<u>Fire Alarms</u>				
E18.4	Alarms	24,987	m2	20.00	499,740
	<u>Works to Sprinkler Valve House</u>				
E18.5	Fire Hydrant Inlet	1	Sum	15,000.00	15,000
E18.6	Fire Sprinkler Inlet	1	Sum	15,000.00	15,000
E18.7	Sprinkler Valve Set	1	Sum	20,000.00	20,000
E18.8	Fire Alarm Panel	1	Sum	20,000.00	20,000
E18.9	Connection to fire main within fire sprinkler valve house	1	Sum	20,000.00	20,000
E18.10	Graphics for alarm system	1	Sum	25,000.00	25,000
E18.11	Allowance for BWIC - 5%	5.00	%	17,801.55	89,008
E18.12	Allowance for seismic restraint - 5%	5.00	%	17,801.55	89,008
E18.13	Rounding	1	Sum	829.50	830
	<b>Subtotal</b>				<b>1,959,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	<b>Electrical Services</b>				
	<u>Electrical</u>				
E19.1	Carpark electrical services	37,490	m2	65.00	2,436,850
E19.2	External street lighting	12,932	m2	65.00	840,566
E19.3	Allowance for BWIC - 5%	5.00	%	24,368.50	121,843
E19.4	Allowance for seismic restraint - 5%	5.00	%	24,368.50	121,843
E19.5	Allowance for plant room - includes walls, finishes and all service related works	1	Sum	100,000.00	100,000
E19.6	Assumed EV charging port - 10% of 1130 No. of parking	113	No.	20,000.00	2,260,000
E19.7	Rounding	1.00	Sum	899.30	899
	<b>Subtotal</b>				<b>5,882,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E20</b>	Vertical and Horizontal Transportation				
	<u>Passenger Lift</u>				
E20.1	Assumed 3000mm x 3000m inclusive of lift sump	3	No.	230,000.00	690,000
E20.2	Allowance for BWIC - 5%	0.05	%	690,000.00	34,500
E20.3	Rounding	1	Sum	500.00	500
	<b>Subtotal</b>				<b>725,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E21</b>	Special Services				
	<u>Data services</u>				
E21.1	Allowance for CCTV	1	Sum	288,000.00	288,000
E21.2	Allowance for comms reticulation to carpark	37,490	m2	25.00	937,250
E21.3	Rounding	1	Sum	750.00	750
	<b>Subtotal</b>				<b>1,226,000</b>



**Details:** Park and Ride Layout G+2 with space for a future Visitor Experience Hub  
Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
E22	Drainage				
E22.1	Allowance for stormwater and sanitary drainage	34,918	m2	50.00	1,745,900
E22.2	Rounding	1	Sum	100.00	100
	Subtotal				1,746,000

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
 for a future Visitor Experience Hub  
 Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E23</b>	<b>External Works</b>				
	<u>Grading, seeding and planting</u>				
E23.1	Grassed area outside of parking structure	2,797	m2	5.00	13,985
	<u>Rain garden</u>				
E23.2	Rain garden outside of parking structure	2,797	m2	1,500.00	4,195,500
	<u>Trees</u>				
E23.3	Allowance for planting trees	Incl.	No.		
	<u>Roads</u>				
E23.4	Allowance for Asphalt surfacing	12,932	m2	200.00	2,586,311
E23.5	Allowance for line marking	12,932	m2	10.00	129,318
E23.6	Kerbs, up-stands, islands, raised pavements and the like	12,932	m2	5.00	64,659
	<u>Paths, terraces, walkway and paved areas</u>				
E23.7	Allowance for pedestrian pavement	398	m2	150.00	59,672
E23.8	Rounding	1	Sum	556.06	556
	<b>Subtotal</b>				<b>7,050,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with space  
 for a future Visitor Experience Hub  
 Option for Te Anau

Code	Description	Quantity	Unit	Rate	Total
<b>E24</b>	<b>Sundries</b>				
	<u>Canopies</u>				
E24.1	Allowance for non-glazed canopies to bus parking area inclusive of structural column and roofing (no rain garden allowed to roof)	701	m2	1,500.00	1,050,810
	<u>Waiting area building</u>				
E24.2	Enclosed building inclusive of male, female and ACC toilet, tiled flooring, windows, acoustic tiles ceiling, electrical and intercom services, HVAC	2,000	m2	4,637	9,275,000
E24.3	Rounding	1	Sum	190.00	190
	<b>Subtotal</b>				<b>10,326,000</b>

# Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<b>Milford Transportation System</b> Park and Ride Layout G+2 with no space for a future Visitor Experience Hub Option for Knob Flat <b>8/03/2024</b> Drawing No 3823954-TA-06 Rev A  GFA: 39,490 m2				
E1	Site Preparation				780,000
E2	Substructure				11,921,000
E3	Frame				7,731,000
E4	Structural Walls				1,046,000
E5	Upper Floors				10,340,000
E6	Roof				652,000
E7	Exterior Walls and Exterior Finish				3,687,000
E8	Windows and Exterior Doors				60,000
E9	Stairs and Balustrades				1,022,000
E10	Interior Walls				50,000
E11	Interior Doors				0
E12	Floor Finishes				506,000
E13	Wall Finishes				65,000
E14	Ceiling Finishes				1,000,000
E15	Fittings and Fixtures				323,000
E16	Sanitary Plumbing				0
E17	Heating and Ventilation Services				541,000
E18	Fire Services				1,959,000
E19	Electrical Services				5,882,000
E20	Vertical and Horizontal Transportation				725,000
E21	Special Services				1,226,000
E22	Drainage				1,746,000
E23	External Works				7,050,000
E24	Sundries				10,326,000

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E25	Extra over logistic allowances to Knob Flat - 5%	0.050			3,431,900
	<b>Subtotal Physical Works</b>				<b>72,070,000</b>
E26	Preliminaries & General (20%)	0.20			14,414,000
E27	Margin (10%)	0.10			8,648,400
E28	Design Development Contingency (15%)	0.15			14,269,860
E29	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>109,402,160</b>
E30	Professional Fees and Consents (15%)	0.15			16,410,324
E31	Construction Contingency (10%)	0.10			10,940,216
	<b>Total (P50)</b>				<b>136,752,700</b>
E32	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>136,752,700</b>
	<u>Clarifications, Notes and Assumptions</u>				
	<u>Basis of estimate:</u>				
	Milford Transport System Assessment 3823954-TA-06 Rev A - Park and Ride Layout Three-Storey No Visitor Experience Hub				
	<u>Notes</u>				
	This is a concept level (class 4) estimate as outlined by AACE International.				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.</p> <p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p> <p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p><u>General Assumptions</u></p> <p>We have assumed that there is no building on site, no demolition work required and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done once and does not allow for multiple establishments</p> <p>We assumed the utilities connection is available from external to the site footprint (within 50m).</p> <p>Allowance has been made for lighting water and access items and are indicated in the estimate</p> <p>Assumed temporary drainage for stormboss and dirty water diversions</p> <p>Assumed excavated material tip off-site within 50km radius from site</p> <p>Assumed no piling required to the building</p> <p>Assumed 610UB125 beam to upper level floor beam</p> <p>Assumed corrosion protection is required to structural steel</p> <p>Assumed 175kg/m3 of reinforcing in 30Mpa base foundations, ground beams and columns</p> <p>Assumed 30kg/m2 of reinforcing in 20Mpa slab on grade</p> <p>Assumed 600mm Double T suspended slab</p> <p>Asphalt areas are: DG10 Asphalt 35mm thk Chipseal Grade 5 seal membrane 150mm thk AP40 250mm thk AP65 sub-base</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services</p> <p>Assumed no allowance for parking management system</p> <p>Allowed 1 No. plant room</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>Allowed 10% of the total parking capacity for electric vehicle charging ports.</p> <p>Assumed 3 No. of 3000mm x 3000mm passenger lift</p> <p>Assumed 1 No. of 3000mm x 3000mm stairwell</p> <p>Assumed 150mm precast wall to stairwell</p> <p>Assumed partial roof covering to top floor to stairwell and passenger lift area</p> <p>Assumed painting to underside of Double T slab including support beams</p> <p>Assumed 12 No. of CCTV to each level of multi-storey parking</p> <p>Excluded pedestrian walkway down the ramp</p> <p>We have assumed the enclosed waiting area building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC</p> <p>We have assumed that no rain garden will be installed on the roof of the bus shelter area.</p> <p>We have assumed 50% rain garden and 50% grass area contribute to the overall footprint of the 'rain garden/grassed area'.</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
	<p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p> <p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E1</b>	<b>Site Preparation</b>				
	<b><u>Site clearance</u></b>				
	<i>All works assumed disposal off site</i>				
E1.1	Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)	34,917	m2	20.00	698,346
E1.2	Assumed to remove existing trees	10	No.	1,000.00	10,000
E1.3	Allowance for temporary drainage and other measures (Stormboss and dirty water diversions)	312	m	230.00	71,650
E1.4	Rounding	1	Sum	4.60	5
	<b>Subtotal</b>				<b>780,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E2</b>	<b>Substructure</b>				
E2.1	<u>Excavation</u> Excavate to levels and backfill (500mm allowance)	17,459	m3	60.00	1,047,540
E2.2	<u>Isolated base foundations, including excavation, concrete, formwork and reinforcement</u> Assumed concrete bases for 400mm x 400mm concrete columns - 1500mm(w) x 1500mm(l) x 800mm(d) including reinforcing and formwork	112	No.	3,900.00	436,800
E2.3	<u>Strip foundations, including excavation, concrete, formwork and reinforcement</u> Assumed 1500mm(w) x 800mm(d) 30Mpa concrete ground beam	2,197	m	2,500.00	5,491,850
E2.4	<u>Concrete in floor slabs on grade, including excavation, concrete, formwork and reinforcement</u> Assumed 200mm thick Insitu concrete slab with 20Mpa including base course, backfilling etc	12,495	m2	390.00	4,873,163
E2.5	Allowance to form lift pits	1	Sum	71,000.00	71,000
E2.6	Rounding	1	Sum	646.90	647
	<b>Subtotal</b>				<b>11,921,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E3</b>	<b>Frame</b>				
	<u>Concrete columns, including reinforcement, formwork and fairface finish</u>				
E3.1	400mm(w) x 400mm(l) x 8400mm(h) concrete reinforced column	112	No.	3,150.00	352,800
E3.2	Extra over allowance for ramp support	1	Sum	337,000	337,000
	<u>Structural Steel in Beams</u>				
E3.3	Assumed 610UB125 Beam	549,184	kg	6.00	3,295,104
E3.4	Allowance for cleats and connections (15%)	82,378	kg	15.00	1,235,664
E3.5	Allowance for intumescent paint	9,613	m2	150.00	1,441,950
E3.6	Extra value for topcoat corrosive protection to steel columns	9,613	m2	100.00	961,300
E3.7	Allowance for frame at elevator and stairwell area to support roof (refer also Structural Walls)	174	m2	270.00	47,107
E3.8	Allowance for lift shaft frame	1	Sum	60,000.00	60,000
E3.9	Rounding	1	Sum	75.10	75
	<b>Subtotal</b>				<b>7,731,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E4</b>	<b>Structural Walls</b>				
	<u>Precast Concrete</u>				
	<i>Supply and install 150 thick non structural precast panel, including all unloading, distribution, erection, temporary works, grouting etc.</i>				
E4.1	150mm thick precast wall to lift shaft	439	m2	550.00	241,450
E4.2	150mm thick precast wall to stairwell	145	m2	550.00	79,750
E4.3	150mm thick precast wall to lift & stair lobby	1,317	m2	550.00	724,350
E4.4	Rounding	1	Sum	450.00	450
	<b>Subtotal</b>				<b>1,046,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E5</b>	<b>Upper Floors</b>				
	<u>Supply &amp; install floor slab including topping</u>				
E5.1	600mm double T including 90mm reinforced topping	23,879	m2	290.00	6,924,910
E5.2	Allowance to create 1:80 fall to L1 & L2 slab	23,879	m2	18.00	429,822
E5.3	Trafficable membrane to top slab	12,503	m2	140.00	1,750,420
E5.4	Seismic joints in floor with cover plate	309	m	600.00	185,190
E5.5	Kerbs, up-stands, islands, raised pavements and the like	37,490	m2	5.00	187,450
	<u>Extra over ramp, including reinforcement, formwork and approved finish</u>				
E5.6	Allowances for '200mm 30Mpa concrete ramp	1,116	m2	750.00	837,000
E5.7	Extra over for crane 30Ton single post for ramp	1	Sum	25,000.00	25,000
E5.8	Rounding	1	Sum	208.00	208
	<b>Subtotal</b>				<b>10,340,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E6</b>	<b>Roof</b>				
	<u>Roof covering and associated flashings</u>				
E6.1	Supply and install membrane roofing fixed to concrete substrate including all necessary flashings				
E6.2	Elevator and stairwell	197	m2	340.00	66,980
	<u>Eaves gutters</u>				
E6.3	250mm box Coloursteel gutters to perimeter of slabs	954	m	220	209,880
E6.4	Folded colorsteel flashing to gutter	954	m	120.00	114,480
E6.5	Rainwater heads	10	No.	450.00	4,500
E6.6	Leaf guard to roof all gutters	954	m	230.00	219,420
	<u>Downpipes</u>				
E6.7	Assumed 175mm PVC downpipes from Level 2 (9.1m high) to Ground including painting and necessary brackets etc	91	m	190.00	17,290
E6.8	Paint downpipes	91	m	40.00	3,640
E6.9	Connection to stormwater system	10	No.	1,500.00	15,000
E6.10	Rounding	1	Sum	810.00	810
	<b>Subtotal</b>				<b>652,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E7</b>	Exterior Walls and Exterior Finish				
	<u>Perforated cladding</u>				
E7.1	Assumed 10.4m high perforated cladding to perimeter of carpark	5,267	m2	700.00	3,686,900
E7.2	Rounding	1	Sum	100.00	100
	<b>Subtotal</b>				<b>3,687,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E8</b> Windows and Exterior Doors					
E8.1	Allowance for fire rated door to lift & stair lobby	12	No.	5,000.00	60,000
E8.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>60,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E9</b>	<b>Stairs and Balustrades</b>				
E9.1	<u>Precast concrete stairs including balustrade/handrails and selected finish</u> 200mm(w) x 1000mm(l) x 150mm(h), including handrails	18	m2	1,100.00	19,932
E9.2	<u>Crash Protection / Handrails</u> Vehicle crash rail including handrail	1,178	m	850.00	1,001,156
E9.3	Rounding	1	Sum	912.50	913
	<b>Subtotal</b>				<b>1,022,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E10 Interior Walls					
	<u>Timber framed partitions, including with 9mm fibre cement board</u>				
E10.1	Allowance for riser cupboards	1	Sum	50,000.00	50,000
E10.2	Rounding	1	Sum	0.00	0
	Subtotal				50,000

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E12</b>	<b>Floor Finishes</b>				
	<u>Kerbing and channeling</u>				
E12.1	Assumed 350mm wide Insitu kerb and channel to the edge of ramp	450	m	252.00	113,476
	<u>Line Markings</u>				
E12.2	Allowance for line marking	37,490	m2	10.00	374,900
E12.3	Allowance for pedestrian walkway	1,174	m2	15.00	17,614
E12.4	Rounding	1	Sum	10.05	10
	<b>Subtotal</b>				<b>506,000</b>

## Estimate Details

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E13</b>	<b>Wall Finishes</b>				
E13.1	Prepare and cement finish to internal lift core and stairs precast walls	638	m2	40.00	25,520
E13.2	Wall finishes to lift and stairs precast walls	583	m2	40.00	23,320
E13.3	Wall finishes to lift lobby - L2	396	m2	40.00	15,840
E13.4	Rounding	1	Sum	320.00	320
	<b>Subtotal</b>				<b>65,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E14 Ceiling Finishes					
E14.1	Paint finishes to underside of double T slab	24,995	m2	40.00	999,800
E14.2	Rounding	1	Sum	200.00	200
	Subtotal				1,000,000

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E15</b>	<b>Fittings and Fixtures</b>				
E15.1	Vehicle stops	1,131	No.	250.00	282,750
E15.2	Allowance for waste bins, bollards etc	1	Sum	20,000.00	20,000
E15.3	Allowance for wayfinding signange	1	Sum	20,000.00	20,000
E15.4	Rounding	1	Sum	250.00	250
	<b>Subtotal</b>				<b>323,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E16 Sanitary Plumbing					
E16.1	Included under Sundries (waiting area)	1	Sum	Incl.	0
E16.2	Rounding	1	Sum	0.00	0
	Subtotal				0

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no  
space for a future Visitor Experience  
Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E17</b>	Heating and Ventilation Services				
E17.1	Allowance for extraction system to ground floor	1	Sum	491,000.00	491,000
E17.2	Allowance for BWIC - 5%	5.00	%	4,910.00	24,550
E17.3	Allowance for seismic restraint - 5%	5.00	%	4,910.00	24,550
E17.4	Rounding	1	Sum	900.00	900
	<b>Subtotal</b>				<b>541,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E18</b>	<b>Fire Services</b>				
	<u>Hydrant Water Supply</u>				
E18.1	150mm dia pipe in trench; including all excavation, disposal, backfill, marker tape testing, commissioning etc.	1	Sum	11,000.00	11,000
E18.2	Hydrant points	3	No.	10,000.00	30,000
	<u>Fire Sprinkler System</u>				
E18.3	Sprinkler system throughout building	24,987	m2	45.00	1,124,415
	<u>Fire Alarms</u>				
E18.4	Alarms	24,987	m2	20.00	499,740
	<u>Works to Sprinkler Valve House</u>				
E18.5	Fire Hydrant Inlet	1	Sum	15,000.00	15,000
E18.6	Fire Sprinkler Inlet	1	Sum	15,000.00	15,000
E18.7	Sprinkler Valve Set	1	Sum	20,000.00	20,000
E18.8	Fire Alarm Panel	1	Sum	20,000.00	20,000
E18.9	Connection to fire main within fire sprinkler valve house	1	Sum	20,000.00	20,000
E18.10	Graphics for alarm system	1	Sum	25,000.00	25,000
E18.11	Allowance for BWIC - 5%	5.00	%	17,801.55	89,008
E18.12	Allowance for seismic restraint - 5%	5.00	%	17,801.55	89,008
E18.13	Rounding	1	Sum	829.50	830
	<b>Subtotal</b>				<b>1,959,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	<b>Electrical Services</b>				
	<u>Electrical</u>				
E19.1	Carpark electrical services	37,490	m2	65.00	2,436,850
E19.2	External street lighting	12,932	m2	65.00	840,566
E19.3	Allowance for BWIC - 5%	5.00	%	24,368.50	121,843
E19.4	Allowance for seismic restraint - 5%	5.00	%	24,368.50	121,843
E19.5	Allowance for plant room - includes walls, finishes and all service related works	1	Sum	100,000.00	100,000
E19.6	Assumed EV charging port - 10% of 1130 No. of parking	113	No.	20,000.00	2,260,000
E19.7	Rounding	1.00	Sum	899.30	899
	<b>Subtotal</b>				<b>5,882,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E20</b>	Vertical and Horizontal Transportation				
	<u>Passenger Lift</u>				
E20.1	Assumed 3000mm x 3000m inclusive of lift sump	3	No.	230,000.00	690,000
E20.2	Allowance for BWIC - 5%	0.05	%	690,000.00	34,500
E20.3	Rounding	1	Sum	500.00	500
	<b>Subtotal</b>				<b>725,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E21</b>	Special Services				
	<u>Data services</u>				
E21.1	Allowance for CCTV	1	Sum	288,000.00	288,000
E21.2	Allowance for comms reticulation to carpark	37,490	m2	25.00	937,250
E21.3	Rounding	1	Sum	750.00	750
	<b>Subtotal</b>				<b>1,226,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
E22	Drainage				
E22.1	Allowance for stormwater and sanitary drainage	34,918	m2	50.00	1,745,900
E22.2	Rounding	1	Sum	100.00	100
	Subtotal				1,746,000

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E23</b>	<b>External Works</b>				
	<u>Grading, seeding and planting</u>				
E23.1	Grassed area outside of parking structure	2,797	m2	5.00	13,985
	<u>Rain garden</u>				
E23.2	Rain garden outside of parking structure	2,797	m2	1,500.00	4,195,500
	<u>Trees</u>				
E23.3	Allowance for planting trees	Incl. No.			
	<u>Roads</u>				
E23.4	Allowance for Asphalt surfacing	12,932	m2	200.00	2,586,311
E23.5	Allowance for line marking	12,932	m2	10.00	129,318
E23.6	Kerbs, up-stands, islands, raised pavements and the like	12,932	m2	5.00	64,659
	<u>Paths, terraces, walkway and paved areas</u>				
E23.7	Allowance for pedestrian pavement	398	m2	150.00	59,672
E23.8	Rounding	1	Sum	556.06	556
	<b>Subtotal</b>				<b>7,050,000</b>

## Estimate Details

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Knob Flat

Code	Description	Quantity	Unit	Rate	Total
<b>E24</b>	<b>Sundries</b>				
	<u>Canopies</u>				
E24.1	Allowance for non-glazed canopies to bus parking area inclusive of structural column and roofing (no rain garden allowed to roof)	701	m2	1,500.00	1,050,810
	<u>Waiting area building</u>				
E24.2	Enclosed building inclusive of male, female and ACC toilet, tiled flooring, windows, acoustic tiles ceiling, electrical and intercom services, HVAC	2,000	m2	4,637	9,275,000
E24.3	Rounding	1	Sum	190.00	190
	<b>Subtotal</b>				<b>10,326,000</b>

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<b>Milford Transportation System</b> Park and Ride Layout G+2 with no space for a future Visitor Experience Hub Option for Eglinton Reveal <b>8/03/2024</b> Drawing No 3823954-TA-06 Rev A  GFA: 39,490 m2				
E1	Site Preparation				780,000
E2	Substructure				11,921,000
E3	Frame				7,731,000
E4	Structural Walls				1,046,000
E5	Upper Floors				10,340,000
E6	Roof				652,000
E7	Exterior Walls and Exterior Finish				3,687,000
E8	Windows and Exterior Doors				60,000
E9	Stairs and Balustrades				1,022,000
E10	Interior Walls				50,000
E11	Interior Doors				0
E12	Floor Finishes				506,000
E13	Wall Finishes				65,000
E14	Ceiling Finishes				1,000,000
E15	Fittings and Fixtures				323,000
E16	Sanitary Plumbing				0
E17	Heating and Ventilation Services				541,000
E18	Fire Services				1,959,000
E19	Electrical Services				5,882,000
E20	Vertical and Horizontal Transportation				725,000
E21	Special Services				1,226,000
E22	Drainage				1,746,000
E23	External Works				7,050,000
E24	Sundries				10,326,000

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E25	Extra over logistic allowances to Eglinton Reveal - 2.5%	0.025			1,715,950
	<b>Subtotal Physical Works</b>				<b>70,354,000</b>
E26	Preliminaries & General (20%)	0.20			14,070,800
E27	Margin (10%)	0.10			8,442,480
E28	Design Development Contingency (15%)	0.15			13,930,092
E29	Escalation (Excl.)				Excl.
	<b>Subtotal (Inc. On-Costs)</b>				<b>106,797,322</b>
E30	Professional Fees and Consents (15%)	0.15			16,019,598
E31	Construction Contingency (10%)	0.10			10,679,732
	<b>Total (P50)</b>				<b>133,496,653</b>
E32	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>133,496,653</b>
	<u>Clarifications, Notes and Assumptions</u>				
	<u>Basis of estimate:</u>				
	Milford Transport System Assessment 3823954-TA-06 Rev A - Park and Ride Layout Three-Storey No Visitor Experience Hub				
	<u>Notes</u>				
	This is a concept level (class 4) estimate as outlined by AACE International.				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.</p> <p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p> <p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p> <p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p><u>General Assumptions</u></p> <p>We have assumed that there is no building on site, no demolition work required and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that only general traffic management is required, and we are not blocking off the roads during construction No allowance has been allowed for extra over transport management.</p> <p>The establishment is done once and does not allow for multiple establishments</p> <p>We assumed the utilities connection is available from external to the site footprint (within 50m).</p> <p>Allowance has been made for lighting water and access items and are indicated in the estimate</p> <p>Assumed temporary drainage for stormboss and dirty water diversions</p> <p>Assumed excavated material tip off-site within 50km radius from site</p> <p>Assumed no piling required to the building</p> <p>Assumed 610UB125 beam to upper level floor beam</p> <p>Assumed corrosion protection is required to structural steel</p> <p>Assumed 175kg/m3 of reinforcing in 30Mpa base foundations, ground beams and columns</p> <p>Assumed 30kg/m2 of reinforcing in 20Mpa slab on grade</p> <p>Assumed 600mm Double T suspended slab</p> <p>Asphalt areas are: DG10 Asphalt 35mm thk Chipseal Grade 5 seal membrane 150mm thk AP40 250mm thk AP65 sub-base</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services</p> <p>Assumed no allowance for parking management system</p> <p>Allowed 1 No. plant room</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>Allowed 10% of the total parking capacity for electric vehicle charging ports.</p> <p>Assumed 3 No. of 3000mm x 3000mm passenger lift</p> <p>Assumed 1 No. of 3000mm x 3000mm stairwell</p> <p>Assumed 150mm precast wall to stairwell</p> <p>Assumed partial roof covering to top floor to stairwell and passenger lift area</p> <p>Assumed painting to underside of Double T slab including support beams</p> <p>Assumed 12 No. of CCTV to each level of multi-storey parking</p> <p>Excluded pedestrian walkway down the ramp</p> <p>We have assumed the enclosed waiting area building inclusive of male, female, ACC toilet, tiled flooring, windows and doors, acoustic tiles ceiling, wooden wall cladding, electrical, intercom services and HVAC</p> <p>We have assumed that no rain garden will be installed on the roof of the bus shelter area.</p> <p>We have assumed 50% rain garden and 50% grass area contribute to the overall footprint of the 'rain garden/grassed area'.</p> <p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p>				

## Estimate Summary

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
	<p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p> <p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E1</b>	<b>Site Preparation</b>				
	<b><u>Site clearance</u></b>				
	<i>All works assumed disposal off site</i>				
E1.1	Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)	34,917	m2	20.00	698,346
E1.2	Assumed to remove existing trees	10	No.	1,000.00	10,000
E1.3	Allowance for temporary drainage and other measures (Stormboss and dirty water diversions)	312	m	230.00	71,650
E1.4	Rounding	1	Sum	4.60	5
	<b>Subtotal</b>				<b>780,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E2</b>	<b>Substructure</b>				
E2.1	<u>Excavation</u> Excavate to levels and backfill (500mm allowance)	17,459	m3	60.00	1,047,540
E2.2	<u>Isolated base foundations, including excavation, concrete, formwork and reinforcement</u> Assumed concrete bases for 400mm x 400mm concrete columns - 1500mm(w) x 1500mm(l) x 800mm(d) including reinforcing and formwork	112	No.	3,900.00	436,800
E2.3	<u>Strip foundations, including excavation, concrete, formwork and reinforcement</u> Assumed 1500mm(w) x 800mm(d) 30Mpa concrete ground beam	2,197	m	2,500.00	5,491,850
E2.4	<u>Concrete in floor slabs on grade, including excavation, concrete, formwork and reinforcement</u> Assumed 200mm thick Insitu concrete slab with 20Mpa including base course, backfilling etc	12,495	m2	390.00	4,873,163
E2.5	Allowance to form lift pits	1	Sum	71,000.00	71,000
E2.6	Rounding	1	Sum	646.90	647
	<b>Subtotal</b>				<b>11,921,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E3</b>	<b>Frame</b>				
	<u>Concrete columns, including reinforcement, formwork and fairface finish</u>				
E3.1	400mm(w) x 400mm(l) x 8400mm(h) concrete reinforced column	112	No.	3,150.00	352,800
E3.2	Extra over allowance for ramp support	1	Sum	337,000	337,000
	<u>Structural Steel in Beams</u>				
E3.3	Assumed 610UB125 Beam	549,184	kg	6.00	3,295,104
E3.4	Allowance for cleats and connections (15%)	82,378	kg	15.00	1,235,664
E3.5	Allowance for intumescent paint	9,613	m2	150.00	1,441,950
E3.6	Extra value for topcoat corrosive protection to steel columns	9,613	m2	100.00	961,300
E3.7	Allowance for frame at elevator and stairwell area to support roof (refer also Structural Walls)	174	m2	270.00	47,107
E3.8	Allowance for lift shaft frame	1	Sum	60,000.00	60,000
E3.9	Rounding	1	Sum	75.10	75
	<b>Subtotal</b>				<b>7,731,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E4</b>	<b>Structural Walls</b>				
	<u>Precast Concrete</u>				
	<i>Supply and install 150 thick non structural precast panel, including all unloading, distribution, erection, temporary works, grouting etc.</i>				
E4.1	150mm thick precast wall to lift shaft	439	m2	550.00	241,450
E4.2	150mm thick precast wall to stairwell	145	m2	550.00	79,750
E4.3	150mm thick precast wall to lift & stair lobby	1,317	m2	550.00	724,350
E4.4	Rounding	1	Sum	450.00	450
	<b>Subtotal</b>				<b>1,046,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E5</b>	<b>Upper Floors</b>				
	<u>Supply &amp; install floor slab including topping</u>				
E5.1	600mm double T including 90mm reinforced topping	23,879	m2	290.00	6,924,910
E5.2	Allowance to create 1:80 fall to L1 & L2 slab	23,879	m2	18.00	429,822
E5.3	Trafficable membrane to top slab	12,503	m2	140.00	1,750,420
E5.4	Seismic joints in floor with cover plate	309	m	600.00	185,190
E5.5	Kerbs, up-stands, islands, raised pavements and the like	37,490	m2	5.00	187,450
	<u>Extra over ramp, including reinforcement, formwork and approved finish</u>				
E5.6	Allowances for '200mm 30Mpa concrete ramp	1,116	m2	750.00	837,000
E5.7	Extra over for crane 30Ton single post for ramp	1	Sum	25,000.00	25,000
E5.8	Rounding	1	Sum	208.00	208
	<b>Subtotal</b>				<b>10,340,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
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**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E6</b>	<b>Roof</b>				
	<u>Roof covering and associated flashings</u>				
E6.1	Supply and install membrane roofing fixed to concrete substrate including all necessary flashings				
E6.2	Elevator and stairwell	197	m2	340.00	66,980
	<u>Eaves gutters</u>				
E6.3	250mm box Coloursteel gutters to perimeter of slabs	954	m	220	209,880
E6.4	Folded colorsteel flashing to gutter	954	m	120.00	114,480
E6.5	Rainwater heads	10	No.	450.00	4,500
E6.6	Leaf guard to roof all gutters	954	m	230.00	219,420
	<u>Downpipes</u>				
E6.7	Assumed 175mm PVC downpipes from Level 2 (9.1m high) to Ground including painting and necessary brackets etc	91	m	190.00	17,290
E6.8	Paint downpipes	91	m	40.00	3,640
E6.9	Connection to stormwater system	10	No.	1,500.00	15,000
E6.10	Rounding	1	Sum	810.00	810
	<b>Subtotal</b>				<b>652,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E7</b>	<b>Exterior Walls and Exterior Finish</b>				
	<u>Perforated cladding</u>				
E7.1	Assumed 10.4m high perforated cladding to perimeter of carpark	5,267	m2	700.00	3,686,900
E7.2	Rounding	1	Sum	100.00	100
	<b>Subtotal</b>				<b>3,687,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E8 Windows and Exterior Doors					
E8.1	Allowance for fire rated door to lift & stair lobby	12	No.	5,000.00	60,000
E8.2	Rounding	1	Sum	0.00	0
	Subtotal				60,000

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E9</b>	<b>Stairs and Balustrades</b>				
E9.1	<u>Precast concrete stairs including balustrade/handrails and selected finish</u> 200mm(w) x 1000mm(l) x 150mm(h), including handrails	18	m2	1,100.00	19,932
E9.2	<u>Crash Protection / Handrails</u> Vehicle crash rail including handrail	1,178	m	850.00	1,001,156
E9.3	Rounding	1	Sum	912.50	913
	<b>Subtotal</b>				<b>1,022,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E10 Interior Walls					
	<u>Timber framed partitions, including with 9mm fibre cement board</u>				
E10.1	Allowance for riser cupboards	1	Sum	50,000.00	50,000
E10.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>50,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E12</b>	<b>Floor Finishes</b>				
	<u>Kerbing and channeling</u>				
E12.1	Assumed 350mm wide Insitu kerb and channel to the edge of ramp	450	m	252.00	113,476
	<u>Line Markings</u>				
E12.2	Allowance for line marking	37,490	m2	10.00	374,900
E12.3	Allowance for pedestrian walkway	1,174	m2	15.00	17,614
E12.4	Rounding	1	Sum	10.05	10
	<b>Subtotal</b>				<b>506,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E13</b>	<b>Wall Finishes</b>				
E13.1	Prepare and cement finish to internal lift core and stairs precast walls	638	m2	40.00	25,520
E13.2	Wall finishes to lift and stairs precast walls	583	m2	40.00	23,320
E13.3	Wall finishes to lift lobby - L2	396	m2	40.00	15,840
E13.4	Rounding	1	Sum	320.00	320
	<b>Subtotal</b>				<b>65,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E14 Ceiling Finishes					
E14.1	Paint finishes to underside of double T slab	24,995	m2	40.00	999,800
E14.2	Rounding	1	Sum	200.00	200
	Subtotal				1,000,000

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E15</b>	<b>Fittings and Fixtures</b>				
E15.1	Vehicle stops	1,131	No.	250.00	282,750
E15.2	Allowance for waste bins, bollards etc	1	Sum	20,000.00	20,000
E15.3	Allowance for wayfinding signange	1	Sum	20,000.00	20,000
E15.4	Rounding	1	Sum	250.00	250
	<b>Subtotal</b>				<b>323,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E16</b>	<b>Sanitary Plumbing</b>				
E16.1	Included under Sundries (waiting area)	1	Sum	Incl.	0
E16.2	Rounding	1	Sum	0.00	0
	<b>Subtotal</b>				<b>0</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E17</b>	Heating and Ventilation Services				
E17.1	Allowance for extraction system to ground floor	1	Sum	491,000.00	491,000
E17.2	Allowance for BWIC - 5%	5.00	%	4,910.00	24,550
E17.3	Allowance for seismic restraint - 5%	5.00	%	4,910.00	24,550
E17.4	Rounding	1	Sum	900.00	900
	<b>Subtotal</b>				<b>541,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E18</b>	<b>Fire Services</b>				
	<u>Hydrant Water Supply</u>				
E18.1	150mm dia pipe in trench; including all excavation, disposal, backfill, marker tape testing, commissioning etc.	1	Sum	11,000.00	11,000
E18.2	Hydrant points	3	No.	10,000.00	30,000
	<u>Fire Sprinkler System</u>				
E18.3	Sprinkler system throughout building	24,987	m2	45.00	1,124,415
	<u>Fire Alarms</u>				
E18.4	Alarms	24,987	m2	20.00	499,740
	<u>Works to Sprinkler Valve House</u>				
E18.5	Fire Hydrant Inlet	1	Sum	15,000.00	15,000
E18.6	Fire Sprinkler Inlet	1	Sum	15,000.00	15,000
E18.7	Sprinkler Valve Set	1	Sum	20,000.00	20,000
E18.8	Fire Alarm Panel	1	Sum	20,000.00	20,000
E18.9	Connection to fire main within fire sprinkler valve house	1	Sum	20,000.00	20,000
E18.10	Graphics for alarm system	1	Sum	25,000.00	25,000
E18.11	Allowance for BWIC - 5%	5.00	%	17,801.55	89,008
E18.12	Allowance for seismic restraint - 5%	5.00	%	17,801.55	89,008
E18.13	Rounding	1	Sum	829.50	830
	<b>Subtotal</b>				<b>1,959,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	<b>Electrical Services</b>				
	<u>Electrical</u>				
E19.1	Carpark electrical services	37,490	m2	65.00	2,436,850
E19.2	External street lighting	12,932	m2	65.00	840,566
E19.3	Allowance for BWIC - 5%	5.00	%	24,368.50	121,843
E19.4	Allowance for seismic restraint - 5%	5.00	%	24,368.50	121,843
E19.5	Allowance for plant room - includes walls, finishes and all service related works	1	Sum	100,000.00	100,000
E19.6	Assumed EV charging port - 10% of 1130 No. of parking	113	No.	20,000.00	2,260,000
E19.7	Rounding	1.00	Sum	899.30	899
	<b>Subtotal</b>				<b>5,882,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E20</b>	Vertical and Horizontal Transportation				
	<u>Passenger Lift</u>				
E20.1	Assumed 3000mm x 3000m inclusive of lift sump	3	No.	230,000.00	690,000
E20.2	Allowance for BWIC - 5%	0.05	%	690,000.00	34,500
E20.3	Rounding	1	Sum	500.00	500
	<b>Subtotal</b>				<b>725,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E21</b>	<b>Special Services</b>				
	<u>Data services</u>				
E21.1	Allowance for CCTV	1	Sum	288,000.00	288,000
E21.2	Allowance for comms reticulation to carpark	37,490	m2	25.00	937,250
E21.3	Rounding	1	Sum	750.00	750
	<b>Subtotal</b>				<b>1,226,000</b>



**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
E22 Drainage					
E22.1	Allowance for stormwater and sanitary drainage	34,918	m2	50.00	1,745,900
E22.2	Rounding	1	Sum	100.00	100
	Subtotal				1,746,000

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E23</b>	<b>External Works</b>				
	<u>Grading, seeding and planting</u>				
E23.1	Grassed area outside of parking structure	2,797	m2	5.00	13,985
	<u>Rain garden</u>				
E23.2	Rain garden outside of parking structure	2,797	m2	1,500.00	4,195,500
	<u>Trees</u>				
E23.3	Allowance for planting trees	Incl. No.			
	<u>Roads</u>				
E23.4	Allowance for Asphalt surfacing	12,932	m2	200.00	2,586,311
E23.5	Allowance for line marking	12,932	m2	10.00	129,318
E23.6	Kerbs, up-stands, islands, raised pavements and the like	12,932	m2	5.00	64,659
	<u>Paths, terraces, walkway and paved areas</u>				
E23.7	Allowance for pedestrian pavement	398	m2	150.00	59,672
E23.8	Rounding	1	Sum	556.06	556
	<b>Subtotal</b>				<b>7,050,000</b>

## Estimate Details



## Cost Advisory

**Project:** 381 - Transport  
**Building:** 3823954 - Milford Transportation System

**Details:** Park and Ride Layout G+2 with no space for a future Visitor Experience Hub  
Option for Eglinton Reveal

Code	Description	Quantity	Unit	Rate	Total
<b>E24</b>	<b>Sundries</b>				
	<u>Canopies</u>				
E24.1	Allowance for non-glazed canopies to bus parking area inclusive of structural column and roofing (no rain garden allowed to roof)	701	m2	1,500.00	1,050,810
	<u>Waiting area building</u>				
E24.2	Enclosed building inclusive of male, female and ACC toilet, tiled flooring, windows, acoustic tiles ceiling, electrical and intercom services, HVAC	2,000	m2	4,637	9,275,000
E24.3	Rounding	1	Sum	190.00	190
	<b>Subtotal</b>				<b>10,326,000</b>

# C

Appendix C – SID and Risk Registers



Safety in Design Risk Assessment Register

Author (Role):Shania Rajanayagam

Approved By:Andy Lightowler

Revision:Project Name:ford Transport System Assessm

Job No:3823954

Date:25 March 2024

Stage of Design / Project:Concept Design

(Note: minimum of 2 reviews per project)

RISKS ASSOCIATED WITH DESIGN ELEMENTS						Risk Matrix		PROPOSED & APPROVED MITIGATION MEASURES				Mitigated Risk & Resolution				RESIDUAL RISK			
Ref	Hazard (Guideword)	Cause & Outcome	Existing controls, if any	L	C	R	Proposed Control (1 Eliminate, 2 Substitute, 3 Reduce, 4 Control)				L	C	LR	Risk Owner	Client Approved	Design Status	Date	Risk Owner	Action Required
1 Construction Phase																			
1.01	Interfaces External to the Project	Underground services could be struck by excavation activities.		1	4	M	Ensure potholing has been conducted prior to works. Trenches during excavation				1	2	L	Contractor		Concept Design	13.02.24		
1.02	Hazardous Materials	Contaminated land e.g. coal tar could be uncovered during works leading to sickness or hospitalisation		2	5	H	Contractor to undertake pavement testing prior/during works				2	3	M	Contractor		Concept Design	13.02.24		
1.03	Interfaces External to the Project	Unknown hazards could be experienced on private land e.g. dogs, discontented residents		3	3	H	Be aware of surroundings and do not engage. Workers to conduct desktop site investigation to be aware of surroundings				3	2	M	Contractor		Concept Design	13.02.24		
1.04	Interfaces External to the Project	Constructions workers struck by live traffic.		3	5	E	Ensure appropriate TTM is undertaken and appropriate PPE worn				3	3	H	Contractor		Concept Design	13.02.24		
1.05	Egress / Access	Emergency service access is disrupted temporarily through construction		3	4	H	Ensure TTM on site to respond. Coordinate with emergency services				3	2	M	Contractor		Concept Design	13.02.24		
1.06	Heights / Depths	Working at heights		3	4	H	Temporary edge protection used.				1	2	L	Contractor		Concept Design	13.02.24		
1.07	Hazardous Materials	Exposure to strong chemicals e.g. adhesives, epoxy resins, hot bitumen		3	2	M	H&S procedures for dealing with hot materials to be established.				2	2	L	Contractor		Concept Design	13.02.24		
1.08	Load / Force / Energy	Loud construction activities		3	2	M	Communication process to be established.				1	2	L	Contractor		Concept Design	13.02.24		
1.09	Position / Location	Overhead power lines.		2	4	H	Powerlines to be protected (PVC sleeves or sim.)				2	2	L	Contractor		Concept Design	13.02.24		
1.10	Site Environment	Dust from earth works		4	2	M	Water trucks to be onsite for dust control during eathworks phase				2	2	L	Contractor		Concept Design	13.02.24		
1.11	Position / Location	Moving plant + machinery		2	4	H	Communication process to be established.				1	4	M	Contractor		Concept Design	13.02.24		
1.12	Load / Force / Energy	Piling operations (e.g. falling into hole and crushing, methane gas)		2	4	H	Procedure for piling operations to be established (fencing, exculsion zones, etc.)				1	4	M	Contractor		Concept Design	13.02.24		
2 Operation & Maintenance Phase																			
2.01	Interfaces External to the Project	Maintenance workers struck by live traffic.		3	5	E	Ensure appropriate TTM is undertaken				3	3	H	Contractor		Concept Design	13.02.24		
2.04	Position / Location	Inadequate maintenance, damage during future excavations, potential personnel injury.		3	2	M	Make sure location of underground services are as built accureately and captured in the system				1	2	L	Contractor		Concept Design	13.02.24		
2.05	Position / Location	Maintenance/inspection of civil street furniture (guard rails and signage)		3	2	M	Undertake maintenance regularly so compontents can achieve design life. Implement appropriate temporary traffic management.				2	2	L	Contractor		Concept Design	13.02.24		



Safety in Design Risk Assessment Register

Author (Role):Shania Rajanayagam

Approved By:Andy Lightowler

Revision:Project Name:ford Transport System Assessm

Job No:3823954

Date:25 March 2024

Stage of Design / Project:Concept Design

(Note: minimum of 2 reviews per project)

RISKS ASSOCIATED WITH DESIGN ELEMENTS					Risk Matrix		PROPOSED & APPROVED MITIGATION MEASURES				Mitigated Risk & Resolution				RESIDUAL RISK	
Ref	Hazard (Guideword)	Cause & Outcome	Existing controls, if any	L	C	R	Proposed Control (1 Eliminate, 2 Substitute, 3 Reduce, 4 Control)	L	C	LR	Risk Owner	Client Approved	Design Status	Date	Risk Owner	Action Required
3 Demolition Phase																
3.01	Egress / Access	Removal of permanent structure at the end of design life.		3	4	H	Contractor demolition methodology to implement safe working practices.	2	4	H						

Key;

C=Consequence 1) Low 2) Moderate 3) Significant 4) Major 5) Critical

L=Likelihood 1) Rare 2) Unlikely 3) Possible 4) Likely 5) Almost Certain

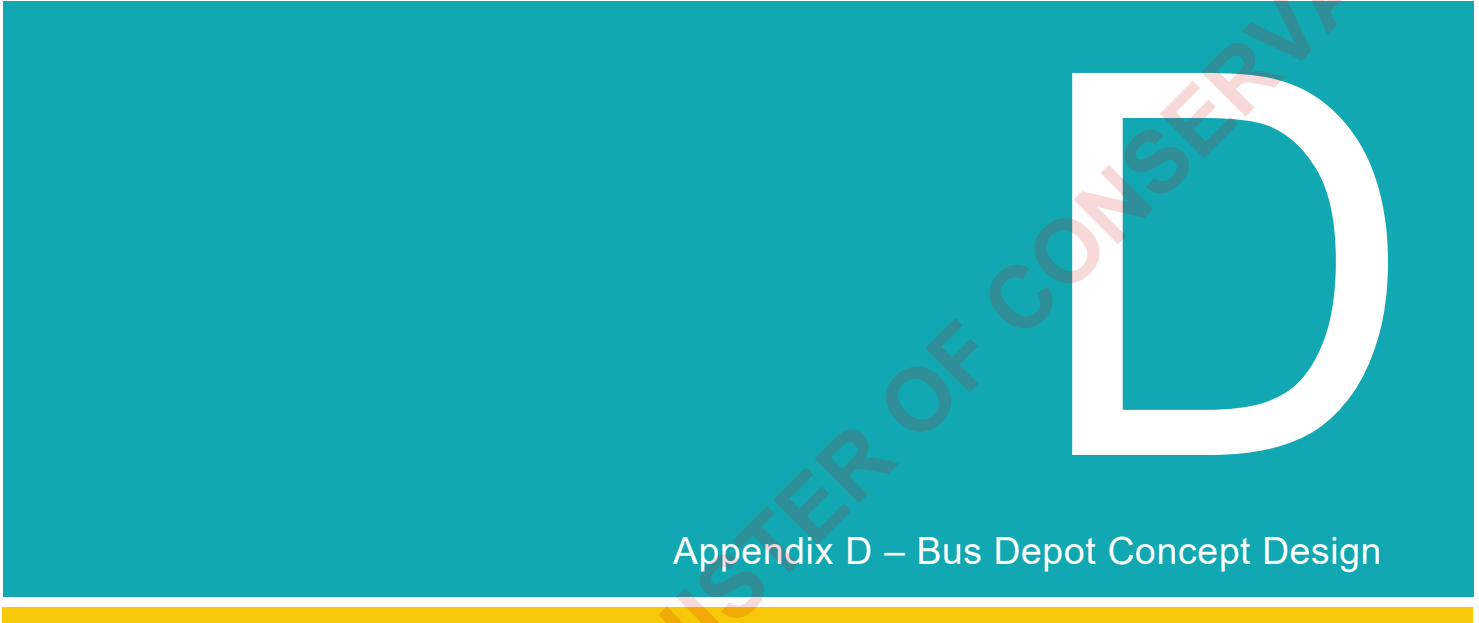
LR =Level L) Low M) Medium H) High E) Extreme

Notes: Hazards / risks considered are those that are project / site specific, non-standard / bespoke designs, special processes, high hazard risks (e.g. non 'business as usual' hazards) that have been identified at the time of the review(s). Other risks will continue to appear during the design life of the project and should be assessed and managed by appropriate parties.

Risk Register

	Project/Contract Description	Milford Sound Park and Ride		DOC Lead
	Contract ID	SSI-O-408		Courtney Hart

Contract Risk											
Risk identifier	Date raised (dd/mm/yyyy)	Risk Description (include whether this is a threat or an opportunity)	Risk Cause(s)	Risk Consequence(s)	Risk Owning Organisation	Risk Owner	Controls	Current Risk Likelihood	Current Risk Consequence	Consequence Category	Current Controlled Risk Level
Project Risk											
1.1	13/11/2023	Lack of suitable Park and Ride Location in Te Anau	Resource consents, stakeholder and iwi agreement, pristine natural landscape	Failure to implement Park and Ride	Beca/DOC	Courtney Hart / Shania Rajanayagam	Early stakeholder engagement, wide range of site options. High level best approach for optimal size and shape.	Possible	Extreme	Delivery	Critical
1.2	13/11/2023	Limitations on availability and accuracy of data	Lack of data or statistical reliability resulting in assumptions needing to be made	Modelling results unable to reflect likely scenario outcomes	Beca/DOC	Courtney Hart / Shania Rajanayagam	Validation of data provided and use of client approved assumptions to fill any key gaps	Possible	Severe	Public/Media	High
1.3	27/11/2023	Potential vagueness/inconsistencies in Masterplan proposal	Misinterpretation of scenarios that is input to the model	Modelling results unable to accurately reflect scenarios to be tested and outcomes	DOC	Courtney Hart	Validation of data provided and use of client approved assumptions to fill any key gaps	Possible	Moderate	Delivery	Medium
1.4	13/11/2023	Future visitor numbers do not match projections	Change in visitor behaviour	Negative financial impacts, visitor dissatisfaction.	Beca/DOC	Courtney Hart / Shania Rajanayagam	Validation of data provided and use of client approved assumptions to fill any key gaps	Unlikely	Moderate	Cost	Medium
1.5	27/11/2023	Timeframe of deliverables	Lack of float in programme resulting in delays and flow on effect delays from model to feasibility to concept deliverables	Cabinet meetings not progressed	Beca	Shania Rajanayagam	Communicate early to the client of any delays	Likely	Severe	Delivery	Critical
Workstream											
2.1	13/11/2023	Fare/Operating Costs make Park and Ride unviable	Unsustainable operational and maintenance costs	Negative financial impacts, visitor dissatisfaction.	Beca	Shania Rajanayagam	Investigate range of pricing and funding scenarios	Possible	Severe	Cost	High
2.2	13/11/2023	Demand of Park and Ride affected by Permit System	Lack of alignment between the two separate projects	Negative financial impacts, visitor dissatisfaction.	DOC	Courtney Hart	Communication between the two projects	Possible	Moderate	Public/Media	Medium
2.3	27/11/2023	Other workstreams to be incorporated e.g energy, technology	Different timeframes of delivery	Lack of integration leading to a system that does not interact well	Beca/DOC	Courtney Hart / Shania Rajanayagam	Communication between different workstream projects	Possible	Moderate	Delivery	Medium



Appendix D – Bus Depot Concept Design

BUS DEPOT ACCESS

ADDITIONAL BUS PARKING FOR GARAGE AREA

MAINTENANCE FACILITY





PEDESTRIAN AREA

MAINTENANCE GARAGE

EV BUS CHARGING STATIONS

STAFF PARK PARK ENTRY/EXIT

NUMBER OF STAFF CAR PARKS:	80
NUMBER OF BUS DEPOT PARKS:	50 (ADDITIONAL 10 SPACES FOR GARAGE AREA)
NUMBER OF EV BUS CHARGING PARKS:	30
FOOTPRINT:	14,300m <sup>2</sup>

LEGEND:	
	MAINTENANCE GARAGE/FACILITY
	CLEAR ZONE
	CONCRETED AREAS
	PEDESTRIAN AREAS

PARK AND RIDE BUS DEPOT  
SCALE 1:500

No.	Revision	By	Chk	Appd	Date
A	CONCEPT DESIGN	YC	YC	SR	23.02.24

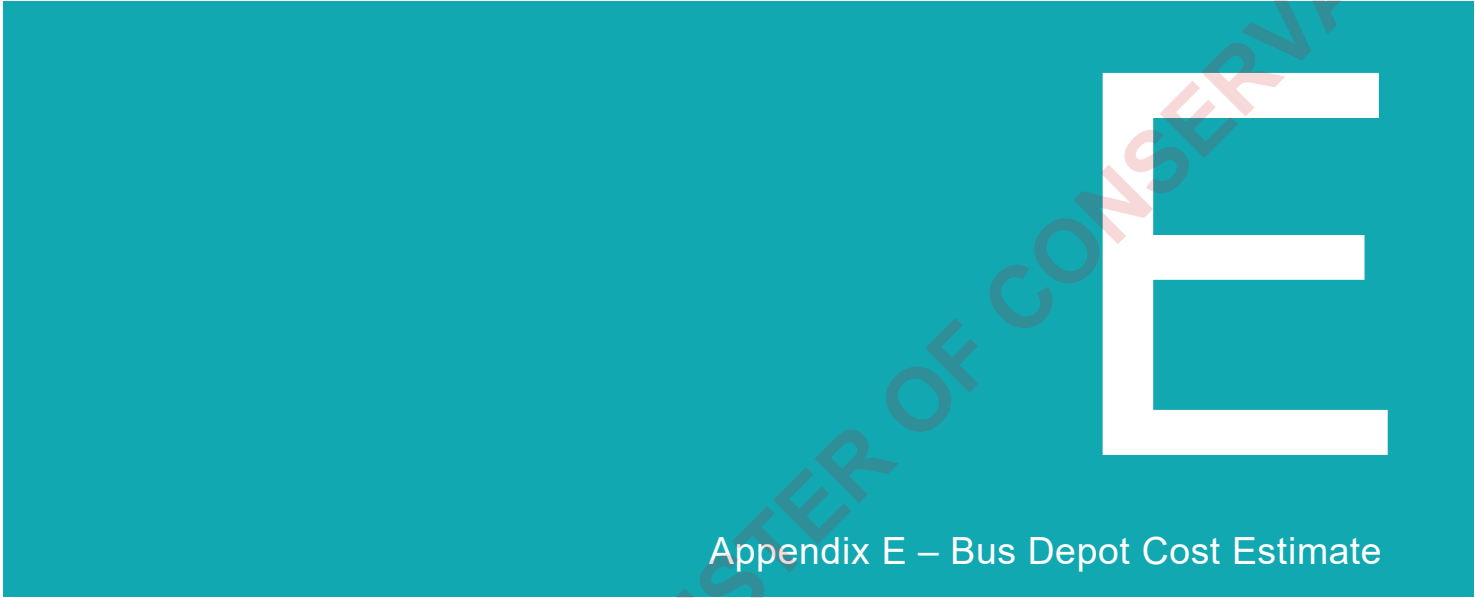
Original Scale (A1)	Design	Y.CHEN	23.02.24	Approved For Construction*
AS SHOWN	Drawn	Y.CHEN	23.02.24	
Reduced Scale (A3)	Design Checker	N.MOHOTTIGE	23.02.24	Date
HALF SHOWN	Design Check	N.MOHOTTIGE	23.02.24	



Project: MILFORD TRANSPORT SYSTEM ASSESSMENT

Title: PARK AND RIDE BUS DEPOT LAYOUT

Discipline	TRANSPORTATION
Drawing No.	3823954-TA-07
Rev.	A



Appendix E – Bus Depot Cost Estimate

RELEASED BY THE MINISTER OF CONSERVATION

Code	Description	Quantity	Unit	Rate	Total
	<b><u>Milford Park and Ride - Bus Depot</u></b>				
	<b>11/03/2024</b>				
	Drawing No 3823954-TA-07 A				
	Estimated by Robin Garrett				
	Verify by Jason Luo				
	GFA:	14,300	m2		
E03	Ground Investigation				0
E04	Environmental Compliance				90,000
E05	Demolition and Site Clearance				193,000
E06	Earthworks				267,000
E07	Stormwater Drainage				186,000
E08	Pavement and Surfacing				0
E08	Sidewalk				2,588,000
E09	Retaining Walls				0
E10	Traffic Services				33,000
E11	Services / Utilities/ toilets				118,000
E12	Rail Track				0
E13	Fuel Lines and Tanks				0
E14	Landscaping				885,000
E15	Traffic/Airfield Management and Coordination				50,000
E16	Temporary Works				0
E17	Miscellaneous Work (Fences, Gates, etc)				67,000
E18	Sewer and Water Main Renovation and Ancillary Works				0
E19	Simple Building Works Incidental to Civil Engineering Works				2,560,000
	<b>Subtotal Physical Works</b>				<b>7,037,000</b>
E20	Preliminaries & General (20%)				1,408,000
E21	Margin (15%)				1,267,000
E22	Design Development Contingency (15%)				1,457,000
E23	Escalation (Excl.)				Excl.

Code	Description	Quantity	Unit	Rate	Total
	<b>Subtotal (Inc. On-Costs)</b>				<b>11,169,000</b>
E24	Professional Fees and Consents (15%)				1,676,000
E25	Construction Contingency (10%)				1,117,000
	<b>Total (P50)</b>				<b>13,962,000</b>
E26	Funding Risk (Excl.)				Excl.
	<b>Total (P90)</b>				<b>13,962,000</b>
	<p><u>Basis of estimate:</u></p> <p>Basis of Design R0.1.docx - Concept Design Report</p> <p>Milford Transport System Assessment 3823954-TA 1 A</p> <p><u>Notes</u></p> <p>This is a concept level (class 4) estimate as outlined by AACE International.</p> <p>We have provided the estimate numbers for P50, indicating the likelihood of costs being this number or lower. Specifically, there is a 50% chance that the cost will be this cost or lower with the P50 estimate.</p> <p>If a more accurate estimate is required (eg. for funding or similar), then further engineering and design inputs will be required to enable these more accurate estimates to be prepared.</p> <p>A design development contingency of 15% has been included in the estimate to cover items of unforeseen detail and design development.</p> <p>This estimating contingency is expected to be converted to scope, and therefore should not be regarded as discretionary.</p> <p>This construction contingency has been included at 10%. This is a risk contingency to cover the cost of variation claims made by the contractor during the construction phase of the project.</p> <p>All works are priced in \$NZD</p> <p>No allowance has been made for the impacts of extraordinary global events (such as the COVID-19 outbreak) within the base estimate</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p><u>Assumptions</u></p> <p>All elements of cost included within this estimate are based on costs from similar projects and other Beca cost benchmarks.</p> <p>All of the work will be undertaken by a single 'Main Contractor' through a single contract for the project.</p> <p>A design and construct procurement route will be used. Works will be competitively tendered with a single stage tender.</p> <p>A robust tendering process will be followed and that a minimum of 3 contractor tenders (where possible) are received for the project as part of the agreed procurement process.</p> <p>All works are carried out during normal daytime working hours.</p> <p>The contractor will have unobstructed access to the whole site throughout the construction phase.</p> <p>All base prices are current to 1st quarter 2024. No construction escalation allowance has been included beyond this quarter.</p> <p>Easy site access with favorable site lay down areas and reduction in need for traffic management.</p> <p>Assumed site does not contain asbestos or have any contaminated materials within them or within the footprint.</p> <p>We have only allowed to connect into existing service infrastructure, assumed connection is available within 50m of the site. This excludes any upgrade of existing infrastructure capacity.</p> <p><u>General Exclusions</u></p> <p>Goods and services Tax (GST)</p> <p>Land acquisition costs</p> <p>Finance / Sales / Marketing costs</p> <p>Legal / Accounting fees</p> <p>Out of hours working</p> <p>Operational costs</p> <p><u>Project Specific Exclusions</u></p> <p>Escalation</p> <p>Project funding cost</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p>Major market fluctuations</p> <p>Alternative procurement routes</p> <p>Client personnel costs</p> <p>Noise mitigation during construction phase.</p> <p>Removal of any contaminated materials including asbestos or ground conditions</p> <p>Main infrastructure services / upgrades outside that allowed for in this estimate.</p> <p>Interfacing works required to public and services areas that have not been developed or detailed.</p> <p>Any demolition work.</p> <p><b><u>General Assumptions</u></b></p> <p>No building on site and that the ground is suitable for general clearing only</p> <p>We have assumed a number of trees may have to be removed and have allowed for 10 number</p> <p>We have assumed that there is no building on site and that the ground is suitable for general clearing only</p> <p>The establishment is done on a single and does not allow for multiple establishments.</p> <p>Allowance has been made for subsoil drainage with a perforated pipe enclosed in a bitum wrapping.</p> <p>Have allowed for standard bus shelters and does not allow for any green gardens.</p> <p>Allowance has been made for lighting water and access items and are indicated in the bill</p> <p>No allowance for the edge of the car park</p> <p>Assumed 150Kg/m3 of 30Mpa concrete</p> <p>Assumed a 110 Dia perforated sub soil drainage in herring bone formation</p> <p>Assumed that there are no retaining walls on all sites</p> <p>No allowance for the relocation of services No details</p> <p>No Allowance for street furniture eg waste bins and benches</p> <p>No allowance made for the perimeter edge on the top and first floor</p> <p>No allowance made for the perimeter edge</p>				

Code	Description	Quantity	Unit	Rate	Total
	<p><u>Disclaimers</u></p> <p>This estimate is solely for the Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than those stated above and any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent.</p> <p>This estimate must be read in its entirety and no portion of it should be relied upon without regard to the estimate, especially the assumptions, limitations and disclaimers set out in the estimate notes and elsewhere in the estimate.</p> <p>While Beca believes that the use of the assumptions, as set out elsewhere in this estimate, are reasonable for the purposes of this study, Beca makes no assurances with respect to the accuracy of such assumptions and some may vary significantly due to unforeseen events and circumstances. To the extent that the conditions differ from those assumed in this estimate, the opinions expressed by Beca in this estimate may no longer be valid and should be reviewed.</p> <p>In preparing this estimate, Beca has relied on the accuracy, completeness and currency of the information provided, therefore is not responsible for the information provided, and has not sought to independently verify it. To the extent that the information is inaccurate or incomplete, the opinions expressed by Beca may no longer be valid and should be reviewed.</p> <p>The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, industry unit rates and the general experience of Beca. The budget estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. On completion of the detailed design a more reliable estimate shall be generated.</p> <p>The concept cost estimates presented in this section have been developed solely for the purpose of comparing and evaluating competing options. They are sufficiently accurate to serve this purpose. They cannot be used for budget-setting purposes. A functional design should be undertaken if a budget estimate is required.</p>				

Code	Description	Quantity	Unit	Rate	Total
<b>E05</b> Demolition and Site Clearance					
	<b>Site clearance</b>				
	<u>Site clearance (including hedges, shrubs, general vegetation, rubbish etc.)</u>				
E05.1	Site clearance including tipping to the nearest tipping site (50km radius) 0-100mm	1,837	m3	55.00	101,035
E05.2	Site clearance assumed stockpile onsite 100-300mm	3,674	m3	25.00	91,850
E05.3	Rounding	1	Sum	115.00	115
	<b>Subtotal</b>				<b>193,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E06</b>	Earthworks				
E06.1	Cut to waste	2,755	m3	50.00	137,750
E06.2	Cut to fill	6,429	m3	20.00	128,580
E06.3	Rounding	1	Sum	670.00	670
	<b>Subtotal</b>				<b>267,000</b>

# Estimate Details-Bus Depot

Code	Description	Quantity	Unit	Rate	Total
<b>E07</b>	<b>Stormwater Drainage</b>				
E07.1	Square with retro grid 350x350mm	291	m	138.00	40,194.37
E07.2	2000mm x 1000mm x 900mm Catch pit incliding drain pipe of 2000mm long	7	No	4,000.00	28,000.00
E07.3	1050mm dia manhole with scruffy dome, 3000mm deep to invert level including lid cover and access hole	7	No	8,000.00	56,000.00
E07.4	Subsoil drainage 110mm Dia perforated poly ethylene pipe . including a bidum wrapping	468	m	80.00	37,440
E07.5	Exit assembly unit	3	No	8,000	24,000
E07.6	Rounding	1	Sum	365.63	366
	<b>Subtotal</b>				<b>186,000</b>

# Estimate Details-Bus Depot

Code	Description	Quantity	Unit	Rate	Total
<b>E08</b>	<b>Pavement and Surfacing</b>				
	<b>Pavement and Surfacing</b>				
	<u>Carriageway</u>				
E08.1	Sawcut existing pavement surfacing		m		0
E08.2	Subgrade preparation and testing		m2		0
E08.3	Subgrade Improvement Layer		m3		0
E08.4	[ADD PAVEMENT TYPE]				
E08.5	APXX sub-base - XXmm thick		m3		0
E08.6	Geotextile fabric - Grade 3 membrane seal		m2		0
E08.7	APXX basecourse - XXmm thick		m3		0
E08.8	Extra over (ITEM 5.06) for Cement Modification		m3		0
E08.9	Two coat grade 3/5 chipseal - XXmm thick		m2		0
E08.10	Extra value over for (XX SMA10 etc.) Raised Speed Platform - XXmm thick		m2		0
	<u>Traffic Islands</u>				
E08.11	Traffic island Infill - Coloured concrete XXMPa		m2		0
E08.12	Rounding	1	Sum	0.00	0
E08.13	<b>Subtotal</b>				<b>0</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E08</b>	Sidewalk				
E08 .1	Allowance for Asphalt surfacing	12,895	m2	200.00	2,578,943
E08 .2	Concrete foot Path	57	m2	150.00	8,501
E08 .3	Rounding	1	Sum	556.63	557
	<b>Subtotal</b>				<b>2,588,000</b>

# Estimate Details-Bus Depot

Code	Description	Quantity	Unit	Rate	Total
<b>E10</b>	<b>Traffic Services</b>				
	<b>Pavement markings and markers</b>				
E10.1	White road marking, 100mm wide line, continuous	2,594	m	7	18,158
E10.2	White arrows	7	no	150	1,050
E10.3	Blue paint walkway	57	m2	80	4,534
E10.4	NSAAT yellow road marking, 100mm wide line	212	m	7	1,484
E10.5	Allowance for signage	1	Sum	7,000.00	7,000
E10.6	Rounding	1	Sum	774.40	774
	<b>Subtotal</b>				<b>33,000</b>

Code	Description	Quantity	Unit	Rate	Total
E11	Services / Utilities/ toilets				
	<b>Water service</b>				
E11.1	Fire hydrant	5	No.	4,240	21,200
E11.2					
E11.3	Street lights Double Luminaire	8	No.	12,000.00	96,000
E11.4	Rounding	1	Sum	800.00	800
	<b>Subtotal</b>				<b>118,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E14</b>	Landscaping				
	<b>Garden bed</b>				
E14.1	Typical garden bed with 150mm cultivated sub grade, 400mm screened top soil and 75mm mulch	4,020	m2	180	723,607
	<b>Planting and landscape finishes</b>				
E14.2	Mixed groundcover planting to garden beds	4,020	m2	40	160,802
E14.3	Round	1	Sum	591	591
	<b>Subtotal</b>				<b>885,000</b>



Code	Description	Quantity	Unit	Rate	Total
<b>E17</b> Miscellaneous Work (Fences, Gates, etc)					
E17.1	Fencing around perimeter	554	m	120.00	66,538
E17.2	Rounding	1	Sum	0.00	462
	<b>Subtotal</b>				<b>67,000</b>

Code	Description	Quantity	Unit	Rate	Total
<b>E19</b>	Simple Building Works Incidental to Civil Engineering Works				
E19.1	Maintenance Garage	1,269	m2	1,500.00	1,903,140
E19.2	Maintenance Facility	132	m2	3,000.00	395,880
E19.3	Toilets	2	no.	130,000.00	260,000
E19.4	Rounding	1	Sum	980.00	980
	<b>Subtotal</b>				<b>2,560,000</b>